



# UCDAVIS

2023-24 General Catalog



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# GENERAL CATALOG HOME

## UC Davis 2023-2024 General Catalog



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The provisions of this General Catalog reflect information as of the date of publication. Content is subject to change without notice. All times are local Pacific time zone (PT), unless otherwise stated. It is the responsibility of the individual student to become familiar with the announcements and regulations of the university contained in this General Catalog.

Programs (majors & minors) are updated for fall term only; once-a-year at the publication date.

Courses are updated & published with effective terms (p. 470), as they are approved. To better understand course descriptions, see About Courses (p. 470). Courses listed in this catalog are subject to change without notice.

UC Davis will provide assistance to the visually impaired regarding the information contained in this catalog; questions should be directed to the office or department concerned.

### Printing the Catalog

To print the entire General Catalog, see General Catalog Archive & Downloads (p. 1397).

To print a single section, like *Animal Science* or *Introduction*, use *Print Options* in the right panel of every web page.

### Editorial & Production Coordination

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Davis, CA 95616-8692

### Disclaimer Notice

*This General Catalog is not a contract nor an offer to enter into a contract. While every effort is made to ensure the accuracy of the information provided in this General Catalog, it must be understood that all courses, course descriptions, designations of instructors, curricular and degree requirements*

*and other academic information described herein are subject to change or elimination at any time without notice or published amendment to this catalog. In addition, The University of California reserves the right to make changes at any time, without prior notice, to other programs, policies, procedures and information, which are described in this General Catalog only as a convenience to its readers. Fees and all other charges are subject to change at any time without notice. Students should consult the appropriate academic or administrative department, school, college, graduate division or other service provider for currently accurate information on any matters described in this General Catalog; contact information is available at <http://ucdavis.edu>.*

# ACADEMIC CALENDARS

All major UC Davis Academic Calendars are maintained by the Office of the University Registrar; see:

- Master Academic Calendar (<https://registrar.ucdavis.edu/calendar/master/>)
- Registration Calendar (<https://registrar.ucdavis.edu/calendar/registration/>)
- Quarter Dates & Deadlines (<https://registrar.ucdavis.edu/calendar/quarter/>)
- Fees & Billing Calendar (<https://registrar.ucdavis.edu/calendar/fees/>)
- University Holidays & Academic Breaks (<https://registrar.ucdavis.edu/calendar/holidays/>)
- Undergraduate Readmission Deadlines (<https://registrar.ucdavis.edu/registration/return/>)

For graduation and commencement dates, see Applying to Graduate (<https://registrar.ucdavis.edu/registration/leave/graduate/>).

For a variety of campus calendars, see the Campus Events calendar (<http://www.ucdavis.edu/calendar/>).

Other important calendars:

- Graduate Student Deadlines & Dates (<https://grad.ucdavis.edu/academics/academic-dates-deadlines/>)
- Summer Sessions Master Calendar (<https://summer-sessions.ucdavis.edu/calendar/master-calendar/>)
- Semester Dates (<https://registrar.ucdavis.edu/calendar/semester/>)

# INTRODUCTION

## UC Davis

For the full UC Davis story, see About UC Davis (<https://www.ucdavis.edu/about/>).



## Visiting the Campus

UC Davis Welcome Center (<http://visit.ucdavis.edu/>); 530-752-2971

During campus closures, see <http://visit.ucdavis.edu>.

Welcome Center normal operating hours:

- Monday-Friday 8:00 a.m.-4:00 p.m. (PT)
- Saturdays 10:00 a.m.-2:00 p.m. (PT)
- Closed Sundays except for Apr 1-Apr 30 10:00 a.m.-2:00 p.m. (PT)

## Campus Tours

Monday-Friday 9:00 a.m. & 1 p.m. (PT) | Saturdays 11:00 a.m. & Sundays, Apr 1-30 11:00 a.m. (PT). Register at <http://visit.ucdavis.edu>.

**UC Davis Virtual Tours** can be accessed at <https://www.ucdavis.edu/about/visit/campus-virtual-tour> (<https://www.ucdavis.edu/about/visit/campus-virtual-tour/>).

## Accreditation

The University of California, Davis has been fully accredited since 1954 by the WASC Senior College & University Commission (WSCUC) (<https://wasc.ucdavis.edu/>), our regional accreditation agency.

In addition, selected UC Davis schools, colleges, and programs are accredited by:

- Accreditation Board for Engineering & Technology
- Accreditation Council for Graduate Medical Education
- Accreditation Review Commission on Education for the Physician Assistant (ARC-PA)
- American Association for Accreditation of Laboratory Animal Care
- American Bar Association
- American Chemical Society
- American Dietetic Association
- American Psychological Association
- American Society of Crime Lab Directors Laboratory Accreditation Board (ASCLD/LAB)
- American Society of Landscape Architects
- Association of American Law Schools

- Association of American Medical Colleges
- Association to Advance Collegiate Schools of Business
- Commission on Collegiate Nursing Education
- Commission on Teacher Credentialing
- Computer Science Accreditation Commission
- Council on Education & Public Health
- Council on Education of the American Veterinary Medical Association
- Intersocietal Commission for the Accreditation of Vascular Laboratories (ICAVL)
- Liaison Committee on Medical Education

Contact the campus Accreditation Liaison Officer (ALO) (<https://wasc.ucdavis.edu/contact/>).

## UC Davis Principles of Community

The University of California, Davis, is first and foremost an institution of learning, teaching, research and public service. UC Davis reflects and is committed to serving the needs of a global society comprising all people and a multiplicity of identities. The university expects that every member of our community acknowledge, value, and practice the following guiding principles.

We affirm the dignity inherent in all of us, and we strive to maintain a climate of equity and justice demonstrated by respect for one another. We acknowledge that our society carries within it historical and deep-rooted injustices and biases. Therefore, we endeavor to foster mutual understanding and respect among the many parts of our whole.

We affirm the right of freedom of expression within our community (<https://diversity.ucdavis.edu/affirm-right-freedom-expression/>). We affirm our commitment to non-violent exchange and the highest standards of conduct and decency toward all. Within this context we reject violence in all forms (<https://diversity.ucdavis.edu/we-reject-violence-all-forms/>). We promote open expression of our individuality and our diversity within the bounds of courtesy, sensitivity and respect. We further recognize the right of every individual to think, speak, express and debate any idea limited only by university regulations governing time, place and manner.

We confront and reject all manifestations of discrimination (<https://diversity.ucdavis.edu/confront-and-reject-all-manifestations-discrimination/>), including those based on race, ethnicity, gender and gender expression, age, visible and non-visible disability, nationality, sexual orientation, citizenship status, veteran status, religious/non-religious, spiritual, or political beliefs, socio-economic class, status within or outside the university, or any of the other differences among people which have been excuses for misunderstanding, dissension or hatred. We recognize and cherish the richness contributed to our lives by our diversity. We take pride in all our achievements, and we celebrate our differences.

We recognize that each of us has an obligation to the UC Davis community of which we have chosen to be a part. We will strive to build and maintain a culture and climate based on mutual respect and caring.

For more information, to learn more about the *Living the Principles of Community* e-learning course, and translations, see Diversity, Equity & Inclusion (<https://diversity.ucdavis.edu/>) & the Principles of Community (<https://diversity.ucdavis.edu/principles-community/>).

## Educational Objectives for Students

The Educational Objectives for Students were adopted by the Academic Senate in April 2002. They articulate our aspirations for student learning; help to establish campus priorities and guide decision making related to student development; and guide academic programs in the review of how their classes and course requirements interact with the goals to demonstrate educational effectiveness.

Develop effective communication skills:

- Written, oral, interpersonal, group

Develop higher cognitive skills:

- Critical thinking, creativity, analytical ability

Cultivate the virtues:

- Ethics, responsibility, honor, tolerance, respect for others, empathy

Develop focus and depth in one or more disciplines.

Develop leadership skills:

- Ability to stimulate and direct collaborative learning and collaborative action

Develop a global perspective:

- Broad intellectual and cultural experience through active engagement, an understanding of the interactions among the individual, society, and the natural world

Prepare for lifelong learning:

- Independent thinking and learning, learning to find information, asking the right questions

## Mission Statement, Philosophy of Purpose

UC Davis is dedicated to academic excellence and serving the public good. As a major research institution, UC Davis takes a holistic approach in addressing the most critical issues faced by the region, state and the world. The university embraces the principles of diversity, inclusion and equity to sustain a culture of mutual respect.

## Colleges & Schools

### College of

- Agricultural & Environmental Sciences (<https://caes.ucdavis.edu/>)
- Biological Sciences (<https://basc.biology.ucdavis.edu/>)
- Engineering (<https://engineering.ucdavis.edu/>)
- Letters & Science (<https://www.ls.ucdavis.edu/>)

### Schools

- Graduate Study (<https://gradstudies.ucdavis.edu/>)
- Betty Irene Moore School of Nursing (<http://nursing.ucdavis.edu/>)
- Graduate School of Management (<http://gsm.ucdavis.edu/>)
- School of Education (<http://education.ucdavis.edu/>)
- School of Law (<https://law.ucdavis.edu/>)

- School of Medicine (<https://health.ucdavis.edu/medschool/>)
- School of Veterinary Medicine (<https://www.vetmed.ucdavis.edu/>)

## Research Programs & Resources

### Organized Research Units

- Air Quality Research Center (AQRC) (<http://airquality.ucdavis.edu/>)
- Bodega Marine Laboratory & Reserve (<http://bml.ucdavis.edu/>)
- California National Primate Research Center (<http://www.cnprc.ucdavis.edu>)
- Center for Health & the Environment (<http://che.ucdavis.edu/>)
- Crocker Nuclear Laboratory (<http://crocker.ucdavis.edu>)
- Institute for Global Nutrition (<https://globalnutrition.ucdavis.edu/>)
- Institute of Transportation Studies (<https://its.ucdavis.edu/>)
- John Muir Institute of the Environment (<http://johnmuir.ucdavis.edu/>)

### Additional Research Centers & Resources

- Advanced Highway Maintenance & Construction Technology (AHMCT) Research Center (<https://ahmct.ucdavis.edu/>)
- Advanced Materials Characterization & Testing Laboratory (AMCaT) (<https://amcat.ucdavis.edu/>)
- Agricultural Sustainability Institute (<http://asi.ucdavis.edu/>)
- California Agricultural Experiment Station (<http://www.caes.ucdavis.edu/research/aes/>)
- Center for Child & Family Studies (<http://ccfs.ucdavis.edu>)
- Center for Geotechnical Modeling (<http://cgm.engineering.ucdavis.edu>)
- Center for Information Technology in the Interest of Society (CITRIS) (<https://citrис-uc.org/>)
- Center for Mind & Brain (<http://mindbrain.ucdavis.edu>)
- Center for Molecular Genomic Imaging (CMGI) (<https://cmgi.ucdavis.edu>)
- Center for Nano-MicroManufacturing (<https://cnm2.ucdavis.edu>)
- Center for Neuroscience (<http://neuroscience.ucdavis.edu>)
- Center for Plant Diversity (<https://caes.ucdavis.edu/outreach/museums/center-for-plant-diversity-herbarium/>)
- Center for Population Biology (<http://cpb.ucdavis.edu>)
- Center for Poverty & Inequality Research (<https://poverty.ucdavis.edu>)
- Center for Science & Innovation Studies (<http://innovation.ucdavis.edu>)
- Coastal & Marine Sciences Institute (<http://cmsi.ucdavis.edu>)
- Computational Research Service (CRS) (<https://crs.ucdavis.edu>)
- Computer Security Laboratory (<http://seclab.cs.ucdavis.edu>)
- Energy & Efficiency Institute (<http://energy.ucdavis.edu>)
- Genome Center (<http://genomecenter.ucdavis.edu>)
- Human Performance Laboratory (<http://hpl.ucdavis.edu>)
- Humanities Institute (<http://dhi.ucdavis.edu>)
- J. Amorocho Hydraulics Laboratory (JAHL) (<http://jahl.engr.ucdavis.edu>)
- Mann Laboratory; 530-754-8313
- Natural Reserve System (<https://naturalreserves.ucdavis.edu>)
- Nuclear Magnetic Resonance Facility (<http://www.nmr.ucdavis.edu>)
- Sustainable Transportation Energy Pathways (STEPS) Plus (<https://stepsplus.ucdavis.edu>)
- Tahoe Environmental Research Center (TERC) (<http://terc.ucdavis.edu>)
- UC Agricultural Issues Center (<http://www.aic.ucdavis.edu>)
- UC Pavement Research Center (<http://www.ucprc.ucdavis.edu>)
- X-Ray Crystallographic Laboratory (<http://chemgroups.ucdavis.edu/%7Exray/admin.htm>)

## Administrative Offices & U.C. Governance

Chancellor (<https://www.ucdavis.edu/about/administration/>)  
Provost & Executive Vice Chancellor (<https://www.ucdavis.edu/about/administration/>)  
Vice Chancellors (<https://www.ucdavis.edu/about/administration/>)  
Vice Provosts (<https://www.ucdavis.edu/about/administration/>)  
Associate/Assistant Vice Chancellors (<https://www.ucdavis.edu/about/administration/>)  
Chief Campus Counsel (<https://campuscounsel.ucdavis.edu/>)  
Chief Executive Officer—Medical Center (<https://ombuds.ucdavis.edu/>)  
Ombuds (<https://ombuds.ucdavis.edu/>)  
University Librarian (<https://www.library.ucdavis.edu/about/university-librarian/>)  
Registrar (<https://registrar.ucdavis.edu/about/staff/registrar/>)

## Directors

Cal Aggie Alumni Association (<https://www.alumni.ucdavis.edu/about/contact-us/>)  
Financial Aid (<https://financialaidmigrate.sf.ucdavis.edu/contact/>)  
Intercollegiate Athletics (<https://ucdavisaggies.com/staff-directory/>)  
Mondavi Center for the Performing Arts (<https://www.mondaviarts.org/about-us/staff/>)  
News & Media Relations (<https://strategiccommunications.ucdavis.edu/who-we-are/news-and-media-relations/>)  
Enterprise Infrastructure Services (<https://iet.ucdavis.edu/unit/enterprise-student-applications/>)  
Student Health & Wellness Center (<https://shcs.ucdavis.edu/about/staff/>)  
Student Housing (<https://housing.ucdavis.edu/contact-us/>)  
World Food Center (<https://worldfoodcenter.ucdavis.edu/about/>)  
Agricultural & Environmental Sciences, College of (<https://caes.ucdavis.edu/about/directory/directory-org/>)  
Betty Irene Moore School of Nursing ([http://www.ucdmucdavis.edu/nursing/ourteam/faculty/faculty\\_](http://www.ucdmucdavis.edu/nursing/ourteam/faculty/faculty_))  
Biological Sciences, College of (<https://biology.ucdavis.edu/about/leadership/college-leadership/>)  
Education, School of (<https://education.ucdavis.edu/deans-office/>)  
Engineering, College of (<https://engineering.ucdavis.edu/about/college-leadership/>)  
Graduate Studies (<https://grad.ucdavis.edu/about-us/leadership/>)  
Letters & Science, College of (<https://www.ls.ucdavis.edu/our-college/office-dean/>)  
Management, Graduate School of (<https://gsm.ucdavis.edu/staff-leadership/>)  
Medical Center, School of Medicine (<https://health.ucdavis.edu/medschool/leadership.html>)  
Medicine, School of (<https://health.ucdavis.edu/medschool/somsenate/>)  
Nursing, Betty Irene Moore School of (<http://www.ucdmucdavis.edu/nursing/ourteam/leadership/>)  
Veterinary Medicine, School of (<https://www.vetmed.ucdavis.edu/about/leadership/>)  
UC Davis Continuing & Professional Education (<https://extension.ucdavis.edu/about-us/>)

## UC Governance

Board of Regents (<https://regents.universityofcalifornia.edu/about/members-and-advisors/>)

## CHANCELLOR'S MESSAGE



A degree from UC Davis is one that commands respect in graduate schools and the workplace worldwide. As part of our thriving community, you have an incredible opportunity to learn from some of the best and brightest professors and students from around the globe.

You're joining a community that's driven by curiosity and motivated to solve the world's greatest problems. Our research and innovations help feed a growing population, sustain our natural resources, advance health worldwide, and better understand how interconnected humanity is.

At UC Davis, you can develop new ways of thinking, seeing, and being. You can challenge limitations and outgrow the expected. The personal touch, social engagement, and passion for learning you bring to UC Davis elevates the university as a whole.

I wish you much success in your studies and all your future endeavors.

Gary S. May, Chancellor

# UNDERGRADUATE ADMISSIONS

Undergraduate Admissions (<https://www.ucdavis.edu/admissions/undergraduate/contact/>)

One Shields Avenue  
Davis, CA 95616-8507

Welcome Center Advising (<https://www.ucdavis.edu/about/visit/>)  
Campus Tours (<https://www.ucdavis.edu/about/visit/campus-tour/>)

## Applying to UC Davis

### Freshman Admission

- Admission Requirements (<https://www.ucdavis.edu/admissions/undergraduate/freshman/>)
- Special Situations (<https://www.ucdavis.edu/admissions/undergraduate/freshman/special-situations/>)

### Transfer Admission

- Admission Requirements (<https://www.ucdavis.edu/admissions/undergraduate/transfer/>)
- Special Situations (<https://www.ucdavis.edu/admissions/undergraduate/transfer/special-situations/>)
- UC Intercampus Transfer.* Undergraduate students who are currently or were previously registered at another UC campus and have not since registered at a non-UC institution may apply for transfer to UC Davis. Filing dates, application, fees/waivers and requirements are the same as for new undergraduate transfer applicants.

### AP & IB Examination Credit

International Admission Requirements (<https://www.ucdavis.edu/admissions/undergraduate/international/>)

Application Fees (<https://www.ucdavis.edu/admissions/undergraduate/apply/>) | Fee Waivers (<https://www.ucdavis.edu/admissions/undergraduate/apply/>)

### Application Filing Periods

Apply for Admission (<https://www.ucdavis.edu/admissions/undergraduate/apply/>)

## After You Apply for Admission

Next Steps (<https://www.ucdavis.edu/admissions/cost/next-steps/>)

UC Transfer Academic Update (TAU) (<https://admission.universityofcalifornia.edu/how-to-apply/applying-as-a-transfer/after-you-apply/transfer-academic-update.html>)

Reporting Changes After Admission (<https://www.ucdavis.edu/admissions/undergraduate/apply/after-reporting-changes/>)

Deferred Enrollment (<https://www.ucdavis.edu/admissions/undergraduate/apply/deferred-enrollment/>)

## Examination Credit

The University awards credit for successful completion of the College Board (p. 18)Advanced Placement (AP) and the International Baccalaureate Higher Level Examinations (IB) (p. 20). Students must have official test score reports sent directly from the testing service to UC Davis to receive credit. Students will meet with advising staff during New Student Orientation to discuss which courses or requirements they may have satisfied based on transfer credit for scores in these examinations.

## Advanced Placement Credit & Chart

Students who earn scores of 3, 4, or 5 on College Board Advanced Placement Examinations taken before high school graduation will receive 2, 4, or 8 units of credit toward graduation at UC Davis for each such test completed with the required scores, provided official scores are submitted to the Office of Admissions.

Students should be advised that college courses taken before or after attending UC may duplicate AP, IB and/or A Level (GCE) examinations. Additionally, exams may duplicate each other; for example, an AP or IB exam in the same subject area. If the student does duplicate an exam with another exam of the same subject content, and/or an exam with a college course, we will award credit only once.

Note: Advanced Placement credit earned prior to entering the university will not be counted toward maximum unit limitations either for the selection of a major or for graduation.

Updated Jun 14, 2023

- 2D & 3D Art & Design:* Removed "Studio Art."
- Italian Language & Culture:* Italian 004 & 005 changed to Italian 021 & 022.
- Latin Literature:* Removed.
- Physics 1 & 2:* Removed "beginning S15."
- Physics B:* Removed.

AP Exam with Score of 3 or 4 or 5	Units Awarded	UC Davis Course Equivalent	Duplicate Credit Allowed
2D Art & Design (Studio Art) <sup>1</sup>	8	None	N/A
3D Art & Design (Studio Art) <sup>1</sup>	8	None	N/A
Art History	8	Exam prior to 2020 with score of 5 receive credit for Art History 001A/B/C. Effective May 2020, Art History 001A/B/C no longer awarded	N/A
Biology	8	Biological Sciences 010	No
Calculus AB (or AB subscore of BC exam) <sup>1</sup>			
With score of 3	4	None	N/A
With score of 4 or 5	4	Mathematics 012, 016A, 017A or 021A	Math 012 No
Calculus BC <sup>1</sup>			
With score of 3 or 4	8	Mathematics 012, 016A, 017A, 019A or 021A	Math 012 No
With score of 5	8	Mathematics 012, 016A/B, 017A/B, 019A/B or 021A/B	Math 012 No
Chemistry			
With score of 3 or 4	8	Chemistry 010	No

With score of 5	8	Chemistry 02A	Yes	Physics 1 (beginning S15) <sup>1</sup>	With score of 3	8	None	N/A
Chinese Language & Culture	8	Consult with Department	N/A	With score of 4 or 5	8	Physics 001A/B	No	
Comparative Government & Politics	4	Exams prior to 2015 receive credit for Political Science 002. Effective May 2015, Political Science 002 no longer awarded credit	N/A	Physics 2 (beginning S15) <sup>1</sup>	With score of 3	8	None	N/A
Computer Science A (through S17) <sup>2</sup>	2 or 8	Engineering Computer Science 032A	No	With score of 4 or 5	8	Physics 001A	No	
Computer Science Principles (effective S17)	8	Engineering Computer Science 015	Yes	Physics B (last offered S14) <sup>1</sup>	With score of 3	8	None	N/A
Drawing (Studio Art) <sup>1</sup>				With score of 4 or 5	8	Physics 001A/B	No	
With score of 3	8	None	N/A	Physics C: Mechanics <sup>1</sup>	With score of 3	4	None	N/A
With score of 4 or 5	8	Art Studio 002	No	With score of 4 or 5	4	Physics 001A	No	
English—Language & Composition or Literature & Composition <sup>1</sup>				Physics C: Electricity & Magnetism <sup>1</sup>	4	None	N/A	
With score of 3	8	None	N/A	Psychology	With score of 3 or 4	4	None	N/A
With score of 4 or 5	8	English 003, University Writing Program 001	No	With score of 5	4	Psychology 001	No	
Environmental Science	4	Environmental Science & Policy 10	No	Spanish Language & Culture <sup>1</sup>	With score of 3	8	Spanish 021	No
European History	8	History 004B/C	Yes	With score of 4	8	Spanish 022	No	
French Language & Culture <sup>1</sup>				With score of 5	8	Spanish 023	No	
With score of 3	8	French 003	No	Spanish Literature & Culture	With score of 3	8	Spanish 023	No
With score of 4	8	French 021	No	With score of 4 or 5	8	Spanish 024	No	
With score of 5	8	French 022	No	Statistics	With score of 3	4	None	N/A
German Language & Culture <sup>1</sup>				With score of 4 or 5	4	Statistics 013	Yes	
With score of 3	8	German 003	No	United States Government & Politics	4	None	N/A	
With score of 4	8	German 020	No	United States History	8	History 017A/B	Yes	
With score of 5	8	German 021	No	World History:	8	History 010B/C	Yes	
Human Geography	4	Landscape Architecture 010	Yes	Modern				
Italian Language & Culture <sup>1</sup>								
With score of 3	8	Italian 003	No					
With score of 4	8	Italian 004	No					
With score of 5	8	Italian 005	No					
Japanese Language & Culture	8	Consult with Department	N/A					
Latin	8	Latin 002	No					
Latin Literature	4	None	N/A					
Macroeconomics	4	Economics 001B	Yes					
Microeconomics	4	Economics 001A	Yes					
Music Theory	8	Music 003A	No					

<sup>1</sup> A maximum of 8 units EACH in art studio, English, mathematics, physics, and language other than English is allowed. The Physics B exam is no longer offered.

<sup>2</sup> The change from 2 units to 8 units for AP Computer Science A was approved for students matriculating at a UC campus in fall 2018 or later. Students who matriculated in fall 2018 may earn 8 units for the exam if it was taken in spring 2018 or later.

To have AP scores sent to UC Davis, contact:

AP Services at 609-771-7300 or 888-225-5427; use the UC Davis CEEB code 004834; View Your AP Scores (<https://apstudents.collegeboard.org/view-scores/>). Older CollegeBoard test scores require additional fulfillment time.

## International Baccalaureate Credit & Chart

Students who earn scores of 5, 6, or 7 on International Baccalaureate (IB) Higher Level (HL) Examinations taken before high school graduation will receive 8 units of credit toward graduation at UC Davis for each such test completed with the required scores, provided official scores are submitted to the Office of Admissions. Students who complete the IB diploma with a score of 30 or above will receive 6 quarter units in addition to the units earned for individual Higher Level exams (effective S20). The university does not grant credit for Standard Level (SL) exams.

Students should be advised that college courses taken before or after attending UC may duplicate AP, IB and/or A Level examinations. Additionally, exams may duplicate each other; for example, an AP or IB exam in the same subject area. If the student does duplicate an exam with another exam of the same subject content, and/or an exam with a college course, we will award credit only once.

Note: International Baccalaureate credit earned prior to entering the university will not be counted toward maximum unit limitations either for the selection of a major or for graduation.

Note: This is not a comprehensive list. If your exam is not listed, credit will be determined in consultation with an advisor.

**Updated Jun 14, 2023**

- *Italian A1:* Italian 004, 005 changed to Italian 021, 022.
- *Italian A: Literature:* Italian 004, 005 changed to Italian 021, 022.

IB Higher Level (HL) Exam with score of 5 or 6 or 7 Awarded	Units	UC Davis Course Equivalent	Duplicate Credit Allowed
Biology	8	Biological Science 010	No
Business Management	8	None	N/A
Chemistry	With score of 5 or 6	Chemistry 010	No
	With score of 7	Chemistry 002A	Yes
Classical Greek	8	Greek 001, 002	Yes
Computer Science	8	None	N/A
Dance	8	None	N/A
Economics	8	Economics 001A/B	No
English A1 <sup>1</sup>	8	English 003	No
English A2	8	None	N/A
English A: Literature <sup>1</sup> or English A: Language & Literature <sup>1</sup>	8	English 003	No
English B	8	None	N/A
Film	8	None	N/A
French A1	8	French 021, 022, 023	No

French A2	8	French 021, 022	No
French A: Language & Literature;	8	French 021, 022, 023	No
Literature			
French B	8	French 001, 002, 003	No
Geography	8	None	N/A
German A1; German A2	8	German 001, 002	No
German A: Language & Literature	8	German 001, 002, 003	No
German A: Literature	8	German 001, 002	No
German B	8	German 001, 002	No
Global Politics	8	None	N/A
History of Africa	8	History 015	Yes
History of the Americas	8	History 017A/B	Yes
History of Europe	8	History 004C	Yes
History of Europe & the Islamic World	8	None	N/A
History of Europe & the Middle East	8	None	N/A
History of the Islamic World	8	History 006	Yes
History of Southeast Asia & Oceania	8	None	N/A
Italian A1	8	Italian 004, 005	No
Italian A2	8	None	N/A
Italian A: Language & Literature	8	Italian 009	No
Italian A: Literature	8	Italian 004, 005	No
Italian B	8	None	N/A
Languages other than English (if not listed separately)	8	See department for level placement	
Latin	8	Latin 001, 002	Yes
Mathematics: Analysis & Approaches (beginning S21)	8	Math 021A/B	Yes
Mathematics (last offered F20)	8	Math 016A/B, 017A/ B, 021A/B	Yes
		Credit for one math series only	
Mathematics, Further (last offered S20)	8	Math 022A	Yes
Music	8	Music 010	Yes
Philosophy	8	Philosophy 001	No
Physics	8	Physics 001A/B	No
Portuguese B	8	Portuguese 001, 002, 003, 008	
Psychology	8	Psychology 001	No
Social & Cultural Anthropology	8	Anthropology 002	Yes
Spanish A	8	None	N/A
Spanish B	8	None	N/A

Theatre	8	None	N/A
Visual Arts	8	None	N/A
IB Diploma (30+ points)	6	None	N/A

<sup>1</sup> 6 or higher on the Standard Level (SL) exam satisfies the university Entry Level Writing Requirement, but does not result in any course credit.

Students who complete the IB diploma with a score of 30+ will receive 6 quarter units towards their UC degree, in addition to the units earned for individual Higher Level exams (effective S20).

The university does not grant credit for Standard Level (SL) exams.

**To have IB scores sent to UC Davis, contact:**

International Baccalaureate Office at US +1 301 202 3025; More contact options; Requesting IB transcripts & certificates.

## AP & IB Charts Archive

- 2023-2024: AP ([http://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/APCurrent.pdf](http://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/APCurrent.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IBCurrent.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IBCurrent.pdf))
- 2022-2023: AP ([http://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20222023.pdf](http://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20222023.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20222023.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20222023.pdf))
- 2021-2022: AP ([http://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20212022.pdf](http://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20212022.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20212022.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20212022.pdf))
- 2020-2021: AP ([http://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20202021.pdf](http://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20202021.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20202021.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20202021.pdf))
- 2019-2020: AP ([http://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20192020.pdf](http://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20192020.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20192020.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20192020.pdf))
- 2018-2019: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20182019.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20182019.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20182019.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20182019.pdf))
- 2017-2018: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20172018.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20172018.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20162018.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20162018.pdf))
- 2016-2017: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20162017.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20162017.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20162018.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20162018.pdf))
- 2014-2016: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20142016.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20142016.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20142016.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20142016.pdf))
- 2012-2014: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20122014.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20122014.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20122014.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20122014.pdf))

- resources.ucdavis.edu/local\_resources/docs/APIBCharts/IB20122014.pdf)
- 2010-2012: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20102012.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20102012.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20102012.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20102012.pdf))
- 2008-2010: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20082010.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20082010.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20082010.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20082010.pdf))
- 2006-2008: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20062008.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20062008.pdf)) | IB ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/IB20062008.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/IB20062008.pdf))
- 2004-2006: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20042006.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20042006.pdf))
- 2002-2004: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20022004.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20022004.pdf))
- 2000-2002: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP20002002.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP20002002.pdf))
- 1999-2000: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP19992000.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP19992000.pdf))
- 1998-1999: AP ([https://local-resources.ucdavis.edu/local\\_resources/docs/APIBCharts/AP19981999.pdf](https://local-resources.ucdavis.edu/local_resources/docs/APIBCharts/AP19981999.pdf))

# FEES, EXPENSES, & FINANCIAL AID

Give careful consideration to the total financing of your university education. If you need funds beyond those that you and your family can provide, you should apply for financial aid well in advance of enrollment. There are deadlines for applying for financial aid; grants, loans, Work Study and scholarships.

For current student fee information, see Tuition & Fees (<https://financeandbusiness.ucdavis.edu/student-resources/tuition-fees/>). Every student must pay the quarterly fees, and any amounts charged to the student account, in full by the fee payment deadlines in the Fees & Billing calendar (<https://registrar.ucdavis.edu/calendar/fees/>). A Deferred Payment Plan (DPP) (<https://afs.ucdavis.edu/student-resources/accounting/mybill/dpp/>) is available, allowing students to pay quarterly tuition & fees, health insurance, document, orientation, international, equitable access and housing fees in three monthly installments, or semester fees in four monthly installments.

## Course Materials & Service Fees

Students may be charged fees in some courses for the use, rental or consumption of materials, tools or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials fees may cover the purchase of chemicals and glassware for a science laboratory or art supplies for an art studio class. They might also cover film rentals, field trips, or the purchase or rental of specific equipment. Courses that may be subject to the course materials and services fee are noted in the Schedule Builder (<https://registrar.ucdavis.edu/registration/register-for-classes/schedule-builder/>). The course materials & services fees list is available at Tuition & Fees (<https://financeandbusiness.ucdavis.edu/student-resources/tuition-fees/>).

## Part-Time & Employee Students Fees

### Part-Time Students Fees

Students approved for part-time status for tuition purposes are assessed one-half of Tuition. Nonresident students are also assessed one-half of Nonresident Supplemental Tuition. There is no reduction in the Student Services Fee or in any of the campus-base fees. For more information and specific requirements, see Part-Time Status (<https://registrar.ucdavis.edu/registration/part-time/>).

### UC Employee-Student Reduced Fees

Reduced fees are available to UC career employees and certain UC retirees who are qualified for admission to the university. For full information, see UC Employee-Student Reduced Fee (<https://registrar.ucdavis.edu/tuition/employee-student-reduced-fee/>).

## Parking & Bicycle Fees

### Vehicle Parking Permit & Bicycle Licensing Fees

Parking permit information & rates ([https://taps.ucdavis.edu/types\\_and\\_rates/](https://taps.ucdavis.edu/types_and_rates/)) or 530-752-8277. A California State bicycle license sticker is required on all bicycles operated on campus; full information

([https://taps.ucdavis.edu/bicycleprogram/parking\\_security/#register](https://taps.ucdavis.edu/bicycleprogram/parking_security/#register)) or 530-752-2453.

## Costs for a Year at UC Davis

For the most recent Cost of Attendance figures, see undergraduate (<https://financialaid.ucdavis.edu/undergraduate/cost/>); graduate/professional (<https://financialaid.ucdavis.edu/graduate/gradstudies/cost/>).

## International Student Expenses

International students are responsible for all of their expenses while studying at UC Davis. The expenses include nonresident supplemental tuition, systemwide tuition & fees, campus-based fees, room & board, books and a modest amount for personal expenses. For the latest costs, see Cost of Attendance (<http://financialaid.ucdavis.edu/undergraduate/cost.html>). It is extremely important that students arrive on campus with sufficient funds for the entire academic year to cover all fees, tuition and expenses such as room & board, health insurance, books, supplies, transportation and other miscellaneous expenses. Careful budgeting is essential for international students.

During the admission process, most international undergraduate students are required to demonstrate that they have financial support and that these funds are available for nine months. Students need to have adequate, reliable and continuing financial support for the whole time they are here. After students arrive in the United States, it is extremely difficult to obtain additional funding. The university does not offer grants or financial aid to international undergraduate students.

## Fee Refunds

UC Davis follows the University of California's systemwide refund procedures (<https://www.ucop.edu/operating-budget/fees-and-enrollments/other-fee-information/payment-refunds.html>). Any refund is based on the Schedule of Refunds (<https://registrar.ucdavis.edu/registration/leave/refunds/>). When considering a leave of absence or separating from the university, any refund is based upon the number of *calendar days* elapsed from when instruction begins for the term to when such request is submitted.

Cancellation or Withdrawal From the University (<https://registrar.ucdavis.edu/registration/leave/>) | Planned Educational Leave Program (PELP) (<https://registrar.ucdavis.edu/registration/leave/>) | University of California Student Health Plan (SHIP) (<https://shcs.ucdavis.edu/insurance/>) | UC Davis Graduate Studies Filing Fee (<https://grad.ucdavis.edu/filing-fee/>)

## Residence for Tuition Information

For complete information for determination of residence for tuition, see Tuition & Residence (<https://registrar.ucdavis.edu/tuition/>).

## Financial Aid

Financial Aid & Scholarships (<https://financialaid.ucdavis.edu/>) provides financial assistance in the form of grants, scholarships, loans, and Work-Study employment. To apply, undergraduates and graduate students are required to annually file the Free Application for Federal Student Aid (FAFSA) (<https://studentaid.ed.gov/sa/fafsa/>), or the California Dream Act Application (CADA) (<http://dream.csac.ca.gov/>).

UC Education Finance Policy for Undergraduates (<https://financialaid.ucdavis.edu/undergraduate/types/need/>) | Graduate Student Funding (<https://financialaid.ucdavis.edu/graduate/>)

## Satisfactory Academic Progress

Federal regulations require that undergraduate and graduate student financial aid recipients meet the published Standards for Satisfactory Academic Progress (SAP) for Financial Aid concerning GPA, Pace of Progression, and Maximum Timeframe of attempted units allowed to obtain a degree; see Satisfactory Academic Progress (SAP) (<https://financialaid.ucdavis.edu/consumer/sap/standards/>).

## Financial Aid Types

### Grants

A grant is an award that does not have to be repaid as long as the student remains eligible. Whenever criteria and funding levels permit, a student's financial aid award includes grants; see Available Grant Awards (<https://financialaid.ucdavis.edu/undergraduate/types/grants/>).

### Loans

Financial aid often includes a long-term loan; see Undergraduate Student Loans (<https://financialaid.ucdavis.edu/loans/undergraduate/>) or Graduate Student Loans (<https://financialaid.ucdavis.edu/graduate/loans/>).

### Work-Study

#### Work-Study for Undergraduate Students

**Undergraduate Work-Study** allows students to earn part of their financial aid through part-time employment; see Work-Study for Undergraduate Students (<https://financialaid.ucdavis.edu/undergraduate/types/work-study/>).

**Community Service Work-Study** offers a wide variety of community service jobs available for students who apply for Work-Study funding; see Work-Study for Undergraduate Students (<https://financialaid.ucdavis.edu/undergraduate/types/work-study/>).

#### Work-Study for Graduate Students

Work-Study funds for graduate students are allocated directly to the chairpersons of the graduate programs; see Work-Study for Graduate Student Researchers (<https://financialaid.ucdavis.edu/graduate/work-study/>).

### Scholarships

With their UC admissions application, first-year students are automatically considered for campus scholarships. Continuing students are encouraged to apply every academic year for consideration. Students may also apply for Outside and Prestigious Scholarships; see Undergraduate & Prestigious Scholarships (<https://financialaid.ucdavis.edu/scholarships/>).

## Undergraduate Scholarships & Awards

Undergraduates with outstanding academic records are encouraged to apply for scholarships. For information about the scholarship application process, see Undergraduate & Prestigious Scholarships (<http://financialaid.ucdavis.edu/scholarships/>).

# STUDENT LIFE

As a UC Davis student, you're part of a creative, innovative community. Located in a vibrant college town where bicycles abound and students make up half the population, UC Davis offers resources to create your unique path whether you have established academic and career goals or are still open to opportunities. Living-learning communities and welcoming student centers (<https://studentaffairs.ucdavis.edu/student-life/communities/>) are spaces for exploring and affirming diverse identities. The campus's multiple advising, tutoring, leadership and career resources will help you excel and achieve your aspirations, and the array of UC Davis professional schools—business, law, veterinary medicine and medicine—offer unique opportunities for undergraduates. With over 750 student organizations, you will find supportive groups that share your interests and passions, and when it's time to get active, options at UC Davis encompass everything from arts & crafts to indoor rock climbing.

## Living at Davis On-Campus Housing

Student Housing & Dining Services (<https://housing.ucdavis.edu/>)

UC Davis students who live on campus benefit from being close to classes and study opportunities, campus dining (<http://dining.ucdavis.edu/>), and campus life (<https://www.ucdavis.edu/campus-life/>). They also tend to do better academically and are more involved in campus (<https://housing.ucdavis.edu/value/>).

All incoming fall quarter freshmen and the first 1000 transfer students who apply are guaranteed housing (<https://housing.ucdavis.edu/guaranteed-housing/>) in Student Housing, provided they meet eligibility requirements and all Student Housing and university deadlines.

Student Housing also has a limited number of housing options for families (<https://housing.ucdavis.edu/family-housing/>) and graduate students (<https://housing.ucdavis.edu/graduate-and-professional-housing/>).

All other students should contact Student Housing to inquire about their housing options.

For more information about housing, see the following:

- Residence Halls (<https://housing.ucdavis.edu/residence-halls/>)
- Apartments (<https://housing.ucdavis.edu/apartments/>)
- Capital Projects (<https://housing.ucdavis.edu/capital-projects/>)

## Off-Campus Housing

The majority of UC Davis students live off campus. There are many apartments for rent in the City of Davis, from one-person studio apartments to five- or six-person suites. Townhouses, duplexes and houses throughout the city are also available for student rental. Associated Students, University of California, Davis (ASUCD (<https://asucd.ucdavis.edu/>)) maintains a list of available community housing (<https://chl.ucdavis.edu/>) and, early every year, hosts Housing Day (<https://housing.ucdavis.edu/returning-students-program/>), an event that brings dozens of local housing managers to campus to introduce their communities to UC Davis students.

## Transportation & Parking

### Transportation Services

Transportation Services (TS) (<https://taps.ucdavis.edu>)

The restricted, gated central campus is closed to unauthorized motor vehicles. Walking and bicycling are the most common ways to traverse the campus. For complete information, see Transportation Services (TS) (<https://taps.ucdavis.edu>).

Bicycles (<http://taps.ucdavis.edu/bicycle/>) | Parking (<https://taps.ucdavis.edu/parking/>) | Motorist Assistance (<https://taps.ucdavis.edu/parking/assistance/>) | Commute Options (<http://taps.ucdavis.edu/transportation/>)

### Buses

Unitrans (<https://unitrans.ucdavis.edu>) provides year-round public transit bus service across Davis from two main UC Davis campus bus terminals—the Memorial Union and Silo Bus Terminals. Information on bus schedules and fares is available at Unitrans (<https://unitrans.ucdavis.edu>) or 530-752-2877.

## WorkLife

Heitman Staff Learning Center (<http://worklife-wellness.ucdavis.edu>); WorkLife (worklife@ucdavis.edu); 530-754-8791

WorkLife is the principle resource on campus for resource, referral, and programming that support students, faculty, and staff to meet their responsibilities both at work and at home, enabling them to bring their best selves to school/work. For services addressing child and family care, lactation support, flexible work arrangements, recognition, and employee engagement, see WorkLife (<http://worklife-wellness.ucdavis.edu>).

## Health & Counseling Services

### Student Health & Counseling Services (SHCS)

#### Medical Services

Student Health & Wellness Center (<https://shcs.ucdavis.edu>); Appointments: 530-752-2349; General information: 530-752-2300

Student Health Services provides wellness resources and cost-sensitive medical care tailored to the unique and diverse needs of UC Davis students. All registered students choose a primary care provider (PCP) who coordinates their wellness care and treatment needs. SHCS staff includes physicians, nurse practitioners, registered nurses, physical therapists, dietitians and health educators. Pharmacy, lab, and x-ray services are available. Medical care is provided at the Student Health & Wellness Center (<http://campusmap.ucdavis.edu/?b=146>). Services are available to all registered students regardless of insurance coverage. After hours, students can speak with an advice nurse at 530-752-2349. To read about services and fees, make an appointment, get urgent care information, or contact an advice nurse after hours, see Services (<https://shcs.ucdavis.edu/medical-services/>).

### Student Health Insurance

The University of California (UC) requires that all students have health insurance. To ensure this requirement is met, all UC students are

automatically enrolled in UC Student Health Insurance Plan (UC SHIP) and fees for coverage are charged to your student account each term. UC SHIP includes medical, dental and vision benefits. Students with comparable health insurance can apply for a UC SHIP student health insurance waiver (<https://shcs.ucdavis.edu/insurance/waiver/>). For complete information, see Insurance (<https://shcs.ucdavis.edu/insurance/>).

## Immunizations

All incoming new, transfer and graduate students, including students in the Veterinary Medicine and School of Nursing programs, are required to meet the UC Immunization & TB Risk Screening requirement (<https://shcs.ucdavis.edu/services/primary-care/>). Students become compliant with this requirement by entering their vaccination dates, uploading a copy of their immunization records, and completing the TB Risk Screening Questionnaire via the SHCS Health-e-Messaging (<https://hem.ucdavis.edu/>) website.

**Students who do not complete this requirement will have a hold on their registration and will not be able to register for their second term.**

## Counseling Services

Student Health & Counseling Services (SHCS) (<https://shcs.ucdavis.edu/>); 219 North Hall; Appointments: 530-752-0871; General information: 530-752-2300

SHCS Counseling Services offers short-term individual counseling services to all registered students, as well as group therapy and workshops. There are also case managers and mental health advocacy specialists who assist in using insurance and referrals to community resources. To make a counseling or case management appointment, or for consultations, call 530-752-0871. Students can also schedule appointments online through the SHCS Patient Portal (<https://hem.ucdavis.edu/>). Mental Health Crisis Consultation Services are available at Counseling Services (<https://shcs.ucdavis.edu/about/locationshours/>) at 219 North Hall, and in the Student Health & Wellness Center (<https://shcs.ucdavis.edu/about/locationshours/>) in Acute Care. If you need to speak to someone on the weekend, holiday, or after hours, call 530-752-0871 and follow the prompts.

## Health Education & Promotion

Health Education & Promotion (HEP) (<https://shcs.ucdavis.edu/services/health-education-and-promotion/>) uses a health equity lens to foster environments, institutional practices and a campus culture that promote student well-being and academic success. HEP focuses on the following areas:

- Alcohol.
- Tobacco & other drug use.
- Sexual, Mental, & Physical well-being.

## Extracurricular Activities

By participating in extracurricular activities at UC Davis, students benefit from numerous opportunities for educational, personal, cultural and social enrichment. In general, registered and enrolled UC Davis students may participate in extracurricular activities sponsored by the campus. Some activities have additional eligibility criteria, so you are encouraged to inquire about the particular requirements of the groups and programs that interest you.

## Campus Recreation & Memorial Union

Department of Campus Recreation (<https://campusrecreation.ucdavis.edu/>); Activities & Recreation Center (ARC) (<https://campusrecreation.ucdavis.edu/arc/>) | Memorial Union (<https://memorialunion.ucdavis.edu/>)

The UC Davis Department of Campus Recreation (<https://campusrecreation.ucdavis.edu/>) and Memorial Union (<https://memorialunion.ucdavis.edu/>) manage the following programs and facilities, creating opportunities to build community, cultivate friendships and enhance learning; complementing the academic mission of the university and enhancing the quality of life for the campus:

- Activities & Recreation Center (ARC) (<https://campusrecreation.ucdavis.edu/arc/>)
- Aquatics/Recreation Pool (<https://campusrecreation.ucdavis.edu/recreation/aquatics/>)
- Craft Center (<https://campusrecreation.ucdavis.edu/recreation/craft-center/>)
- Dairy Outdoor Recreation Complex (<https://campusrecreation.ucdavis.edu/dairy-outdoor-recreation-complex/>)
- Equestrian Center (<https://campusrecreation.ucdavis.edu/recreation/equestrian-center/>)
- Games Area (<https://memorialunion.ucdavis.edu/games-area/>)
- Gunrock Gaming (<https://memorialunion.ucdavis.edu/gunrock-gaming/>)
- Living Well (exercise, well-being, & personnel training) (<https://campusrecreation.ucdavis.edu/recreation/living-well/>)
- Memorial Union (<https://memorialunion.ucdavis.edu/>)
- Outdoor Adventures (<https://campusrecreation.ucdavis.edu/outdoor-adventures/>)
- Rec Sports (<https://campusrecreation.ucdavis.edu/recreation/rec-sports/>)
- Sport Clubs (<https://campusrecreation.ucdavis.edu/sport-clubs/>)
- UC Davis Marching Band (<https://campusrecreation.ucdavis.edu/band/>)
- UCDHS Student Fitness Center (<https://campusrecreation.ucdavis.edu/ucdhs-fitness/>)
- University Credit Union Center (<https://campusrecreation.ucdavis.edu/university-credit-union-center/>)

## UC Davis Stores

The UC Davis Stores (<http://ucdavisstores.com/>) are full-service stores owned and operated by the university.

## Silo Union

The Silo Union (<https://campusmap.ucdavis.edu/?b=137>) common area houses the Gunrock restaurant (<https://housing.ucdavis.edu/dining/restaurants/the-gunrock/>), the Crepe Bistro (<https://housing.ucdavis.edu/dining/crepe-bistro/>), the Silo Market (<https://housing.ucdavis.edu/dining/markets/silo-market/>), the Silo Food Truck Patio (<https://housing.ucdavis.edu/dining/food-trucks/>), meeting/conference facilities, and indoor & outdoor lounge areas.

## Intercollegiate Athletics

UC Davis is the home of the Aggies (<https://ucdavisaggies.com/>). We sponsor 25 NCAA Division I sports spreading the UC Davis brand across

the country as student-athletes compete for conference and national championships. Athletics affords students the opportunity to enjoy fun, free entertainment, meet new people, and show their Aggie Pride while cheering our teams to victory. Tens of thousands of Aggies attend games each year, taking part in traditions such as storming the field before their first football game or collecting our custom giveaways. Games are also broadcast on ESPN+, meaning sports fans across the globe are exposed to all this great University has to offer. Learn more (<https://www.ucdavis.edu/campus-life/athletics-sports/>) about how to get involved and show your school spirit.

## Arts & Music

### Arts

#### **Robert & Margrit Mondavi Center for the Performing Arts | UC Davis**

The Mondavi Center (<https://www.mondaviarts.org/>) is the premier performance venue in Northern California and the regional destination for the best in music, dance, distinguished speakers, jazz, theater, and world music.

### Music

Department of Music (<http://music.ucdavis.edu/>)

### Theatre & Dance

Department of Theatre & Dance (<http://arts.ucdavis.edu/theatre-dance/>)

### Art Galleries

Manetti Shrem Museum (<https://manettishremmuseum.ucdavis.edu/>)  
UC Davis Design Museum (<https://arts.ucdavis.edu/designmuseum/>)  
Basement Gallery (<https://arts.ucdavis.edu/art-studio-basement-gallery/>)  
C.N. Gorman Museum (<https://gormanmuseum.ucdavis.edu/>)

## Student Government

### **Associated Students (ASUCD)**

ASUCD Student Services & Administrative Office (<https://asucd.ucdavis.edu/>)

### **UC Davis Administrative Advisory Committees**

Office of the Chancellor (<https://leadership.ucdavis.edu/about/councils-committees-boards/>)

### **Graduate Student Association (GSA)**

Graduate Student Association (GSA) (<https://gsa.ucdavis.edu/>)

## **Center for Student Involvement**

The Center for Student Involvement (<https://csi.ucdavis.edu/>) (CSI) has over 750 student organizations registered and supported at UC Davis. To find a list of all Registered Student Organizations (RSOs), see AggieLife ([https://aggielife.ucdavis.edu/club\\_signup/](https://aggielife.ucdavis.edu/club_signup/)). Each fall, CSI hosts the Involvement Fair (<https://csi.ucdavis.edu/involvement-fair/>) on the Quad where students can connect and learn about registered student organizations.

Sorority & Fraternity Life (<https://csi.ucdavis.edu/sfl/>) (SFL) represents a wide diverse variety of Greek-Lettered organizations. These organizations represent service, leadership, professionalism, social, and civic engagement that they cultivate within each other. There are six governing councils that encompass 50 organizations with over 1,600 Aggies as active members. Recruitment varies for each organization but typically occurs at the beginning of fall, winter, and spring quarters. To learn more about SFL follow us on Instagram (<https://www.instagram.com/UCDavisSFL/>) and stay updated on events and activities!

If you have any questions, visit us on the fourth floor of the Memorial Union. Contact us at [getinvolved@ucdavis.edu](mailto:getinvolved@ucdavis.edu) or 530-752-2027.

The Center for Student Involvement is a unit of the Community Resource & Retention Centers (<https://crcr.ucdavis.edu/>).

### **Cal Aggie Student Alumni Association (SAA)**

Cal Aggie Student Alumni Association (SAA) (<https://alumni.ucdavis.edu/membership/student-alumni-association/>) is a student organization that was established in 1989 with the mission to advance student and alumni relations. With support from the Cal Aggie Alumni Association (CAAA), SAA connects current students to UC Davis alumni around the world.

## **University Policies on Nondiscrimination, Sexual Harassment/Sexual Violence, Student Records & Privacy**

Nondiscrimination (<https://ucdavispolicy.ellucid.com/documents/view/39/59/>) | Sexual Harassment/Sexual Violence Prevention (<https://ucdavispolicy.ellucid.com/documents/view/41/>) | Accommodations for Students with Disabilities (<https://sdc.ucdavis.edu/>)

Disclosures from Student Records (<https://registrar.ucdavis.edu/records/privacy/>); see also UC Davis Policy & Procedure Manual Section 320-21 (<https://ucdavispolicy.ellucid.com/documents/view/397/active/>)

Social Security Numbers ([https://registrar.ucdavis.edu/records/changes-personal-information/#u\\_ssn](https://registrar.ucdavis.edu/records/changes-personal-information/#u_ssn)) | Release of Registration Material & Grades (<https://registrar.ucdavis.edu/records/privacy/reg-materials-grades/>)

## **Campus Security, Crime Awareness, and Alcohol & Drug Abuse Prevention**

In accordance with federal laws, Crime Awareness and Campus Security Act of 1990, and the Drug Free Schools and Communities Act of 1989, UC Davis annually makes information available to students and employees regarding campus security (<https://police.ucdavis.edu/crime-safety-data/>), crime statistics (<https://police.ucdavis.edu/crime-safety-data/>), and alcohol & drug abuse prevention (<https://shcs.ucdavis.edu/health-and-wellness/alcohol-tobacco-and-other-drugs/>). Also see victim support services (<https://care.ucdavis.edu/>).

# ACADEMIC ADVISING & STUDENT SERVICES

To help you get the most from your education, UC Davis offers many different types of academic advising. College advisors assist you in meeting degree requirements and taking maximum advantage of available university resources. A conference at least once a quarter with your faculty or staff advisor is especially desirable during your first year and during your final quarters preceding graduation. A meeting with a faculty or staff advisor is required each year for students in the College of:

- Engineering (<http://engineering.ucdavis.edu/undergraduate/advising/>)
- Letters & Science (<https://lettersandscience.ucdavis.edu/mandatory-advising/>)

College of Biological Sciences matriculating students in their first year at UC Davis are required to meet with a BASC advisor in the Biology Academic Success Center (<http://basc.ucdavis.edu/>) (BASC).

For complete information on academic advising, see the College of:

- Agricultural & Environmental Sciences (<http://www.caes.ucdavis.edu/students/advising/>)
- Biological Sciences (<http://basc.ucdavis.edu/>)
- Engineering (<http://engineering.ucdavis.edu/undergraduate/advising/>)
- Letters & Science (<https://ls.ucdavis.edu/advising/>)

## Student Disability Center (SDC)

Student Disability Center (<http://sdc.ucdavis.edu/>), 530-752-3184. The SDC is the campus unit designated to receive requests for academic accommodation, approve services, and coordinate support for students with disabilities. We are committed to equitable educational access and inclusive programming that allows students to thrive. The SDC advises students on their rights and responsibilities, as well as strategies and tools for managing their disabilities. Current and prospective students, faculty, and staff are encouraged to contact the SDC for additional information.

## Office of Educational Opportunity & Enrichment Services

The Office of Educational Opportunity and Enrichment Services (OEOES) (<https://opportunity.ucdavis.edu/>) is a family of services, programs and centers designed to support student learning, enhance the student experience and foster strong communities where students are empowered to achieve their goals. Transition assistance, support services and co-curricular opportunities are offered to all students along with specialized support geared toward various diverse student communities.

## Aggie Compass Basic Needs Center

The Aggie Compass (<https://aggiecompass.ucdavis.edu/>) is a comfortable space for students to build community and learn about basic needs resources, pick up fresh fruits and vegetables, receive CalFresh

enrollment assistance and get financial support and help finding stable housing and healthy food options.

## Educational Opportunity Program (EOP) Services

Educational Opportunity Program (EOP) (<https://eop.ucdavis.edu/>), 530-752-9366, offers an array of services to help first-generation students and students from disadvantaged backgrounds adapt both academically and socially to the University setting and successfully achieve their educational goals. EOP provides a caring and supportive environment for students to meet with peer and staff advisors and network with other students. For complete information, see Educational Opportunity Program (EOP) (<https://eop.ucdavis.edu/>).

## First-Year Aggie Connections (FYAC)

First-Year Aggie Connections (FYAC) (<https://opportunity.ucdavis.edu/programs/aggie-connect/>), 530-752-4475, groups first-year students (freshmen and transfers, including international students) into 25-person "Connections" based on a shared purpose, interest, or theme. Connections meet regularly for one academic quarter and are led by staff or faculty facilitators who engage students in discussions surrounding crucial topics related to transitioning to life at UC Davis. The First-Year Aggie Connections program aims to foster opportunities that will empower students as they navigate their first year at UC Davis.

## Guardian Scholars Program (GSP)

The mission of the Guardian Scholars Program (GSP) (<https://opportunity.ucdavis.edu/programs/guardian-scholars/>), 530-752-1211, is to empower foster and former foster youth at UC Davis to reach their potential by providing a community network that supports their academic progress and personal growth. For complete information, see Guardian Scholars Program (GSP) (<https://opportunity.ucdavis.edu/programs/guardian-scholars/>).

## Mentorships for Undergraduate Research in Agriculture, Letters & Science (MURALS)

Mentorships for Undergraduate Research in Agriculture, Letters & Science (MURALS) (<http://murals.ucdavis.edu/>), 530-752-4475, is designed to enrich the research experience of students situationally disadvantaged in their access to graduate school. For complete information, see MURALS (<http://murals.ucdavis.edu/>).

## Pre-Graduate/Law Advising Services

Pre-Graduate/Law Advising (<https://opportunity.ucdavis.edu/services/pre-grad-law/>), 530-752-4475, offers individualized advice and information to students interested in admission to professional and graduate schools (law, Masters and Ph.D. programs, etc.) including prerequisite course planning, exam preparation, evaluation of competitiveness and assistance with all aspects of the application process such as writing the personal statement, getting good letters of recommendation, selecting schools/programs and strategies for becoming the most competitive applicant possible. In addition, the program offers small group advising and informative workshops, and hosts visits from admissions officers from various professional schools. For complete information, see Pre-Graduate/Law Advising (<https://opportunity.ucdavis.edu/services/pre-grad-law/>).

## Special Transitional Enrichment Program (STEP)

Incoming first-year EOP students are invited to participate in the Special Transitional Enrichment Program (STEP) ([https://eop.ucdavis.edu/step/?utm\\_source=step&utm\\_medium=redirect-hostname](https://eop.ucdavis.edu/step/?utm_source=step&utm_medium=redirect-hostname)), 530-752-0280.

The program begins in summer and continues through the first two academic years. STEP offers academic course work, transitional support, academic assistance and advising to help students adjust and succeed academically and socially. For complete information, see Special Transitional Enrichment Program (STEP) ([https://eop.ucdavis.edu/step/?utm\\_source=step&utm\\_medium=redirect-hostname](https://eop.ucdavis.edu/step/?utm_source=step&utm_medium=redirect-hostname)).

## Success Coaching & Learning Strategies

Services offered by Success Coaching & Learning Strategies (<https://opportunity.ucdavis.edu/services/scls/>), 530-752-4475, are designed to help undergraduate students become the designer and driver of their academic, personal, and professional success. Through workshops and one-on-one appointments, students learn new strategies, build skills, and reflect on their experiences to develop practical strategies for solving problems and achieving goals.

## Transfer & Reentry Center

The Transfer & Reentry Center (<https://trc.ucdavis.edu/>), (<http://trc.ucdavis.edu>) 530-752-2200, serves students who transferred to UC Davis and reentry students. Reentry refers to undergraduate students who are 25 years old or older, graduate students who are 30 years old or older, married students or student parents. The Transfer and Reentry Center addresses the important areas of a transfer and reentry student's progress while here at UC Davis: transfer transition, academic excellence, community engagement and beyond the Bachelors. Specialized programs, combined with collaborations with campus partners, allow the Center a unique opportunity to work with transfer and reentry students at each phase of their education. For complete information, see Transfer & Reentry Center (<https://trc.ucdavis.edu/>).

## TRiO Scholars Program

The TRiO Scholars Program (<https://opportunity.ucdavis.edu/programs/trio-scholars/>), 530-752-0681, also known as Student Support Services (SSS), supports the success and graduation of first-generation and low-income students and students with disabilities. Through a variety of services and activities, the program promotes academic excellence, financial empowerment and community building. The TRiO Scholars program is funded by the U.S. Department of Education and serves 160 UC Davis students.

## Veterans Success Center

The Veterans Success Center (<https://veterans.ucdavis.edu/>) provides veterans, service members and dependents a welcoming space, a community network, guidance with educational benefits and engagement opportunities that span the university and the larger Davis community. For complete information, see Veterans Success Center (<https://veterans.ucdavis.edu/>).

## Student Housing

Residential Academics (<https://housing.ucdavis.edu/academics/residential-academics/>), is one component of the *New Student Academic Services* unit in Student Housing & Dining Services, which includes the UC Davis Orientation program and the academic year Residential

Peer Mentor program. The academic support provided consists of one-on-one Peer Mentorship, academic success workshops, and much more. Residential Academics collaborates with several departments on campus, such as the Academic Assistance & Tutoring Center, the Internship & Career Center, and the four colleges to provide academic & career readiness support and tutoring within the residence halls.

## Academic Peer Mentors

Making the academic transition into and through UC Davis can be difficult. Class structure, instructor interaction, academic rigor, expectations, and studying are all different from high-school or two-year institutions. Academic Peer Mentors are one source of support for new and continuing students. Academic Peer Mentors are current students who meet one-on-one with students to answer questions, share experiences and offer tips and guidance. Each student living in the residence halls and The Green will have an Academic Peer Mentor who they will meet during Aggie Orientation or the first week of classes.

Academic Peer Mentors are trained to assist students in all four colleges and can help: prepare for academic advising appointments, strategize for test taking and studying, explore and change majors, utilize campus resources, identify and help to resolve academic concerns, get engaged on campus and find community, learn to navigate technological systems (OASIS, Schedule Builder, Canvas, etc.) and support new students in academic pursuits. For Academic Peer Mentor hours of availability, refer to Residential Academic Centers (<https://housing.ucdavis.edu/academics/residential-academic-centers/>).

## Residential Academic Centers

The Residential Academic Centers (RAC) are academic hubs for studying, information, charging devices, and more. A Center is located in each living area: Segundo, Tercero, and Cuarto. The Residential Academic Centers, staffed by Academic Peer Mentors, are open from the first day of instruction until the quarter ends. Note: Residents may use any Residential Academic Center, regardless of the residence hall area they live in.

**Segundo Area:** Segundo Services Center, First Floor; 530-754-0279

**Tercero Area:** Tercero Services Center, First Floor; 530-752-5566

**Cuarto Area:** Shasta Hall, First Floor; 530-754-0278

Students may email questions to Residential Academic Support. ([reshallacademics@ucdavis.edu](mailto:reshallacademics@ucdavis.edu))

New Student Orientation (<https://orientation.ucdavis.edu/>), 530-752-4443 or [orientation@ucdavis.edu](mailto:orientation@ucdavis.edu), assists new students and their families with the transition to UC Davis. Orientation is mandatory for all incoming first-year and transfer students. Orientation consists of three required parts: Aggie 101, Aggie Advising, and Aggie Orientation. **Aggie 101** is an online platform that helps students learn about UC Davis resources and prepare for academic advising and course registration. **Aggie Advising** provides you the academic advising support you need by completing a step-by-step process to plan an appropriate schedule and an opportunity to work with an academic advisor to address questions in preparation for your first quarter. Finally, **Aggie Orientation** is an on-campus experience for students to build community, find networks of support and resources, and get excited about being an Aggie!

# Student Conduct & Support Services

Office of Student Support & Judicial Affairs (<https://ossja.ucdavis.edu/>),  
530-752-1128

The Office of Student Support & Judicial Affairs (OSSJA) supports the University's educational mission by assisting students in need, promoting student development, and upholding standards of academic honesty and responsible behavior.

## Student Support

Every year, students struggle with challenges and crisis-related issues that interfere with their academic and student life success. The non-clinical case managers in OSSJA provide support and assistance to students experiencing difficulties and to staff and faculty members who become aware of such students. Case managers serve students in distress by reaching out to understand each student's needs and then coordinating with campus and community resources for assistance and care. They also provide consultation to faculty and staff regarding students of concern, help problem-solve situations involving students of concern, and provide feedback to involved parties as needed. Finally, they serve on the Students of Concern Response Team (SCRT), an interdisciplinary group of professionals that manages situations involving students of concern who present potentially serious risk of harm to self or others.

## Student Responsibilities

UC Davis policies serve multiple purposes:

- To support the safety and security of all members of our community.
- To promote responsible and engaged involvement in the campus community.
- To uphold the University's standards of excellence in education and promote the ethical, intellectual, and emotional growth and development of students involved in the disciplinary process.
- To ensure compliance with federal, state and local laws and regulations.

Students are responsible for complying with the announcements and regulations in this catalog and with all policies of the university and this campus. The student conduct staff in OSSJA uphold campus standards of academic honesty and student conduct by resolving alleged violations of university policies. The Code of Academic Conduct and other policies related to student conduct may be found on the Policies (<https://ossja.ucdavis.edu/policies/>) page at the Office of Student Support & Judicial Affairs (<https://ossja.ucdavis.edu/>). Students must meet all university obligations in order to register for courses or receive transcripts of record and diplomas.

## Nondiscrimination & Sexual Harassment/Sexual Violence Prevention

Nondiscrimination (<https://hdapp.sf.ucdavis.edu/complaint-type/>) | Sexual Harassment (<https://hdapp.sf.ucdavis.edu/complaint-type/>) | Sexual Violence (<https://sexualviolence.ucdavis.edu/>)

If students believe that they have been subjected to prohibited discrimination, harassment, sexual harassment, and/or sexual violence, they may contact the Harassment & Discrimination Assistance

& Prevention Program (<https://hdapp.ucdavis.edu/>) (HDAPP) at 530-747-3864 or [hdapp@ucdavis.edu](mailto:hdapp@ucdavis.edu). We also offer an anonymous call-in line at 530-747-3865.

# Associated Students, University of California at Davis (ASUCD)

The Associated Students, University of California, Davis (<https://asucd.ucdavis.edu/>) (ASUCD), is the association representing the students of UC Davis. Composed of over 35 units, committees, and commissions, each with its own unique mission, ASUCD provides programs and services to its students based on four pillars: basic services, media, advocacy, and social.

As one of the largest student employers on campus, ASUCD empowers students to advocate for topics they are passionate about, express themselves creatively, and develop themselves professionally. ASUCD's mission is to improve the quality of campus life by cultivating a culture of involvement and student leadership. Get connected at ASUCD (<https://asucd.ucdavis.edu/>).

## Academic Assistance & Tutoring Centers

### Academic Assistance & Tutoring Centers (AATC)

Academic Assistance & Tutoring Centers (AATC) (<https://tutoring.ucdavis.edu/>), 530-752-2013 or [aatc-frontdesk@ucdavis.edu](mailto:aatc-frontdesk@ucdavis.edu), exists to help undergraduate students thrive at UC Davis and beyond. We provide an inclusive and interactive environment where students participate in reinforcing and retaining knowledge in multi-disciplinary writing, math and science through co-curricular academic services provided by both professional staff and peer tutors. We strive to support students in developing the academic competence and confidence that will empower them to succeed at UC Davis. AATC provides academic support to undergraduate students enrolled in Biology, Chemistry, Economics, Mathematics, Physics, Statistics, and Writing Across the Disciplines. Our instructional professional staff offer classes, workshops, office hours, individual writing appointments, and a Writing Studio. To support our professional staff and our services, AATC hires 300 undergraduate tutors to provide drop-in tutoring in various campus locations and subjects. Both in-person and remote services are available. For complete information on our academic support services, see AATC. (<https://tutoring.ucdavis.edu/>)

## Internship & Career Center (ICC)

The Internship & Career Center (ICC) (<https://icc.ucdavis.edu/>), located in South Hall (<http://campusmap.ucdavis.edu/?b=143>), works with undergraduate, masters, and Ph.D. students, postdoctoral scholars and recent graduates. The ICC can help you identify your abilities and interests and relate them to career options; gain access to practical experience to increase your competitiveness in the job market; and find employment. ICC workshops on finding an internship or part-time job, beginning a job search, developing a resume, networking and preparing for an interview are available on our website and YouTube channel. Each academic year, the ICC hosts four to six large internship and career fairs which give UC Davis students and alumni the opportunity to connect with employers.

## Internship Programs

Gain practical skills that will transfer to the workplace. Apply your coursework. Launch your career! Take advantage of thousands of internships organized through the Internship & Career Center (ICC) (<https://icc.ucdavis.edu/>) or initiate your own. There is literally something for everyone! An internship may be full-time or part-time, credit-bearing or non-credit bearing, voluntary or paid, depending on your skills, needs and interests, as well as the availability of openings. We are continuing to create more paid opportunities through Federal Work-Study and grants. Internship experiences emphasize learning and must be supervised by a professional. Get your approved internship documented on your UC Davis transcript by completing Transcript Notation (TN) (<https://icc.ucdavis.edu/find/internships/tn/>). Academic credit is awarded for experiences planned and approved in advance by a sponsoring faculty member.

## Masters, Ph.D., & Postdoctoral Services

The Internship & Career Center (ICC) (<http://icc.ucdavis.edu>), located in South Hall, provides comprehensive career services for UC Davis Masters and Ph.D. students, and Postdoctoral scholars (MPP). Career advisors can assist you with all aspects of your career search whether your goal is a career in industry, government or academia. Our team realizes these are complex decisions. Our career services include confidential one-to-one advising with an individualized review of curriculum vitae (CV), resumes, and cover letters; workshops and panel discussions; recruiting and networking events; and employer information sessions, all specifically designed for advanced degree holders.

## Student Employment

Student Employment is a resource within the Internship & Career Center (ICC) (<https://icc.ucdavis.edu/>) that connects students to paid, part-time opportunities (on and off campus) that help fund their educational expenses, while gaining professional skills and a professional network. With support from the Internship & Career Center, students have easy access to student employment as well as internship and career opportunities.

## Academic Resources

UC Davis has many academic resources to help you succeed and enjoy your time here on campus; here are just a few:

- University Library (<http://www.lib.ucdavis.edu>); 530-752-8792
- Information & Educational Technology (<http://iet.ucdavis.edu>); 530-754-HELP (4357)
- UC Davis Arboretum & Public Garden (<https://arboretum.ucdavis.edu>); 530-752-4880
- CalTeach/Mathematics & Science Teaching Program (CalTeach/MAST) (p. 30)
- Global Learning Hub (p. 30)
- Undergraduate Research Center (p. 30)
- Student Resource & Information Centers (p. 30)

## CalTeach/Mathematics & Science Teaching Program (CalTeach/MAST)

The UC Davis CalTeach/Mathematics & Science Teaching Program (CalTeach/MAST) (<https://mast.ucdavis.edu>), 530-754-1056, provides STEM undergraduate majors with seminar and internship opportunities

to explore careers in K-16 mathematics and science education. For more complete information, see Mathematics & Science Teaching Program (CalTeach/MAST) (<https://mast.ucdavis.edu>).

## Global Learning Hub

Through the Global Learning Hub (<https://globallearning.ucdavis.edu>), each and every UC Davis student can find global learning opportunities available on campus, in the region, virtually, and internationally. The Hub offers global learning programs, workshops, and resources that enhance all UC Davis students' academic and career pursuits through four broad areas of opportunities: Community Engagement; Global Skills & Leadership; Internships & Research; and Study Abroad. UC Davis is committed to preparing the next generation of global problem-solvers and change-makers. As such, we aim to prepare our undergraduate, graduate, and professional students to solve global challenges collaboratively, equitably, and sustainably. As part of Global Affairs, the Global Learning Hub aims to inspire global curiosity, understanding and engagement. For complete information, see the Global Learning Hub (<https://globallearning.ucdavis.edu>).

## Undergraduate Research Center

The Undergraduate Research Center (<https://urc.ucdavis.edu>) (URC) encourages and facilitates research opportunities for UC Davis undergraduates in all majors and class levels. We offer awards and activities to support undergraduate research across the university. The URC promotes research as a high-impact student experience to enhance readiness to succeed in future careers. From scientific experiments to the scholarly analysis of literature, doing research is an ideal way to improve your future career prospects. Hands-on experience can help you narrow your interests and identify your aptitudes. For more information, see Resources for Students (<https://urc.ucdavis.edu/discover-resources-students>) or contact [urc@ucdavis.edu](mailto:urc@ucdavis.edu).

## Student Resource & Information Centers

The following is just a small sampling of the many student resource & information centers here at UC Davis:

- Center for Advocacy, Resources & Education (CARE) (p. 31)
- Center for African Diaspora Student Success (CADSS) (p. 31)
- Center for Chicanx/Latinx Academic Student Success (CCLASS) (p. 31)
- Center for Leadership Learning (p. 31)
- Cross Cultural Center (p. 31)
- Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual Resource Center (LGBTQIARC) (p. 31)
- Native American Academic Student Success Center (NAASSC) (p. 31)
- Services for International Students & Scholars (SISS) (p. 32)
- Strategic Asian and Pacific Islander Retention Initiative (SAandPIRI) (p. 32)
- Women's Resources & Research Center (WRRC) (p. 32)

## Center for Advocacy, Resources & Education (CARE)

The UC Davis Center for Advocacy, Resources & Education (CARE) (<https://care.ucdavis.edu/>) is committed to reducing sexual violence and its impact using a multifaceted approach including primary prevention, education & awareness, trauma-informed survivor services, and advocacy for victim rights at the campus, UC, and state level. We work to broaden public awareness about the nature of sexual assault, intimate partner violence, stalking, sexual harassment, and their impact on people of all identities. We foster a culture intolerant of sexual violence by promoting healthy sexual communication, safe relationships, and respect.

All survivor advocacy and support services are confidential, free, and available to any UC Davis affiliate who has experienced sexual harassment, sexual assault, intimate partner violence, or stalking. For complete information, see Center for Advocacy, Resources & Education (CARE) (<https://care.ucdavis.edu/>), 530-752-3299 (Davis Campus) or 916-734-3799 (Sacramento Campus).

## Center for African Diaspora Student Success (CADSS)

The Center for African Diaspora Student Success (CADSS) is dedicated to providing opportunities for a transformative educational experience at UC Davis for students of the African Diaspora. We are committed to the retention and success of students of the African Diaspora here at UC Davis. We prioritize learning academic self-efficacy, exploration of Black identity development, and providing community engagement. The Strategic African American Retention Initiative, and CADSS, addresses known societal, cultural, and institutional barriers to retention, persistence, and graduation. Through data-driven, research-based, decision-making, and collective and individual student experiences, the initiative and center provide support for academic achievement for all students of the African Diaspora. For more information, see the Center for African Diaspora Student Success (<https://cadss.ucdavis.edu/>), or contact 530-754-0854 or cfadss@ucdavis.edu.

## Center for Chicanx/Latinx Academic Student Success (CCLASS)

The Center for Chicanx/Latinx Academic Student Success (<https://cclass.ucdavis.edu/>) is dedicated to welcoming, supporting, retaining, and informing students as they navigate the university. It is a space for students to find community and *familia* (Family) on campus. At its core, the unit acts as an academic support space for students to thrive as scholars and unique individuals. We are dedicated to retaining, empowering, and graduating Chicanx and Latinx students at UC Davis. By offering and providing authentic and culturally relevant opportunities for academic and personal growth, *El Centro* seeks to support Chicanx and Latinx students as they navigate the university from first-year students to graduating seniors. For complete information, see Center for Chicanx/Latinx Academic Student Success (<https://cclass.ucdavis.edu/>) or 530-752-8402.

## Center for Leadership Learning

The Center for Leadership Learning (CLL) (<https://cll.ucdavis.edu/>), 530-752-6908, offers a unique space for undergraduates to engage in the study of leadership through a variety of interactive programs, including

quarterly workshops, certificate programs, an annual conference, and internships. The CLL's programs and services are open to all UC Davis undergraduate students and are free of charge. Undergraduates from all majors, class levels, degrees of leadership and professional experience are welcome to participate. The CLL embraces all students who wish to enhance their personal and professional lives! For complete information, see Center for Leadership Learning (<https://cll.ucdavis.edu/>).

## Cross Cultural Center

Our mission at the Cross Cultural Center (<https://ccc.ucdavis.edu/>) (CCC) at UC Davis is to work towards a more just and liberated world. We create compassionate community spaces that foster identity development, critical consciousness, and collective innovation. As a cultural center, the following six values guide our work: advocacy, cultural humility, community building, educational excellence, identity exploration and leadership development.

The Cross Cultural Center (<https://ccc.ucdavis.edu/>) has many exciting celebrations throughout the year known as Culture Days (<https://ccc.ucdavis.edu/programs-and-services/culture-days/>). Other Cross Cultural Center (<https://ccc.ucdavis.edu/>) programs & services include:

- Danzantes del Alma dance troupe (<https://ccc.ucdavis.edu/programs-and-services/danzantes-del-alma/>)
- Graduate Students of Color Mentorship Program (<https://ccc.ucdavis.edu/programs-and-services/graduate-student/>)
- The Peer Education & Community Empowerment group (<https://ccc.ucdavis.edu/programs-and-services/peer-education-peace/>)

To receive updates regarding programs and events, follow us on Instagram ([https://www.instagram.com/ucd\\_ccc/?hl=en](https://www.instagram.com/ucd_ccc/?hl=en)).

The Cross Cultural Center hours of operation are Monday-Thursday 10 a.m.-6 p.m. & Friday 12-5 p.m.; closed weekends & University holidays (<https://registrar.ucdavis.edu/calendar/holidays/>).

## Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual Resource Center (LGBTQIARC)

The Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual Resource Center (LGBTQIARC) (<https://lgbtqia.ucdavis.edu/>), located in the Student Community Center, provides an open and inclusive space and community that is committed to challenging sexism, cissexism/trans oppression/transmisogyny, heterosexism, monosexism, and allosexism. For complete information, see Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual Resource Center (<https://lgbtqia.ucdavis.edu/>); 530-752-2452.

## Native American Academic Student Success Center (NAASSC)

The Native American Academic Student Success Center (NAASSC) (<https://naassc.ucdavis.edu/>) is a collaborative and multifaceted academic success program focused on increasing retention, persistence, and graduation rates of Native American students, in a culturally appropriate way. Following our theme, "Building connection and strengthening community," programming focuses on academic success

and resilience through building a strong connection to students. We take a holistic approach of student success creating a community that not only survives but thrives at UC Davis. For complete information, see Native American Academic Student Success Center (<https://naassc.ucdavis.edu/>) or contact [nari@ucdavis.edu](mailto:nari@ucdavis.edu).

## **Services for International Students & Scholars (SISS)**

Services for International Students & Scholars (SISS) (<https://siss.ucdavis.edu/>), 530-752-0864, assists international students, faculty and researchers in gaining and maintaining an appropriate immigration status while at UC Davis. SISS provides orientation and other information and assistance as part of its mission to build a campus community that is fully inclusive of international students and scholars. For complete information, see Services for International Students & Scholars (<https://siss.ucdavis.edu/>).

## **Strategic Asian and Pacific Islander Retention Initiative (SAandPIRI)**

The Strategic Asian and Pacific Islander Retention Initiative (SAandPIRI) promotes academic excellence, connectedness, and empowering leadership for all students. SAandPIRI recognizes the diversity of the Asian and Pacific Islander (AandPI) diasporas at UC Davis in order to improve academic outcomes through culturally relevant programs and resources. With this in mind, the retention initiative supports the retention of historically marginalized AandPI students with a special focus on Filipinx, Southeast Asian, Native Hawaiian, and Pacific Islander populations. For more information, see Strategic Asian and Pacific Islander Retention Initiative (SAandPIRI) (<https://apiretention.ucdavis.edu/>) or contact [apiretention@ucdavis.edu](mailto:apiretention@ucdavis.edu).

## **Women's Resources & Research Center (WRRC)**

The Women's Resources & Research Center (WRRC) (<https://wrrc.ucdavis.edu/>), 530-752-3372, promotes gender equity and offers educational and community-building programming to all, while centering women, transgender, and nonbinary campus community members. Visit us in North Hall to connect with community, use our study space, and access resources like free menstrual supplies or our Student Parent Closet. For more information, see Women's Resources & Research Center (<https://wrrc.ucdavis.edu/>).

# ACADEMIC INFORMATION, POLICIES, & REGULATIONS

From registration to graduation, there are many aspects to being a successful UC Davis student. To guide you along your path to graduation, see the following sections:

- Registration & Course Load (p. 33)
- Academic Credit (p. 33)
- Examinations (p. 33)
- Grades & Grading (p. 33)
- Probation & Dismissal (p. 34)
- Honors & Prizes (p. 34)
- Leaving UC Davis (p. 35)
- Returning to UC Davis (p. 35)

## Registration & Course Load

### Registration

Office of the University Registrar (<https://registrar.ucdavis.edu/>);  
530-752-3639

Registration includes the process of enrolling in classes, the financial obligation to pay tuition, fees and all other charges, filing current address (mailing, permanent, and emergency) information with the Office of the University Registrar, and completing and submitting any forms pertaining to your registration status. To be a continuing student at the university, you must enroll in classes each academic term. To be considered a registered student, you must also pay all tuition, fees and any outstanding balance due.

If you are a *new* student, your acceptance letter directs you to all of the required next steps to obtain student status at the university. Graduate students who previously attended UC Davis as undergraduates are considered to be *new* students. If you do not enroll in classes for a future academic term or did not take an approved leave of absence, you must apply for Readmission to return to the university and resume student status.

For complete information, see Registration (<https://registrar.ucdavis.edu/registration/>).

### Important Registration-Related Subjects

Preparing to Register (<https://registrar.ucdavis.edu/registration/register/>) | Undergraduate Registration Priority (<https://registrar.ucdavis.edu/registration/register-for-classes/pass-times/>) | Late Registration (<https://registrar.ucdavis.edu/registration/register-for-classes/schedule-adjustments/add-drop/>) | Adding & Dropping Courses | Late Adding & Dropping Courses (<https://registrar.ucdavis.edu/registration/register-for-classes/course-changes/late-actions/>) | Retroactive Drop & Add (<https://registrar.ucdavis.edu/records/changes-personal-information/>) | Change of Name | Change of Address (<https://registrar.ucdavis.edu/records/changes-personal-information/>)

## Course Load

Both Undergraduate and Graduate students need to carry a study load of at least 12 units each quarter in order to be certified as full-time students.

[Full-Time Status](https://registrar.ucdavis.edu/registration/) (<https://registrar.ucdavis.edu/registration/>) | [Part-Time Status for Tuition Purposes](https://registrar.ucdavis.edu/registration/part-time/) (<https://registrar.ucdavis.edu/registration/part-time/>) | [Undergraduate Expected & Minimum Progress](https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#EXPECTED%20AND%20MINIMUM%20PROGRESS) (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#EXPECTED%20AND%20MINIMUM%20PROGRESS>)

## Academic Credit

[Unit Requirements & Limitations](https://registrar.ucdavis.edu/records/credit-exam/) (p. 38) | [Credit by Examination](https://registrar.ucdavis.edu/records/credit-exam/) (<https://registrar.ucdavis.edu/records/credit-exam/>) | [Summer Sessions](https://summer-sessions.ucdavis.edu/) (<https://summer-sessions.ucdavis.edu/>)

## Simultaneous Enrollment

Per Davis Division Academic Senate Regulation A553 (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#A553->), a student may not obtain transfer credit for courses taken at a non-University of California campus in a term during which the student is registered as a UC Davis full-time student. A variance can be obtained only by petitioning the dean of your college prior to enrollment in the non-University of California course. For UC Davis admitted students taking ROTC-related courses at a non-University of California campus, students may submit their request directly to the Office of the University Registrar (OUR). For more information, see Simultaneous Enrollment at a Non-University of California.

## Special Programs

There are a variety of special programs that allow admitted UC Davis students to take courses at other UCs, through the University of California Center Sacramento (UCCS) program, in Washington DC, or abroad, and California Community College (CCC) or California State University (CSU) students to attend UC Davis as non-degree-seeking students. Each program has its own requirements and application process.

[Intercampus Visiting Programs](https://registrar.ucdavis.edu/registration/special-programs/icv/) (<https://registrar.ucdavis.edu/registration/special-programs/icv/>) | [Intersegmental Cross Enrollment: Visiting California State University and California Community College Students](https://registrar.ucdavis.edu/registration/special-programs/) (<https://registrar.ucdavis.edu/registration/special-programs/>) | [Study Abroad](https://studyabroad.ucdavis.edu/) (<https://studyabroad.ucdavis.edu/>) | [University of California Center Sacramento \(UCCS\)](https://uccs.ucdavis.edu/) (<https://uccs.ucdavis.edu/>) | [UC](https://washingtonprogram.ucdavis.edu/) (<https://washingtonprogram.ucdavis.edu/>) | [Washington DC Program \(UCDC\)](https://washingtonprogram.ucdavis.edu/) (<https://washingtonprogram.ucdavis.edu/>)

## Examinations

[Final Examination Information & Schedule](https://registrar.ucdavis.edu/registration/schedule/finals/) (<https://registrar.ucdavis.edu/registration/schedule/finals/>) | [Academic Senate Regulations – Examinations](https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#538-) ([http://academicsenate.ucdavis.edu/bylaws\\_and\\_regulations/regulations.cfm?#538-](https://academicsenate.ucdavis.edu/bylaws-regulations/regulations.cfm?#538-)) | [Midterms](https://registrar.ucdavis.edu/registration/schedule/midterms/) (<https://registrar.ucdavis.edu/registration/schedule/midterms/>)

## Grades & Grading

### Grades

Except as provided otherwise in Davis Division Regulations A545 (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#A545->), the School of Law Regulations (<https://law.ucdavis.edu/students/registrar/regulations/#:~:text=The%20students%20grade%20point%20average%20at%20this%20school%20must%20be,point%20average%20at%20this%20school>), and in the School of Medicine Bylaws Regulation 70 ([https://health.ucdavis.edu/medschool/somsenate/pdf/UCD%20SOM%20Bylaws-School\\_of\\_Medicine%20.pdf](https://health.ucdavis.edu/medschool/somsenate/pdf/UCD%20SOM%20Bylaws-School_of_Medicine%20.pdf)), the grading

of all student work is subject to Davis Division Regulations (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#GRADES>).

For additional information on grading, see Grading Policies (<https://registrar.ucdavis.edu/faculty-staff/faculty/grading-policies/>).

Each college has different rules regarding P/NP grading; see College of:

- Agricultural & Environmental Sciences (<https://caes.ucdavis.edu/students/advising/academic-policies/grading-repeats/>)
- Biological Sciences (<https://biology.ucdavis.edu/undergrad/degree-requirements/>)
- Engineering (<https://engineering.ucdavis.edu/undergraduates/academic-advising/advising-faqs/#a7>)
- Letters & Science (<https://lettersandscience.ucdavis.edu/frequently-asked-questions/>)

## Grade Changes

Students who believe they received an incorrect grade due to a clerical or procedural error should ask their instructor to go to the Online Grade Change Tool (<https://registrar.ucdavis.edu/records/grades/changes/>). For complete information, see Grade Changes (<https://registrar.ucdavis.edu/records/grades/changes/>) and the guidelines for the Committee on Grade Changes (<http://academicsenate.ucdavis.edu/GCC/>).

## Probation & Dismissal

The University of California Regulations of the Academic Senate 900 (<https://senate.universityofcalifornia.edu/bylaws-regulations/regulations/rpart4.html#r900>) and UC Davis Division Regulations A540C (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#A540->) and A552 (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#A552->) govern probation and dismissal. Students must meet both academic standards and minimum progress toward degree completion. For complete information on Probation & Dismissal, see Academic Standing (<https://registrar.ucdavis.edu/records/transcripts/academic-standing/>).

## Honors & Prizes

### Deans' Honors Lists

According to UC Davis Division Regulation 551 (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#551->), the quarterly Dean's Honors List includes names of students who have completed, for a letter grade, a minimum of 12 units in a specific quarter with a grade point average equal to or higher than the minimum grade point average attained by the upper 16 percent of those registered in the same class level and college during that quarter. Honors lists will be posted quarterly on deans' office websites or made available by other means and a notation of these honors will be placed on each student's permanent record by the Office of the University Registrar.

### College of

- Agricultural & Environmental Sciences (<https://caes.ucdavis.edu/students/resources/honors/>)
- Biological Sciences (<http://biology.ucdavis.edu/awards-and-recognition/deans-list/>)
- Engineering (<http://engineering.ucdavis.edu/undergraduate/deans-honor-list/>)

- Letters & Science (<https://lettersandscience.ucdavis.edu/deans-honors-list-and-graduation-honors/>)

## Graduation Honors

Honors at graduation are awarded to students who have a grade point average in the top percent of their college as shown in the table below. The College of Letters & Science (<https://lettersandscience.ucdavis.edu/deans-honors-list-and-graduation-honors/>) requires that additional criteria be met for high and highest honors.

Total Quarter Units at UC	Highest Honors	High Honors	Honors	Total
45-89	2%	next 2%	next 4%	8%
90-134	3%	next 3%	next 6%	12%
135+	4%	next 4%	next 8%	16%

**Grade point averages from the winter quarter prior to graduation are used to determine the averages that will earn an honors designation.** Following are the averages for winter quarter 2023 (202301). These averages will be used through winter quarter 2024.

### Grade Point Average by College

Percent Determining Cut-Off Point	Agricultural & Environmental Sciences	Biological Sciences	Engineering	Letters & Science
2%	3.969	3.985	3.986	3.991
3%	3.955	3.970	3.967	3.982
4%	3.939	3.957	3.948	3.969
6%	3.906	3.937	3.913	3.947
8%	3.878	3.912	3.884	3.925
12%	3.822	3.859	3.817	3.882
16%	3.758	3.802	3.766	3.846

An honors notation is made on a student's diplomas and on their permanent records in the Office of the University Registrar.

## Prizes & Awards

The University Medal (<https://academicaffairs.ucdavis.edu/uc-davis-medal/>) is the highest campus honor awarded to a graduating senior in recognition of superior scholarship and achievement. A College or School Medal is also given to the outstanding graduating student in each of the colleges and professional schools.

Departmental citations, special awards, and prizes are also awarded to students for superior achievement and scholarship.

### Prizes & Awards for College of

- Agricultural & Environmental Sciences (<https://caes.ucdavis.edu/students/resources/honors/>)
- Biological Sciences (<https://biology.ucdavis.edu/undergraduate/awards-undergraduate/awards/>)
- Engineering (<https://engineering.ucdavis.edu/undergraduate/deans-honor-list/>)
- Letters & Science (<https://lettersandscience.ucdavis.edu/advising/>)

### Chancellor's Award for Excellence in Undergraduate Research & Mentoring Undergraduate Research

These prestigious awards recognize up to two graduating seniors who have distinguished themselves through their excellence in undergraduate

research; and faculty, postdocs, or graduate students who have excelled in mentoring undergraduate researchers. For complete information, see Chancellor's Award for Excellence in Undergraduate Research (<https://urc.ucdavis.edu/Chancellors-Award/>).

## **University Honors Program**

The University Honors Program (<https://honors.ucdavis.edu/>) (UHP), 530-752-3225, is a four-year, interdisciplinary, campus-wide program for high potential and socially conscious undergraduate students interested in enhancing their educational experience through special courses, close faculty contact, dynamic peer interaction, and positive social change.

## **Leaving UC Davis**

### **Graduation & Commencement**

To graduate, undergraduate students must complete and submit an Application for Graduation with the Office of the University Registrar by the posted graduation application deadlines (<https://registrar.ucdavis.edu/graduate/>). To participate in the Commencement Ceremony, a student **must** register to walk. **These are separate actions.**

Graduation (<https://registrar.ucdavis.edu/registration/leave/graduate/>) | Commencement Ceremony (<http://commencement.ucdavis.edu/>)

## **Leave of Absence: Planned Educational Leave Program (PELP)**

The Planned Educational Leave Program (PELP (<https://registrar.ucdavis.edu/registration/leave/pelp/>)) allows any continuing undergraduate or graduate level student to temporarily suspend academic work at UC Davis.

## **Other Leaves**

Cancelation & Withdrawal (<https://registrar.ucdavis.edu/registration/leave/>) | Administrative Withdrawals (<https://registrar.ucdavis.edu/registration/leave/>) | Drop for Non-Payment (<https://registrarnew.sf.ucdavis.edu/tuition/non-payment/>) | Break in Registration & Enrollment (<https://registrar.ucdavis.edu/registration/leave/>) | Retroactive Withdrawal (<https://registrar.ucdavis.edu/records/retroactive/>)

## **Returning to UC Davis**

For any term a student is not enrolled, is not on an approved leave of absence (PELP (<https://registrar.ucdavis.edu/registration/leave/>)), or has cancelled/withdrawn from the university, the student is considered non-continuing and must apply for Undergraduate Readmission (<https://registrar.ucdavis.edu/registration/return/>) to return to registered status.

# UNDERGRADUATE EDUCATION

UC Davis offers the Bachelor of Arts (A.B.) and Bachelor of Science (B.S.) degrees in over 100 major programs, as well as over 110 minors in a variety of disciplines; see Departments, Programs, & Degrees (p. 49). For complete program information; see Colleges of;

- University Degree Requirements (p. 36)
- College Major & Minor Information (p. 40)
- Agricultural & Environmental Sciences (p. 40)
- Biological Sciences (p. 41)
- Engineering (p. 43)
- Letters & Science (p. 43)

## Bachelor's Degree Requirements

Students must satisfy four groups of requirements before they can become eligible for candidacy for the bachelor's degree:

- University Requirements (p. 36); applies to all colleges.
- General Education Requirements (p. 38); applies to all colleges.
- College Requirements; **see links above for each college**; college requirements may be stricter than University Requirements for the same obligation.
- College Major & Minor Information (p. 40); find how to declare, change majors, etc., and additional information about minors.
- Major requirements as listed in Departments, Programs, & Degrees (p. 48).

**Students are responsible for seeing that all of their degree requirements are fulfilled.**

## University Degree Requirements University Requirements

To earn a Bachelor's Degree, all students must fulfill the following University of California requirements:

- Entry Level Writing (p. 36)
- American History & Institutions (p. 37)
- Unit Requirements & Limitations (p. 38)
- Senior Residence Requirements (p. 38)
- Scholarship Requirement (p. 39)
- General Education (GE) Requirements (p. 38)
- College Requirements; see:
  - College Major & Minor Information (p. 40)
  - Agricultural & Environmental Sciences (p. 40)
  - Biological Sciences (p. 41)
  - Engineering (p. 43)
  - Letters & Science (p. 43)
- Major/Degree; course requirements for each major/degree are listed in Departments, Programs, & Degrees (p. 48).

For older Bachelor's Degree Requirements, see Bachelor's Degree Requirements Archive (p. 47).

## Entry Level Writing Requirement (ELWR)

The Entry Level Writing Requirement (ELWR) is a University of California requirement. Every first-year student in the UC system must demonstrate their college-level proficiency in writing by fulfilling the ELWR. University-level writing requires students to read carefully, analyze readings with understanding, and draw conclusions about what is read. For more information, see Entry Level Writing Requirement (<https://elw.ucdavis.edu>).

Students must fulfill ELWR by the end of their third quarter of enrollment; students who do not fulfill ELWR by the end of their third quarter of enrollment face disenrollment from the university.

### Before enrolling at UC Davis, students can fulfill ELWR two ways:

1. Earning at least one threshold score on one of the following exams:
  - 30 or better on the ACT, English Language Arts.
  - 63 or better on the ACT English exam + the ACT Reading exam.
  - 680 or better on the SAT, Evidence-Based Reading and Writing.
  - 3 or higher on AP English Language and Composition or AP English Literature and Composition.
  - 5 or higher on Higher Level IB English A: Literature or Higher Level IB English A: Language and Literature.
  - 6 or higher on Standard Level IB English A: Literature or Standard Level IB English A: Language and Literature.
2. Earning a passing grade in a transferable college writing course. For more information about transferable college writing courses, see Assist.org (<https://assist.org>).

NOTE: Official score reports/transcripts must be sent to UC Davis (<https://www.ucdavis.edu/admissions/undergraduate/transcripts-test-scores/>) for ELWR fulfillment.

### After enrolling at UC Davis, students can fulfill ELWR three ways:

1. **UC Davis Writing Placement Survey.** Writing Placement Survey can be taken only once and is only available to incoming first-year undergraduate students. For more information, see Entry Level Writing Requirement (<https://elw.ucdavis.edu>).
2. **UC Davis ELWR fulfilling course.** Earning a C or higher in a designated, credit-bearing writing course fulfills ELWR:
  - UWP 007, a face-to-face 4 unit writing course.
  - UWP 007Y, a hybrid 4 unit writing course with weekly in-person, synchronous meetings and asynchronous components.
  - UWP 007V, a fully online 4 unit writing course with some synchronous and asynchronous components.
  - UWP 007M, a face-to-face 4 unit writing course that offers additional academic English language development instruction and support for non-native English speakers.
  - UWP 001A, a face-to-face 2 unit writing co-course that must be taken concurrently with UWP 001, UWP 1Y, or UWP 1V.
  - ENL 003A, a face-to-face 2 unit writing co-course that must be taken concurrently with ENL 003.
  - NAS 005A, a face-to-face 2 unit writing co-course that must be taken concurrently with NAS 005.

NOTE: Currently, P/NP grade mode is not permitted if the course is used for ELWR fulfillment.

3. **UC Online ELWR fulfilling course.** Earning a C or higher in a designated, credit-bearing writing course offered by UC Online/Cross Campus Enrollment (listed below) that fulfills ELWR.

- WR 040, a fully online 4 unit writing course offered through Cross-Campus enrollment (<https://registrar.ucdavis.edu/registration/special-programs/uc-online/>) and taught by UC Irvine.

NOTE: Students must meet certain eligibility criteria to enroll through Cross-Campus enrollment and should check in with the advisors in their Dean's Office prior to enrollment.

## American History & Institutions Requirement

The American history and institutions requirement ensures that every graduating student will have at least a minimum knowledge of the background of this country's development and an understanding of the political, economic and social interrelationships of its way of life.

You may meet this requirement in any of these ways:

- Complete one high school unit in American history, or 1/2 high school unit in American history and 1/2 high school unit in civics or American government, with a grade of C or better in each course
- Complete any one of the following courses:

Code	Title	Units
<b>African American &amp; African Studies (AAS)</b>		
AAS 010	African-American Culture & Society	4
AAS 100	Survey of Ethnicity in the US	4
<b>Asian American Studies (ASA)</b>		
ASA 001	Historical Experience of Asian Americans	4
ASA 002	Contemporary Issues of Asian Americans	4
<b>Chicana/Chicano Studies (CHI)</b>		
CHI 010	Introduction to Chicana/o Studies	4
<b>Economics (ECN)</b>		
ECN 111A	Economic History	4
ECN 111B	Economics History	4
<b>History (HIS)</b>		
HIS 017A	History of the United States	4
HIS 017B	History of the United States	4
HIS 072A	Women & Gender in America, to 1865	4
HIS 072B	Women & Gender in America, 1865-Present	4
HIS 170A	Colonial America	4
HIS 170B	The American Revolution	4
HIS 170C	The Early National Period, 1789-1815	4
HIS 171A	Slavery, Society & Expansion in the Early U.S.	4
HIS 171B	Civil War Era	4
HIS 174A	The Gilded Age & Progressive Era: United States, 1876-1917	4
HIS 174B	War, Prosperity, & Depression: United States, 1917-1945	4
HIS 174C	The United States Since World War II, 1945 to the Present	4
HIS 176A	Cultural & Social History of United States	4

HIS 176B	Cultural & Social History of United States	4
HIS 177A	History of Black People & American Race Relations: 1450-1860	4
HIS 177B	History of Black People & American Race Relations: 1860-Present	4
HIS 179	Asian American History, 1850-Present	4
HIS 180AN	American Political History, 1789-1896	4
HIS 180BN	American Political History, 1896-present	4
HIS 183A	The Frontier Experience: Trans-Mississippi West	4
HIS 183B	The Frontier Experience: Trans-Mississippi West	4

<b>Native American Studies (NAS)</b>		
NAS 001	Introduction to Native American Studies	4
NAS 010	Native American Experience	4
NAS 116	Native American Traditional Governments	4
NAS 130A	Native American Ethno-Historical Development	4
NAS 130B	Native American Ethno-Historical Development	4
NAS 130C	Native American Ethno-Historical Development	4

<b>Political Science (POL)</b>		
POL 001	American National Government	4
POL 005	Contemporary Problems of the American Political System	4
POL 100	Local Government & Politics	4
POL 102	Urban Public Policy	4
POL 104	California State Government & Politics	4
POL 105	The Legislative Process	4
POL 106	The Presidency	4
POL 108	Policy Making in the Public Sector	4
POL 109	Public Policy & the Governmental Process	4
POL 113	American Political Thought	4
POL 130	Recent U.S. Foreign Policy	4
POL 131	Analysis of U.S. Foreign Policy	4
POL 160	American Political Parties	4
POL 163	Group Politics	4

Students electing to complete one of the above courses in order to meet this requirement are subject to the rules for prerequisites and majors.

- Present evidence that the requirement has been accepted as satisfied at another campus of the university.
- Present evidence that the requirement has been satisfied through courses in the area of American history and institutions at another collegiate institution whose credits are acceptable for transfer to UC Davis.
- Successful completion of the Advanced Placement (AP) Examination in United States Government and Politics taken May 2014 and prior with a score of 3 or higher. As of May 2015, AP examination, AP United States Government & Politics no longer satisfies the American history and institutions requirement.

- Successful completion of the International Baccalaureate (IB) Examination in History of the Americas Higher Level (HL) with a score of 5, 6, or 7.
- Successful completion of the SAT Subject Examination in U.S. History with a score of 550 or higher.

International students, regardless of the type of visa they hold, must meet the university's American history and institutions requirement for graduation.

## Unit Requirements & Limitations

**Minimum.** A minimum of 180 quarter units is required for graduation. These must be distributed according to the minimum requirements set forth by the faculty of your college.

**Unit Credit Limitations.** For certain courses, there may be limits established on the number of units countable towards the 180-unit minimum required for the degree. To avoid discovering just before graduation that a student is short on units, a student should regularly meet with their advisor to keep track of the number of units taken and credited.

**Internship Courses.** A maximum of 15 units of internship courses may be counted toward the 180-unit bachelor's degree requirement; however, some colleges have set a lower maximum. Unless the student has completed a minimum of 84 units, the student shall not receive University credit for an internship course numbered 192. (Davis Division Regulations 532 ([http://academicsenate.ucdavis.edu/bylaws\\_and\\_regulations/regulations.cfm#532-](http://academicsenate.ucdavis.edu/bylaws_and_regulations/regulations.cfm#532-)))

**Special Study Courses.** Unless the student has completed a minimum of 84 units, the student shall not receive University credit for a Special Study courses course numbered 194H or 199. (Davis Division Regulations 535 ([http://academicsenate.ucdavis.edu/bylaws\\_and\\_regulations/regulations.cfm#535-](http://academicsenate.ucdavis.edu/bylaws_and_regulations/regulations.cfm#535-)))

**Transfer Courses.** The acceptability of transfer courses (<https://registrar.ucdavis.edu/records/transfer-credit/>) for unit credit is determined by Undergraduate Admissions (<https://www.ucdavis.edu/admissions/undergraduate/transfer/planning/>). The acceptability of such courses toward specific requirements is determined by the individual college or school. To eliminate the possibility of duplication of credit, students should refer to the Advanced Placement Examination (p. 18) & International Baccalaureate (p. 18) charts and their transcripts.

## Senior Residence Requirements

The minimum senior residence requirement for a bachelor's degree at the University of California is one academic year (three quarters). Thirty-five of the final 45 quarter units completed by each candidate must be earned while in residence on the UC Davis campus (UC Regulations of the Academic Senate 630 (<http://senate.universityofcalifornia.edu/bylaws-regulations/regulations/rpart3.html#r630>))). Each summer session in which a student completes a course of at least 2 quarter units may be counted as half a quarter's residence.

Regularly approved courses (laboratory, field, or other individual work) done outside of a regular session but under the direction of a department of instruction may be accepted upon the recommendation of the department in partial fulfillment of the senior residence requirement for the bachelor's degree. Registration is with the consent of the instructor only.

UC Davis Continuing & Professional Education (CPE) (<https://cpe.ucdavis.edu/>) courses are not accepted as part of the senior university residence requirement.

There are additional senior residence requirements for students enrolled in the College of Letters & Science (<https://www.ls.ucdavis.edu/advising/academic-resources/degree-require.html>). If you are planning to study abroad during your senior year, you should consult your college dean's office or the Biology Academic Success Center (<http://basc.ucdavis.edu/>).

With the approval of the dean of a student's college or school, a candidate for the bachelor's degree who was in active service in the armed forces of the United States in the year preceding the awarding of the degree may be recommended for the degree after only one quarter of university residence in which the candidate completes at least 16 units or passes a comprehensive examination in the major or field of concentration (UC Regulations of the Academic Senate 614 (<http://senate.universityofcalifornia.edu/bylaws-regulations/regulations/rpart3.html#r614>))).

## General Education (GE) Requirements

For complete information, see General Education Requirements (<https://ge.ucdavis.edu/>). For a list of courses that contain GE attributes and GE search tools, see General Education (GE) Requirements (<https://registrar.ucdavis.edu/registration/plan/ge/>).

The General Education (GE) requirement promotes the intellectual growth of all undergraduates by ensuring that they acquire a breadth of knowledge that will enlarge their perspectives beyond the focus of a major and serve them well as participants in a knowledge-based society. It seeks to stimulate continued growth by providing knowledge of both the content and the methodologies of different academic disciplines. It involves students in the learning process by its expectation of considerable writing and class participation, and encourages students to consider the relationships between disciplines.

The GE requirement has two components, Topical Breadth and Core Literacies, and is defined in terms of units, not courses.

### Topical Breadth Component—52 units

A GE course in topical breadth addresses broad subject areas that are important to the student's general knowledge. The units of most undergraduate courses at UC Davis are assigned to one of the three Topical Breadth Areas.

**Note:** In the case of a course that has been certified in more than one Topical Breadth Area, a student may count the units of the course in only one of the areas in which it has been certified.

- **Arts & Humanities—12-20 units.** Courses in this area provide students with knowledge of significant intellectual traditions, cultural achievements and historical processes.
- **Science & Engineering—12-20 units.** Courses in this area provide students with knowledge of major ideas and concepts of science and engineering and their applications.
- **Social Sciences—12-20 units.** Courses in this area provide students with knowledge of the individual, social, political and economic activities of people.

## Core Literacies Component—35 units

The literacies are crucial both for success in one's profession and for a thoughtful, engaged citizenship in the community, nation and world.

**Note:** In the case of a course that has been certified in more than one Core Literacy Area, a student may count the units of the course in only one of the core literacy areas in which it has been certified.

1. **Literacy with Words & Images—20 units.** The objective of this core literacy is to help students communicate their ideas effectively in written, oral and visual forms. The requirement also seeks to enhance students' critical judgment of oral, written, and visual messages created by others.

Note: No course passed prior to satisfaction of the Entry Level Writing Requirement (formerly known as the Subject A requirement) may be used to satisfy the General Education requirements for Writing Experience coursework described in b and c, below. Students should contact their college before taking courses for requirement a, as there may be limitations on credit for students who have not completed the Entry Level Writing Requirement.

- a. **English Composition—8 units.** As described by College of Agricultural & Environmental Sciences, College of Biological Sciences, College of Engineering, or College of Letters & Science.
  - b. **Writing Experience coursework in the student's major or in other departments—6 units.** Courses in writing experience provide students instruction on how to communicate ideas in the subject matter of the course. The opportunity to improve writing after having received careful commentary is crucial to this requirement.
  - c. **Oral Skills coursework or additional Writing Experience coursework—3 units.** Courses in oral literacy involve effective communication of ideas through oral presentation and build on and strengthen the critical thinking skills exercised through writing. As an alternative to developing oral communication skills, students may take additional coursework certified as writing experience (see requirement b, above).
  - d. **Visual Literacy coursework—3 units.** Courses in visual literacy provide students with the analytical skills they need to understand how still and moving images, art and architecture, illustrations accompanying written text, graphs and charts, and other visual embodiments of ideas inform and persuade people. Coursework may stress the skills needed to communicate through visual means as well as the analytical skills needed to be a thoughtful consumer of visual messages.
2. **Civic & Cultural Literacy—9 units.** The objective of this core literacy is to prepare students for thoughtful, active participation in civic society. Students will learn to think analytically about American institutions and social relations, understand the diversity of American cultures, and see the relationships between national and local cultures and the world.
- a. **American Cultures, Governance, & History—3 units.** Courses in American Cultures, Governance, & History provide students with an understanding and appreciation of the social and cultural diversity of the United States and of the relationships between these diverse cultures and larger patterns of national history and institutions.
  - b. **Domestic Diversity—3 units.** Courses in Domestic Diversity provide students with an understanding of issues such as race, ethnicity, social class, gender, sexuality, and religion within the

United States, and develop the student's ability to think critically about diverse socio-cultural perspectives.

- c. **World Cultures—3 units.** Courses in World Cultures provide students with a global perspective in a world where communication technologies, economic relationships, and the flow of people across national borders increasingly challenge national identities and create transnational cultures. Students can satisfy this requirement through coursework or through certified study abroad.
3. **Quantitative Literacy—at least 3 units.** The objective of this core literacy is to provide students with an understanding of quantitative reasoning and skills for evaluating claims and knowledge generated through quantitative methods.
4. **Scientific Literacy—at least 3 units.** The objective of this core literacy is to provide students with an understanding of the fundamental ways scientists approach problems and generate new knowledge, and an understanding of how scientific findings relate to other disciplines and to public policy.

## Approved General Education Courses

*Please note* that you cannot claim GE credit for a course you completed *before* it was an approved GE course.

## Additional Conditions

**Meeting Total Units Requirement.** With the exception of units used to satisfy the English Composition element, units approved for a Core Literacy will be accepted toward satisfaction of the appropriate Topical Breadth component. Course units that satisfy requirements in the candidate's major or majors may also be counted toward satisfaction of General Education requirements.

**Grading.** Students may take courses P/NP to fulfill their General Education requirements, up to the limits set by college and campus regulations.

**Advanced Placement & International Baccalaureate.** Students may not present Advanced Placement or International Baccalaureate credit in satisfaction of GE requirements, except insofar as it may be applied to the English Composition component of the Literacy with Words and Images requirement.

**Transfer Students** who have successfully completed the Intersegmental General Education Transfer Curriculum (IGETC) lower division course work are exempt from all General Education requirements that may be met with lower division courses. Transfer students who have not completed the IGETC, and who are not entitled to graduate under the provisions of a General Catalog issued prior to Fall 2011 as permitted by the applicable college policy on degree requirement changes, are required to satisfy all General Education components under the revised requirement but may offer previously completed coursework toward their satisfaction.

## Scholarship Requirement

To receive a bachelor's degree, you must obtain twice as many grade points as units (a 2.000 GPA) for all courses you have attempted in the university. Each college has specific requirements, as well; see College Requirements:

- Agricultural & Environmental Sciences (p. 40)
- Biological Sciences (p. 41)

- Engineering (p. 43)
- Letters & Science (p. 43)

For more information on calculating your grade points, see Calculate Your GPA (<https://registrar.ucdavis.edu/records/transcripts/calculate-gpa/#:~:text=The%20Official%20UC%20GPA%20is,found%20in%20the%20GPTS%20column>).

## College Major & Minor Information

### The Major

Information regarding majors by school. Complete list of major degrees offered at UC Davis (p. 49).

#### College of Agricultural & Environmental Sciences

- Declaring a Major (<https://caes.ucdavis.edu/students/advising/academic-policies/the-major/>)
- Change of Major (<http://www.caes.ucdavis.edu/students/advising/enrollment/the-major/>)
- Multiple Majors (<http://www.caes.ucdavis.edu/students/advising/enrollment/the-major/>)
- Cross-College Majors (<http://www.caes.ucdavis.edu/students/advising/enrollment/the-major/>)
- Individual Major (<https://caes.ucdavis.edu/students/advising/academic-policies/the-major/>)

#### College of Biological Sciences

- Declaring a Major (<https://basc.biology.ucdavis.edu/change-major/>)
- Change of Major (<https://basc.biology.ucdavis.edu/change-major/>)
- Multiple Majors (<https://basc.biology.ucdavis.edu/change-major/>)
- Cross-College Majors (<https://basc.biology.ucdavis.edu/change-major/>)
- Individual Major (p. 273)

#### College of Engineering

- Declaring a Major (<http://engineering.ucdavis.edu/undergraduate/advising-q-a/>)
- Change of Major (<http://engineering.ucdavis.edu/undergraduate/advising-q-a/>)
- Multiple Majors (<http://engineering.ucdavis.edu/undergraduate/advising-q-a/>)

#### College of Letters & Science

- Declaring a Major (<https://lettersandscience.ucdavis.edu/frequently-asked-questions/>)
- Change of Major (<https://lettersandscience.ucdavis.edu/frequently-asked-questions/>)
- Multiple Majors (<https://lettersandscience.ucdavis.edu/frequently-asked-questions/>)
- Cross-College Majors (<https://lettersandscience.ucdavis.edu/frequently-asked-questions/>)
- Individual Major (<https://lettersandscience.ucdavis.edu/frequently-asked-questions/>)

### The Minor

Information regarding minors. Complete list of minors offered at UC Davis (p. 49).

### Minor Information by College

- Agricultural & Environmental Sciences (<https://caes.ucdavis.edu/students/academics/minors/>)
- Biological Sciences (<https://basc.biology.ucdavis.edu/undergraduate/majors-minors/>)
- Engineering (<https://engineering.ucdavis.edu/undergraduates/majors-and-minors/>)
- Letters & Science (<https://lettersandscience.ucdavis.edu/major-and-minor-advising/>)

### Minor Information by School

College of School of Education (<https://education.ucdavis.edu/general-information/courses-minor-education/>); Declare (<https://education.ucdavis.edu/general-information/how-do-i-declare-minor/>)

School of Management; Accounting (<https://gsm.ucdavis.edu/minors/accounting/>) | Technology Management (<https://gsm.ucdavis.edu/minors/technology-management/>)

## Agricultural & Environmental Sciences

College of Agricultural & Environmental Sciences

### College of Agricultural & Environmental Sciences

A preliminary degree check can be used to help track your progress. You can also utilize the MyDegree (<https://mydegree.ucdavis.edu/>) advising tool to review requirements. It is the responsibility of the undergraduate scholar to ensure all requirements are fulfilled.

### College Units & Limitations

- A minimum of 180 quarter units is required for the degree. At least 54 of the 180 units must be in upper division or graduate courses except that a maximum of 9 units in graduate level courses (200 series) and professional courses (300 and 400 series) will be accepted toward the 54 upper division requirement.
- No more than 6 units of Physical Education 001 and/or 006 and no more than 20 units of Internship 092 and 192 and courses numbered 099, 190C, 197T, and 199 may be counted toward the total of 180 units for the degree.
- A maximum of 12 units of Internship 092 and 192 is permitted. Credit will not be given for 192, 199 numbered courses prior to completion of 84 units.
- The Academic Senate limits the total number of courses grades P, including units earned in courses graded "P/NP only" to one third of the units completed on the UC Davis campus. The P/NP option should not be used for major requirements.
- Students may apply credit for courses taken in the Open Campus Program through UC Davis Continuing and Professional Education (formerly known as UC Davis Extension) towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis. Students registered at UC Davis may not enroll in Open Campus courses.
- University of California Extension courses can be used to satisfy graduation requirements only with approval of the dean, as long as

the units are deemed as transferable units by the Undergraduate Admissions office. Only grade points from University of California, Davis Extension courses, not Extension courses from other campuses, will be counted toward the student's overall UC grade point average.

- Undergraduate students may not exceed 225 units; registration for enrollment when the limit has been reached may only be approved by the dean by petition.

## College Residence

- 35 of the final 45 units must be taken while an undergraduate scholar is in the college. University of California Extension courses can be used to satisfy graduation requirements only with approval of the dean. Only grade points from University of California, Davis extension courses will count toward the student's overall UC grade point average.
- Education Abroad Courses are not considered in residence. Please speak to the Dean's Office if you are planning to study abroad.

## College Scholarship

- The minimum grade point average (GPA) to satisfy the scholarship requirement is 2.000 for all courses counted toward the major and for all upper division courses used to satisfy major requirements.
- Only grades earned in courses taken at UC Davis will be included in the grade point computations.
- Cumulative grade point average (GPA) is a minimum of 2.000; major grade point average (GPA) is also a minimum of 2.000—both are required in order to be eligible for graduation.
- Major grade point average (GPA) calculation varies per program of study. Questions regarding major GPA should be directed to the department advisor.
- To obtain these minimum averages in the major, you may repeat courses that are graded D or F. If you have to repeat a course more than once, scholars must obtain approval from the Dean's Office prior to enrolling.

## English Composition

This requirement may be met in one of three ways:

(1) Either two courses emphasizing written expression or one course emphasizing written expression and one course emphasizing oral expression, with a grade of C- (or P) or better. The following UC Davis courses satisfy this requirement:

- (a) One course must be selected from English (ENL) 003; University Writing Program (UWP) 001, 048, 049, 101, 102 series, or 104 series (courses with primary emphasis in writing skills), and;
- (b) One course selected from the courses not selected above, or from Communication (CMN) 001; Comparative Literature (COM) 001, 002, 003, 004, or Native American Studies (NAS) 005 (courses emphasizing either writing or speaking skills.)

(2) Advanced Placement English score of 4 of 5 PLUS any course listed in 1(a) or 1(b) above EXCEPT University Writing Program (UWP) 001 or English (ENL) 003.

(3) By successfully passing the English Composition Examination administered by the College of Letters & Science upon completion of 70 units of degree credit (the examination does not yield credit).

For specific examination dates, instructions, and to sign up to take an examination, see the University Writing Program-Upper Division

Composition Exam Information (<http://writing.ucdavis.edu/compexam/>). It is recommended that students with disabilities contact the Student Disability Center at 530-752-3184 and the Entry Level Writing Program Office 530-752-0450 at least two weeks prior to the exam date to arrange accommodations.

# Biological Sciences

## College of Biological Sciences

# College of Biological Sciences

## Unit Requirements

### Total Units

Complete no less than 180 units allowing for the unit credit limitations listed below. No student may exceed 225 units in their academic career without approval of the Dean. Units earned in Advanced Placement and International Baccalaureate exams are not counted toward this 225-unit limit. Upon reaching 200 units, a student must submit an Academic Graduation Plan and an Excess Unit Petition on OASIS.

### Upper Division Units

Complete 64 upper division units.

### Unit Credit Limitations

- Passed/Not Passed Units.** All courses used to satisfy major requirements must be taken on a letter-graded basis, unless courses are only offered on a Passed/Not Passed basis. If a student adds or changes a major course offered for a letter grade to Passed/Not Passed, the college will return it to a letter grade. In addition, the Academic Senate limits the total number of courses graded P, including units earned in courses graded "P/NP only," to one third of the units completed on the UC Davis campus.
- Physical Education.** Maximum of 6 units of Physical Education 001 & 006 (PHE), and similar physical activity courses including transfer work.
- Transfer Work.** Maximum of 105 units of credit earned at two-year institutions (community college).
- Graduate Courses.** Units from courses in the 200 series (with the exception of course 299) may apply toward the minimum 64-unit upper division requirement and/or as a substitution for undergraduate courses in the major under the following conditions:
  - Students must obtain written permission from the course instructor and the faculty advisor for their major.
  - The faculty advisor will confirm that students have a minimum 3.400 GPA in the major at the time that they register for the course.
- Professional and teaching courses.** Maximum of 9 units in courses numbered 300-399 and 400-499. These units may not be applied toward the 64-unit upper division requirement.
- Upper division standing.** Must complete 90 units before enrolling in 192, 194H and 199 to receive degree and upper division credit.
- Special Study.** No more than 5 units per quarter of Special Study courses (099, 194H, 199).
- Nonstandard Courses.** A maximum of 20 units of nonstandard courses including transfer work can be counted towards the degree.<sup>1</sup> Nonstandard courses are defined here as tutoring, internship, research, research conference, honors research and similar course activities. Some examples of these courses are, but are not limited to, courses numbered 090C, 091, 092, 092C, 097T, 097TC, 099, 189, 190C,

191, 192, 192C, 193, 194H, 197T, 197TC, 199, etc. Courses numbered 098 or 198 are not included in this 20-unit limitation.

Within these 20 units, there are additional unit credit limitations on tutoring and internship units:

- **Tutoring.** Maximum of 3 tutoring units including but not limited to 097T, 197T, 097TC and 197TC.
- **Internship.** A maximum of 6 internship units including but not limited to 092, 192, 92C, 192C.

<sup>1</sup> Specific exceptions to these limits may be granted by the Committee on Undergraduate Curriculum and Educational Policy (CUCEP) based on the uniqueness of the experiences and their concordance with the petitioner's educational objectives.

### Credit for Open Campus (Concurrent) Courses

Students may apply credit for courses taken in the Open Campus (Concurrent) Program through UC Davis Extension towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis. However, the units earned do not satisfy the university residence requirement. Students registered at UC Davis may not enroll in Open Campus courses.

### Residence

Meet university residence requirement. No additional college residence requirements.

### Scholarship

Students must attain at least a 2.000 GPA for all courses required in their major by graduation. Students must also attain a 2.000 GPA in all Depth Subject Matter courses required in their major.

- **Repeating Courses.** Students may repeat courses once in which they received a grade of D+ or less. To repeat a course more than once, students must submit Multiple Repeat Petition in OASIS for review prior to enrolling in the course.

### English Composition

English Composition requirement may be satisfied in one of two ways:

1. Completing 8 units, to include 4 upper division units, in English composition courses with at least a C- or Passed grade from the following list:
  - Comparative Literature 001, 002, 003, 004
  - English 003
  - Native American Studies 005
  - University Writing Program 001, 001V, 001Y, 048, 049, 101, 101V, 101Y, UWP 104AY, UWP 104FY, 102 series, or 104 series

#### OR

2. Passing the English Composition Examination, administered by the University Writing Program, upon completion of 70 units of degree credit. This examination does not yield credit. Students interested in entering the health science field should check with the Health Professions Advising office or the Biology Academic Success Center before choosing this option.

### English Composition Examination

The no-fee, no-unit examination is typically offered on a Saturday in October, January, and April. For specific dates, see Upper Division Composition Exam (UDCE) (<http://writing.ucdavis.edu/compexam/>).

If students choose to take this challenge exam, they are strongly advised to do so in their junior year. Register for the English Composition Examination at Upper Division Composition Exam (UDCE) (<http://writing.ucdavis.edu/compexam/>) from the Monday before the exam date until Friday at noon or until no spaces remain. The AWPE/Upper Division Composition Examination form, available at the UC Davis Bookstore, is required. It is recommended that students with disabilities contact the Student Disability Center 530-752-3184 and the University Writing Program 530-752-6283 at least two weeks prior to the exam date to arrange accommodations. No examinations are given during the summer.

### Additional Bachelor of Arts Requirements

Bachelor of Arts degrees are available in Biological Sciences; Evolution, Ecology and Biodiversity; Microbiology; and Plant Biology. These degrees offer students an opportunity to broaden their education while pursuing a rigorous life science major. Candidates for the Bachelor of Arts degrees must complete two additional requirements.

### Foreign Language

The requirement can be met in one of three ways:

- Complete with passing grades 15 quarter units of college level course work, or the equivalent thereof, in a single language.
- Attain a minimal score prescribed by the Committee on Undergraduate Curriculum and Educational Policy (CUCEP), in the College Entrance Examination Board Achievement Test in Foreign Language, which may be taken at any time during the student's high school career, or any other achievement test approved by the Committee on Undergraduate Curriculum and Educational Policy.
- Placement beyond the 15-unit level on a placement/proficiency examination offered by one of the foreign language departments of the University.

### Breadth Requirements

Satisfaction of the campus General Education requirement (or IGETC for transfer students) in effect Fall 2011 will satisfy the Breadth requirement.

### Declaration of Major/Undeclared—Life Sciences

**Students must declare a major by 90 units. A hold will be placed on a student's registration if they are still undeclared after completing 90 UC Davis units.**

All changes of major and college must be completed before the beginning of the student's quarter of graduation.

Students who are enrolled in a major administered by the College of Biological Sciences and students who are Undeclared-Life Sciences see an academic advisor in the Biology Academic Success Center for their major, university, general education, and college academic advising. Faculty advisors are also available in the department that houses their major, as listed in the catalog, or at the Biology Academic Success Center.

### Degree Check

Students are encouraged to meet with their academic advisor at least once a year to ensure timely graduation. Students are strongly encouraged to consult a Biology Academic Success Center academic advisor at the following points in their academic careers:

- First-Year Mandatory Advising for transfer students during their first two quarters on the Davis campus (required).
- Before accumulating 90 units.
- Before accumulating 135 units.
- In addition, if you are taking courses which, if passed, will cause your unit total to exceed 200 units and you intend to register for the next quarter, you must file a plan with your advisor that leads to graduation within 225 units. If the plan anticipates registering after you have accumulated 225 units, the plan must be submitted to the Dean for approval.

## Degree Requirement Changes or Catalog Rights

On occasion, the faculty makes changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is college policy that you may choose to fulfill the university and college requirements (see General Education Requirements) as stated in any UC Davis General Catalog in effect at the time you were registered at UC Davis. If you have transferred to UC Davis from a community college, state college, or another university, you may follow the requirements as stated in any UC Davis General Catalog in effect either during the three years immediately preceding your transfer to UC Davis or at the time you first registered at that institution, whichever is most recent. Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university and college requirements specified in that catalog.

With respect to the completion of your major requirements, most of the majors in the College of Biological Sciences require completion of the major degree requirements in effect at the time you officially declared your major. However, because departments differ in how they handle these matters, check with your BASC academic advisor if you have any questions about your major requirements.

## Engineering

College of Engineering

### College of Engineering Unit

Each candidate must complete a program of study under an approved curriculum in Engineering, totaling at least 180 units.

#### Residence

College of Engineering students must meet the university residence requirement. There are no additional college residence requirements.

- **Limitation on Credit for UC Davis Extension Courses.** Students may apply a maximum of 16 units of credit for courses taken in the Open Campus Program through UC Davis Extension towards the unit requirement of their major. Courses may be taken only when written approval has been obtained from the Associate Dean for Undergraduate Studies. The grade points earned when enrolled in Open Campus courses will count toward the calculation of the student's UC GPA upon your admission or readmission to regular student status at UC Davis. Students registered at UC Davis may not enroll in Open Campus courses.

## Scholarship

In addition to meeting the university scholarship requirement, College of Engineering students are required to maintain at least a 2.000 grade point average for all undergraduate course work within the College of Engineering at UC Davis.

## English Composition

All students admitted to the University must complete the Entry Level Writing Requirement (p. 36) before credit for any composition course or general education writing experience course will be granted.

Once the Entry Level Writing Requirement has been satisfied, there are two distinct composition requirements for engineering students:

- **Lower division composition.** This requirement can be satisfied by completion of an
  - Advanced Placement English exam with a score of 4 or 5;
  - International Baccalaureate credit for English 3; or
  - completion of certain coursework with a grade of C- or better.

Courses allowed vary by major. Please see your program advisor to determine coursework that has been approved for your major.

- **Upper division composition.** Requirements for upper division composition vary by major. Please see your program advisor to determine the coursework that has been approved for your major. Please note that when you use coursework to satisfy either of the composition requirements, you must earn a grade of C- or better.

## Current Catalog Curriculum

In order to ensure that students graduate with the most current engineering knowledge, College of Engineering Students must complete the major requirements in effect in the academic year of graduation or in the immediately preceding academic year.

## Letters & Science

College of Letters & Science

### College of Letters & Science Unit

A minimum of 180 units is required for the bachelor's degree. 64 units must be earned in upper division courses.

#### Registration Beyond the 225-Unit Limit

You are expected to fulfill all degree requirements within the 180- to 225-unit range. Once 225 units have been completed (excluding units awarded for College Board Advanced Placement Examinations or International Baccalaureate Examinations), you may register only with the permission of the Letters & Science Office of Undergraduate Education and Advising. Such permission is rarely granted and then typically only to allow completion of minimum degree requirements. A hold will be placed on a student's record when they reach 200 total units, requiring submission of an academic plan to verify the degree can be completed within the 225-unit cap. You will be expected to adhere to a program of courses agreed upon and to meet other conditions that may have been set. Approval must be obtained from Undergraduate Education & Advising in the Office of the Dean before you will be permitted to register for courses for the quarter following completion of 225 or more units.

If you are in good standing, you will be able to complete 12 quarters or the equivalent (e.g., four years) of college work even if you have earned

more than 225 units before you finish your fourth year. You must petition for continuation, however, and file the quarter-by-quarter course program you have planned.

### **Unit Credit Limitations**

For certain courses, limits have been established on the number of units that can be counted towards the 180-unit minimum required for the degree. To avoid discovering just before graduation that you are short units, meet with an advisor regularly and keep track of the number of units you have taken in each of the following categories.

### **Limitation on Credit for Graduate & Professional Courses**

Undergraduates may enroll in graduate and professional courses subject to the restrictions outlined on the petition to Request to Take a 200, 300 or 400 - Numbered Course for Degree Credit ([http://ls.ucdavis.edu/sites/g/files/dgvnsk276/files/files/page/take-200-300-400-course\\_1.pdf](http://ls.ucdavis.edu/sites/g/files/dgvnsk276/files/files/page/take-200-300-400-course_1.pdf)). Graduate and professional courses that have been completed will be listed on the student's transcript in the usual manner. However, the units earned may be counted toward degree requirements only under the conditions listed below.

Within the limitations A, B and C given below, undergraduate students in the College may count up to a combined total of 9 units in graduate 200 series courses and in 300 and 400 series professional courses toward degree requirements. These units, however, are not counted as upper division units.

- A. The recommendations of the instructor in the course and the department chairperson—in addition to approval from Undergraduate Education & Advising in the Office of the Dean—must be obtained by petition in order to receive credit toward the degree for the following kinds of courses:
  - All graduate courses 200–298, whether offered by a department or program outside of or within the College of Letters & Science.
  - All professional courses 300–398 for teachers offered outside of the College of Letters & Science.
  - All postgraduate professional courses 400–498 offered outside of the College of Letters & Science.
  - All variable unit courses 300–398 and 400–498 offered within the College of Letters & Science.
- B. The minimum eligibility conditions for an undergraduate student in the College to petition for degree credit for a 200, 300, or 400 series course are a UC grade point average of 3.300 and completion of 18 upper division units basic to the subject matter of the course. These eligibility conditions may be waived, however, upon the recommendation of the course instructor and concurrence of the department chairperson if the student's preparation warrants exception.
- C. Undergraduates in the College cannot receive degree credit for special study courses 299, 399, or 499.

### **Limitation on Credit for Units Graded P**

Students in the College of Letters & Science are subject to an additional limitation on the number of units that may be completed employing the Passed/Not Passed grading option. Graduating seniors and other students planning to undertake graduate or professional studies, should consult an advisor before electing for Passed/Not Passed grading in courses required for the major program. Excluding courses that are graded on a Passed/Not Passed (P/NP) basis only, the number of units graded P that may be accepted towards a degree in the College of Letters & Science is limited to not more than one fourth of the units completed in residence on the UC Davis campus. The Academic Senate limits the total

number of courses graded P, including units earned in courses graded "P/NP only," to one third of the units completed on the UC Davis campus. This limitation applies to all UC Davis undergraduates, including Letters & Science students.

### **Limitation on Credit for UC Davis Extension Courses**

- A. UC Davis Continuing and Professional Education courses with a designator of "X." Students may apply credit earned through lower division and upper division UC Davis Continuing & Professional Education "X" courses towards the 180-unit requirement only with written approval from Undergraduate Education & Advising in the Office of the Dean prior to registration. The degree credit allowed for such courses is usually less than the unit value listed in the course description. Additional limitations on UC Davis Continuing & Professional Education "X" courses include:
  - A maximum of 9 units may be offered for elective credit only, and
  - They may not be applied toward fulfillment of the Area, Foreign Language, Upper Division, or Residence requirements of the College.
- B. UC Davis Continuing & Professional Education courses with a designator of "XD." Students may apply credit earned through lower division and upper division UC Davis Continuing & Professional Education "XD" courses towards the 180-unit requirement. Additionally, credit from such courses may be applied toward fulfillment of all university, campus, college and major unit and subject matter requirements—including the Area, Foreign Language, Upper Division and Residence requirements of the College—in the same manner that the corresponding regular UC Davis course is so accepted.
- C. UC Davis Continuing & Professional Education courses with a designator of "XDC" [Open Campus (Concurrent) Program]. Subject to the following conditions, students may apply credit earned through lower division and upper division UC Davis Continuing & Professional Education Open Campus (Concurrent) courses—e.g., those bearing the "XDC" designator, towards university unit and subject requirements, and, effective Fall 2003, the calculation of the student's UC GPA, upon admission or readmission to regular student status at UC Davis.
  - Students on leave of absence and regular status students when matriculated, or regular status students for a period of one calendar year following the last term of regular enrollment at UC Davis, may not enroll in Open Campus (Concurrent) courses. Exceptions to this policy for undergraduate students may be made only under extraordinary circumstances by petition with prior approval by Undergraduate Education & Advising in the Office of the Dean and the Dean of UC Davis Continuing and Professional Education.
  - Concurrent ("XDC") courses do not count toward satisfaction of the University residence requirement or the residence requirements of the campus or the college.
  - Concurrent ("XDC") courses may constitute at most half of the units offered in satisfaction of the upper division requirements of the major.
  - In the event that the faculty of the college imposes further restrictions on the number of units of UC Davis Continuing and Professional Education Open Campus (Concurrent) course work that may be applied to undergraduate degree programs, the allowable number of units of course work will be determined chronologically, starting with the course completed first. Grade

point credit for such courses will be determined in the same manner.

### **Other Unit Credit Limitations**

The following are additional courses that have limits on the number of units that can be counted toward your degree:

- Internship courses (numbers 092, 192): 12 units maximum including internship units taken at other institutions; see *Nonstandard courses*, below.
- Music 130, 131, 140, 150 (combined): 19 units maximum.
- Nonstandard courses (092, 097T, 097TC, 099, 192, 194H, 197T, 197TC, 199 and similar courses): 30 units maximum or one sixth of the units taken at UC Davis, whichever is the smaller; note the separate unit limits on internship, special study and tutoring courses; and major limitations
- Physical Education 001 and 006 (combined): 6 units maximum.
- Special Study courses (099, 194H, 199): 5 units maximum in any one quarter; see *Nonstandard courses*, above.
- Tutoring courses (097T, 097TC, 197T, 197TC): 10 units maximum; see *Nonstandard courses*, above.

### **Residence**

While registered in the College of Letters & Science, a minimum of 27 upper division units, including 18 upper division units in the major, must be completed on the Davis campus; work completed while registered in the UC Education Abroad Program or the UC Davis Continuing & Professional Education Open Campus Program does not satisfy university or College Residence requirements.

### **Scholarship**

The minimum grade point average to satisfy the scholarship requirement is 2.000 for all courses counted toward the major and for all upper division courses used to satisfy major requirements. Only grades earned in courses taken at UC Davis will be included in the grade point computations. To obtain these minimum averages in the major, you may repeat courses that are graded D or F. If you have to repeat a course more than once, you need approval from Undergraduate Education & Advising in the Office of the Dean.

### **English Composition**

All undergraduates in the College of Letters & Science must fulfill a two-course writing requirement, by completing each course with a grade of C- (or P) or higher or by testing out of one or both courses. All courses require a minimum of 6,000 words of writing, designed to introduce students to academic and professional writing, advance their analytic skills, and improve their writing process. Students may satisfy the writing requirement by completing:

1. One course from University Writing Program 001, English 003, Comparative Literature 001, 002, 003, 004, or Native American Studies 005; and,
2. After completing 84 units, one course selected from University Writing Program (UWP) 101, UWP 102 series, or UWP 104 series; or completing four units of upper division Writing Experience (WE) designated coursework approved by the English Language & Literacy (ELL) Committee of the College of Letters & Science (these units may only count for the English Composition requirement, not towards the 6 units of General Education—Core Literacy/Writing Experience requirement). Subject to the restrictions just listed, additional ELL approved courses acceptable for satisfying the upper division writing

will be listed on the College of Letters & Science degree requirements (<https://lettersandscience.ucdavis.edu/degree-requirements/>).

### **Transfer Courses in English Composition**

Transfer courses considered to be equivalent or comparable to English 003, Comparative Literature 001, 002, 003, 004, Native American Studies 005, or University Writing Program 001, 001V, 001Y, 101, 102 or 104 series, will be accepted toward satisfaction of the English Composition requirement. Note that University Writing Program 101, 102 and 104 series courses or the equivalent must be taken after you have completed 84 units of degree credit.

### **Upper Division Composition Examination**

The no-fee examination is typically offered on a Saturday morning in October, January and April. No examinations are given during the summer.

For specific examination dates, instructions, and to sign up to take an examination, see the University Writing Program—Upper Division Composition Exam Information (<http://writing.ucdavis.edu/compexam/>). It is recommended that students with disabilities contact the Student Disability Center at 530-752-3184 and the Entry Level Writing Program Office, 530-752-0450, at least two weeks prior to the exam date to arrange accommodations.

Students are advised to complete this requirement in their junior year.

### **Area (Breadth)**

The College Breadth Requirement promotes the intellectual growth of students by asking them to acquire a broader background of knowledge than is provided by the usual major. The Breadth requirement also guides students in exploring the interdependence of knowledge.

#### **A.B. Degree**

Satisfaction of the campus General Education requirement fulfills this requirement.

#### **B.S. Degree**

A total of 90 units in natural sciences/mathematics; units in the approved courses listed below used in satisfaction of the campus General Education requirement in Science & Engineering topical breath may also be used to satisfy this requirement.

Courses numbered 092, 097T, 097TC, 098, 192, 197T, 197TC, 198 and 200-499 cannot be counted toward satisfaction of the natural sciences/mathematics Area requirement. A maximum of 10 units in special study courses (099, 194H, 199) may be counted toward that portion of the Area requirement. Subject to the restrictions just listed, courses acceptable for fulfilling the 90-unit natural sciences/mathematics Area requirement are:

#### **Natural Sciences & Mathematics**

- Anatomy, Physiology & Cell Biology (APC) 100
- Anthropology (ANT) 001, 001Y, 013, 015, 054, 151, 152, 153, 154A, 154BN, 154C, 154CL, 155, 156A, 156B, 157, 158, 159, 160, 180, 182
- Astronomy (AST)
- Avian Sciences (AVS) 013
- Biological Sciences (BIS)
- Cell Biology & Human Anatomy (CHA) 101, 101L
- Chemistry (CHE)
- Engineering (ENG) 006, 010, 035, 102
- Engineering: Biomedical (BIM) 126

- Engineering: Computer Science (ECS) 012, 017, 020, 032A, 032B, 032C, 034, 036A, 036B, 036C, 050, 089A-L, 113, 115, 116, 120, 122A, 122B, 124, 127, 129, 130, 132, 140A, 140B, 142, 145, 150, 152A, 152B, 152C, 153, 154A, 154B, 158, 160, 161, 162, 163, 164, 165A, 165B, 170, 171, 172, 173, 174, 175, 177, 178, 189A-N, 191, 193A, 193B
- Engineering: Electrical & Computer (EEC) 170, 173A
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- Evolution & Ecology (EVE)
- Exercise Biology (EXB) 101, 103, 106, 106L, 110, 111, 112, 113, 115, 116, 117, 126
- Fiber & Polymer Science (FPS) 110
- Food Science & Technology (FST) 100A, 100B, 101A, 101B
- Geology (GEL)
- Integrated Studies (IST) 008A
- Mathematics (MAT)
- Microbiology (MIC)
- Molecular & Cellular Biology (MCB)
- Neurobiology, Physiology, & Behavior (NPB)
- Nutrition 010, 010V, 010Y, 111AV, 111B
- Pathology, Microbiology, & Immunology (PMI) 126
- Physical Education PHE) 133, 135
- Physics (PHY)
- Plant Biology (PLB)
- Psychology (PSY) 041, 100, 100Y, 101, 103A, 103B, 104, 113, 121, 122, 123, 124, 125, 126, 127, 129, 130, 131, 132, 135, 137, 146, 180B
- Statistics (STA)
- Wildlife, Fish, & Conservation Biology (WFC) 010

## Foreign Language (A.B. & B.A.S. Degrees)

A key component of liberal education, the study of another language exposes students to a ubiquitous and highly diverse component of human behavior and interaction. Language learning enables students to communicate effectively in an increasingly internationalized world, enhances their ability to understand ways of thinking different from their own, gives them direct access to cultural production from another time and place, awakens in them an awareness of the conditioned nature of their assumptions about the world, and trains them to cope more effectively with intellectual and practical problems they may face in their future careers.

The College of Letters & Science encourages its students to acquire functional proficiency in at least one language other than English before graduating. At a minimum, the College requires A.B. candidates to complete three sequenced quarters (15 units) of courses, or its equivalent, in one foreign language. B.S. candidate requirements are determined by their respective major program.

### Languages Satisfying the Requirement

The Foreign Language Requirement may be satisfied in any language offered at UC Davis, including ancient languages, or which is normally taught at—and for which transfer credit is allowed—from another institution, including American Sign Language. Students may also satisfy this requirement by examination in a language not offered on the UC Davis campus (see below).

### Satisfaction of the Requirement

#### At UC Davis or Another Accredited Institution

You may satisfy the requirement by taking 15 quarter units of one foreign or classical language offered at UC Davis. You may also fulfill this requirement by taking the equivalent number of transferable quarter units in one foreign language at an accredited institution. Transfer students should consult the Transfer Credit Evaluation, which is issued by Undergraduate Education and Advising in the Office of the Dean, within a quarter after their first enrollment at UC Davis. Students planning to continue to study the same language at UC Davis must consult the relevant language coordinator. If you have successfully completed the second or third year of a language in the tenth or higher grade in high school, you may receive unit credit for course 1 of that language when taken at UC Davis, but the grading mode will be P/NP only. Although a Passed or Not Passed grade will be charged to your P/NP option, no petition is required.

#### Through Study Abroad

Certain study abroad programs offered by UC Davis through the Global Learning Hub (<https://globallearning.ucdavis.edu/>), UC Education Abroad Program and other accredited institutions may be used to satisfy the requirement. Some of these programs do not have a language prerequisite, but others do. If you intend to apply for a study abroad program with a language prerequisite, you should plan on completing the relevant foreign language requirement by the end of your second or third year, depending on the program.

#### With the Intersegmental General Education Transfer Curriculum (IGETC)

IGETC is a series of courses which prospective transfer students attending California community colleges may complete to satisfy the lower division breadth/general education requirements at the University of California. Students may satisfy the Foreign Language requirement by attaining certification of **IGETC completion**.

#### By Examination: Proficiency Exam

The UC Davis Language Center (DLC) offers proficiency tests in numerous languages. A proficiency test does not yield unit credit; it only determines whether the Foreign Language requirement has been met or at which point in the language sequence you should enroll. Students must follow the language program's placement policy if they decide to study the language at UC Davis.

#### By Examination: Standardized Tests

College Board Subject Test: Earning a qualifying score of at least 550 on a College Board Foreign Language Subject Test satisfies the requirement. This test may be taken at any time during your high school career. Once your score is on file at Undergraduate Admissions, notify Undergraduate Education and Advising in the Office of the Dean so that satisfaction of the College requirement can be noted on your record.

#### College Board Advanced Placement Examination

A score of 5, 4 or 3 on any foreign language College Board Advanced Placement Examination, with the exception of Latin, taken in high school will satisfy the Foreign Language requirement.

#### International Baccalaureate Higher Level Examination

A score of 7, 6, or 5 on the French A1, A2, or B Examination, the German A1, A2 or B Examination, the Italian A1 Examination, the Latin Examination, the Portuguese A1, A2 or B Examination, or the Spanish A1 Examination taken in high school will satisfy the Foreign Language requirement.

### **By Examination: Other Means**

If you have not completed the required level language course, but assume you have attained equivalent language fluency and cultural knowledge, you may satisfy the language requirement by passing a proficiency examination. For more information, consult the appropriate foreign language department. You may validate your knowledge of a language acquired by any means before matriculating at UC Davis by taking a proficiency test or another form of evaluation (if available in the relevant language department). A test may not be taken, however, in a language for which you have already received degree credit.

### **Major Degree Certification**

These requirements are fulfilled by completing a major program offered by a teaching department or program committee in the College of Letters & Science (see the list of majors) or an individual major program approved by the College's Committee on Individual Majors. No more than 6 units in internship courses (numbered 092, 192, or similar internship courses) may be accepted in satisfaction of the requirements of major programs. Courses numbered 097T, 097TC, 197T and 197TC do not satisfy unit or course requirements in the major. Please check with your major advisor to determine if there are any additional restrictions for your specific major. You can also learn more about the requirements for a major by talking with a Major Advisor and visiting the departmental website.

### **Degree Check**

#### **Freshman Admits**

In your third year, you will be notified by Undergraduate Education & Advising in the Office of the Dean that a summary of your progress in fulfilling college and university requirements has been completed. At approximately this point, you should contact your departmental advisor for a check of your major requirements.

#### **Transfer Admits**

During your UC Davis Orientation Experience, your department/program advisor will review your major requirements with you. Additionally, you will receive notification of the evaluation of your transfer institution credit summarizing your progress in fulfilling college, campus and university requirements in late summer/early fall after your official transcripts have been processed.

#### **Senior Year**

Before the beginning of your senior year, take some time to consider your goals and to plan the academic program for your final year as an undergraduate. To plan properly and to ensure that you get the most out of your remaining education and complete all graduation requirements, you should know what requirements remain unsatisfied. You are encouraged to utilize the MyDegree (<https://mydegree.ucdavis.edu/>) advising tool for assistance. **While not a replacement for academic advising by your college and major advisors**, it is an online advising tool that allows you to understand your degree requirements, track your progress towards degree completion, and explore alternative and/or additional fields of study.

### **Degree Requirement Changes**

On occasion, the faculty makes changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is College policy that, unless otherwise specified by the Davis Division of the Academic Senate, you may choose to fulfill the university, campus and College requirements as stated in any UC

Davis General Catalog in effect at any time you were registered as a full-time student at a post-secondary institution of higher education; e.g., community college, college or university.

Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university, campus and college requirements specified in that catalog. With respect to the completion of your major requirements, most of the majors in the College of Letters & Science require completion of the major degree requirements in effect at the time you officially declared your major. However, because departments differ in how they handle these matters, check with the department or major program office if you have any questions about which requirements apply to you.

## **Bachelor's Degree Requirements Archive**

2023-2024 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2023-2024.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2023-2024.pdf)); effective Apr 24, 2022-Apr 24, 2023.

2022-2023 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2022-2023.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2022-2023.pdf)); effective Apr 25, 2022-Apr 23, 2023.

2021-2022 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2021-2022.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2021-2022.pdf)); effective Apr 26, 2021-Apr 24, 2022.

2020-2021 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2020-2021.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2020-2021.pdf)); effective Apr 27, 2020-Apr 25, 2021.

2019-2020 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2019-2020.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2019-2020.pdf)); effective Apr 29, 2019-Apr 26, 2020.

2018-2019 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2018-2019.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2018-2019.pdf)) | 2017-2018 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2017-2018.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2017-2018.pdf)) | 2016-2017 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2016-2017.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2016-2017.pdf))

2014-2016 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2014-2016.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2014-2016.pdf)) | 2012-2014 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2012-2014.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2012-2014.pdf)) | 2010-2012 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2010-2012.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2010-2012.pdf))

2008-2010 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2008-2010.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2008-2010.pdf)) | 2006-2008 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2006-2008.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2006-2008.pdf)) | 2004-2006 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2004-2006.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2004-2006.pdf))

2002-2004 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2002-2004.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2002-2004.pdf)) | 2000-2002 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-2000-2002.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-2000-2002.pdf)) | 1999-2000 ([https://local-resources.ucdavis.edu/local\\_resources/docs/bachelors-degree-requirements-archive/bdr-1999-2000.pdf](https://local-resources.ucdavis.edu/local_resources/docs/bachelors-degree-requirements-archive/bdr-1999-2000.pdf))

For older versions, see General Catalog Archive & Downloads (p. 1397).

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- Mathematical Analytics & Operations Research, Bachelor of Science (p. 304)
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- Mathematics, Bachelor of Science (p. 300)
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- Medieval & Early Modern Studies, Bachelor of Arts (p. 314)
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- Middle East/South Asia Studies, Bachelor of Arts (p. 323)
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- Molecular & Medical Microbiology, Bachelor of Arts (p. 316)
- Molecular & Medical Microbiology, Bachelor of Science (p. 318)
- Molecular, Cellular, & Integrative Physiology, Doctor of Philosophy (p. 334)
- Molecular, Cellular, & Integrative Physiology, Master of Science (p. 334)
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- Music, Bachelor of Arts (p. 334)
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- Music, Master of Arts (p. 342)
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- Native American Studies, Master of Arts (p. 346)
- Native American Studies, Minor (p. 345)
- Nematology, Minor (p. 216)
- Neurobiology, Physiology, & Behavior, Bachelor of Science (p. 349)
- Neuroscience, Doctor of Philosophy (p. 353)
- Neuroscience, Minor (p. 352)
- Nursing Science & Health-Care Leadership, Doctor of Philosophy (p. 354)
- Nutrition & Food, Minor (p. 357)
- Nutrition Science, Bachelor of Science (p. 358)
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- Pharmaceutical Chemistry, Bachelor of Science (p. 134)
- Pharmaceutical Chemistry, Master of Science (p. 136)
- Pharmacology & Toxicology, Doctor of Philosophy (p. 363)
- Pharmacology & Toxicology, Master of Science (p. 363)
- Philosophy, Bachelor of Arts (p. 363)
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- Physician Assistant Studies, Master of Health Services (p. 355)
- Physics, Bachelor of Arts (p. 372)
- Physics, Bachelor of Science (p. 373)
- Physics, Doctor of Philosophy (p. 375)
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- Plant Biology, Bachelor of Arts (p. 375)
- Plant Biology, Bachelor of Science (p. 376)
- Plant Biology, Doctor of Philosophy (p. 380)
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- Plant Pathology, Doctor of Philosophy (p. 383)
- Plant Pathology, Master of Science (p. 383)
- Plant Sciences, Bachelor of Science (p. 396)
- Political Science, Bachelor of Arts (p. 409)
- Political Science, Doctor of Philosophy (p. 411)
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- Political Science—Public Service, Bachelor of Arts (p. 406)
- Population Biology, Doctor of Philosophy (p. 412)
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- Sociology, Bachelor of Arts (p. 433)
- Sociology, Doctor of Philosophy (p. 441)
- Sociology, Master of Arts (p. 441)
- Sociology, Minor (p. 441)
- Sociology—Organizational Studies, Bachelor of Arts (p. 430)
- Soil Science, Minor (p. 283)
- Soils & Biogeochemistry, Doctor of Philosophy (p. 442)
- Soils & Biogeochemistry, Master of Science (p. 441)
- Spanish, Bachelor of Arts (p. 443)
- Spanish, Doctor of Philosophy (p. 445)
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- Spanish, Minor (p. 445)
- Statistics, Bachelor of Arts (p. 447)
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**T**

- Technology Management, Minor (p. 292)
- Textiles, Master of Science (p. 453)
- Theatre & Dance, Bachelor of Arts (p. 454)
- Theatre & Dance, Minor (p. 457)
- Transportation Technology & Policy, Doctor of Philosophy (p. 458)
- Transportation Technology & Policy, Master of Science (p. 458)

**V**

- Viticulture & Enology, Bachelor of Science (p. 460)
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**W**

- War-Peace Studies, Minor (p. 412)
- Watershed Science, Minor (p. 287)
- Wildlife, Fish & Conservation Biology, Bachelor of Science (p. 463)
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## African American & African Studies

**College of Letters & Science**

Mark Jerng, Ph.D., Chair of the Department; July 1, 2022-June 30, 2023

### Department Office

2201 Hart Hall; African American & African Studies (<http://aas.ucdavis.edu>); Faculty (<http://aas.ucdavis.edu/people/faculty/>)  
 AAS Student Affairs Officer: 530-754-9581  
 AAS Program Coordinator: 530-752-1474

- African American & African Studies, Bachelor of Arts (p. 54)
- African American & African Studies, Minor (p. 56)

## African American & African Studies, Bachelor of Arts

**College of Letters & Science**

### The Major Program

African American & African Studies is an interdisciplinary field of study in the humanities, arts, and social sciences. This major introduces students to the social, cultural, historical, and artistic dimensions of global African Diaspora and Black communities in the United States, Africa, Europe, Asia, the Caribbean, Latin America, and Pacific regions of the world. The instructors are creative, accessible and highly qualified, with specializations across a range of disciplines. Students are exposed to and trained to think critically about the conditions and demands of global societies. Students may choose to enrich their education by studying for a summer, a quarter, or a year in Africa, or by studying for a quarter in the Caribbean. Majors and Minors are also encouraged to take advantage of relevant internship opportunities.

### The Program

The purpose of this program is to give students a sense of the individual characteristics and common concerns of Black communities in Africa, the United States, and the wider Diaspora. The African American emphasis includes courses on history, culture, and the impact of developments in politics and the economy on the social organization of Black people in the United States. The African Diaspora emphasis enables students to study the way Black communities outside Africa and the United States have dealt with questions of race and ethnicity. It also considers how they have defined their identity in the political arena by using religion, theater and dance, literature, and film. The African emphasis allows students to focus on Africa's recent history, social issues, and contemporary culture.

### Career Alternatives

Students majoring in African American & African Studies gain knowledge and strong critical thinking and analytical skills, problem-solving skills, and communication skills, all suited for advanced studies in all areas, including but not limited to the social sciences, law, education, business, medicine, and professional schools. Graduates in the major have pursued careers in all areas including education, the private and public sectors, the non-profit sector, international development agencies and human service. The interdisciplinary nature of African American & African Studies is excellent preparation for professions in community organizations such as the Urban League, NAACP, and the Office of Economic Opportunity.

### Major Advisor

Katherine Ampaw-Matthei M.Ed; [kampaw@ucdavis.edu](mailto:kampaw@ucdavis.edu) (<https://aas.ucdavis.edu/staff/>)  
 African American & African Studies Staff

## American History & Institutions

This University requirement can be satisfied by completion of AAS 010, AAS 100; listed in University Requirements (p. 36).

**Note:** Although a course may be listed more than once, such a course may satisfy only one requirement.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>African American &amp; African Studies</i>		
AAS 010 or AAS 012	African-American Culture & Society Introduction to African Studies	4
Choose one:		
AAS 015	Introduction to African American Humanities	
AAS 017	Women in African Societies	
AAS 018	Introduction to Caribbean Studies	
AAS 050	Black Popular Culture	
AAS 051	History of Afro American Dance	
AAS 052	African Traditional Religion	
AAS 080	Introduction to Black Politics	
Choose one:		
ANT 002	Cultural Anthropology	
ECN 001A or ECN 001AV	Principles of Microeconomics Principles of Microeconomics	4
or ECN 001AY	Principles of Microeconomics	

ECN 001B or ECN 001BV	Principles of Macroeconomics Principles of Macroeconomics	AAS 150B	Afro-American Visual Arts Tradition: A Historical & Cultural Study
SOC 001	Introduction to Sociology	AAS 151	Afro-American Vernacular Music & Verbal Arts
POL 001 or PSC 001Y	American National Government General Psychology	AAS 152	Major Voices in Black World Literature
POL 002	Introduction to Comparative Politics	AAS/COM 153/154	African Literature
PSC 001	General Psychology	AAS/DRA 155A	African-American Dance & Culture in the United States, Brazil & the Caribbean
Choose one:		AAS 156	Language & Identity in Africa & the African Diaspora
CHI 010	Introduction to Chicana/o Studies	AAS 157	Literature & Society in South Africa
NAS 001	Introduction to Native American Studies	AAS 160	African-American Folklore
NAS 010	Native American Experience	AAS 169	History of African American Television
GSW 050	Introduction to Critical Gender Studies	AAS 170	African-American Film & Video
AMS 010	Introduction to American Studies	AAS 171	Black African & Black European Film & Video
ASA 001	Historical Experience of Asian Americans	AAS 175A	Black Documentary: History & Theory
ASA 002	Contemporary Issues of Asian Americans	AAS 175B	Black Documentary Practicum
<i>History</i>		AAS 181	Hip Hop in Urban America
Choose two:		AAS 182	Hip Hop Culture & Globalization
HIS 015A	Africa to 1900	AAS 185	Topics in African American Film
HIS 015B	Africa Today	Choose one:	
HIS 017A	History of the United States	AAS 111	Cultural Politics in Contemporary Africa
HIS 017B	History of the United States	AAS 123	Black Female Experience in Contemporary Society
Choose one:		AAS 130	Education in the African-American Community
AAS 016	Verbal & Performance Arts in Africa	AAS 133	The Black Family In America
AAS 051	History of Afro American Dance	AAS 141	Psychology of the African American Experience
AAS/DRA 155A	African-American Dance & Culture in the United States, Brazil & the Caribbean	AAS 145A	Black Social & Political Thought
DRA 041A	Beginning Jazz Dance	AAS 145B	Black Intellectuals
DRA 041B	Intermediate Jazz Dance	AAS 156	Language & Identity in Africa & the African Diaspora
DRA 044A	Beginning Hip Hop Dance	AAS 162	Islam in Africa & the Americas
DRA 044B	Intermediate Hip Hop Dance	AAS 163	African Religions in the Americas
MUS 028	Introduction to African American Music	AAS 165	Afro-Christianity & the Black Church
MUS 105	History & Analysis of Jazz	AAS 172	Diaspora & New Black Identities
MUS 106	History of Rock Music	AAS 176	The Politics of Resources
Preparatory Subject Matter Subtotal	28	AAS 177	Politics of Life in Africa
<b>Depth Subject Matter</b>		A coordinated program of upper division courses, selected and approved in consultation with the major advisor and chosen to reflect the student's major emphasis. Possible areas of emphasis include the following:	
Choose one:		Creative arts in the black community worldwide, social and political trends in the global black community, African American society and culture, Africa, African Diasporas. These areas of emphasis are offered as guidelines for students in the major. They are not the only areas of emphasis that students may choose for the major.	
AAS 100	Survey of Ethnicity in the US	Depth Subject Matter Subtotal	
AAS 101	Introduction to Research in the Afro-American Community	Total Units	
AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America	36	
AAS 107B	African Descent Communities & Culture in North America	64	
AAS 107C	African Descent Communities & Culture in Asia		
AAS 110	West African Social Organization		
AAS 145B	Black Intellectuals		
AAS 172	Diaspora & New Black Identities		
AAS 180	Race & Ethnicity in Latin America		
Choose one:			
AAS 150A	Afro-American Visual Arts Tradition: A Historical & Cultural Study		

## Related Upper Division Courses

The following courses are offered by faculty members in other disciplines and focus on African American studies, African diaspora studies, or African studies:

Code	Title	Units
AMS 156	Race, Culture & Society in the United States	4
ANT 104N	Cultural Politics of the Environment	4
ANT 139AN	Race, Class, Gender Systems	4
ANT 140A	Cultures & Societies of West & Central Africa	4
ANT 140B	Cultures & Societies of East & South Africa	4
AHI 150	Arts of Subsaharan Africa	4
CRD 151	Community Field Research: Theory & Analysis	5
CRD 152	Community Development	4
CRD 172	Social Inequality: Issues & Innovations	4
COM 154/AAS 153	African Literature	4
COM 165	Caribbean Literatures	4
ENL 167	20th-Century African American Poetry	4
ENL 178	Topics in Nations, Regions, & Other Cultural Geographies	4
ENL 179	Topics in Comparative Racial & Ethnic Literary Studies	4
ENL 181A	African American Literature to 1900	4
ENL 181B	African American Literature 1900-Present	4
HIS 1020	Undergraduate Proseminar in History: Africa	5
HIS 115A	History of West Africa	4
HIS 115B	History of East Africa & the Indian Ocean	4
HIS 115C	History of Southern Africa from Exploration to the Rainbow Nation	4
HIS 115D	Postcolonial Africa	4
HIS 116	African History: Special Themes	4
HIS 177A	History of Black People & American Race Relations: 1450-1860	4
HIS 177B	History of Black People & American Race Relations: 1860-Present	4
POL 134	Africa & U.S. Foreign Policy	4
POL 176	Racial Politics	4
SOC 128	Interracial Interpersonal Dynamics	4
SOC 129	Sociology of Black Experience in America	4
SOC 130	Race Relations	4
SOC 137	African American Society & Culture 1790 to 1990	4
SOC 143A	Urban Society	4
SOC 145A	Sociology of Third World Development	4
SOC 145B	Gender & Rural Development in the Third World	4
DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean	4
WMS 160	Women, "Race" & Sexuality in Postcolonial Cinema	4

WMS 180	Women of Color Writing in the United States	4
WMS 182	Globalization, Gender & Culture	4

## African American & African Studies, Minor

### College of Letters & Science

### The Minor Program

African American & African Studies is an interdisciplinary field of study in the humanities, arts, and social sciences. This major introduces students to the social, cultural, historical, and artistic dimensions of global African Diaspora and Black communities in the United States, Africa, Europe, Asia, the Caribbean, Latin America, and Pacific regions of the world. The instructors are creative, accessible and highly qualified, with specializations across a range of disciplines. Students are exposed to and trained to think critically about the conditions and demands of global societies. Students may choose to enrich their education by studying for a summer, a quarter, or a year in Africa, or by studying for a quarter in the Caribbean. Majors and Minors are also encouraged to take advantage of relevant internship opportunities.

### The Program

The purpose of this program is to give students a sense of the individual characteristics and common concerns of Black communities in Africa, the United States, and the wider Diaspora. The African American emphasis includes courses on history, culture, and the impact of developments in politics and the economy on the social organization of Black people in the United States. The African Diaspora emphasis enables students to study the way Black communities outside Africa and the United States have dealt with questions of race and ethnicity. It also considers how they have defined their identity in the political arena as well, by using religion, theater and dance, literature, and film. The African emphasis allows students to focus on Africa's recent history, social issues, and contemporary culture.

### Career Alternatives

Students minoring in African American & African Studies gain knowledge, strong critical thinking, and analytical, problem-solving, and communication skills, all suited for advanced studies in the social sciences, law, education, and other professional schools. Graduates in the major have pursued careers in education, the private and public sectors, the non-profit sector, international development agencies, and human service. The interdisciplinary nature of African American & African Studies is excellent preparation for professions in community organizations such as the Urban League, NAACP, and the Office of Economic Opportunity.

### Minor Advisor

Katherine Ampaw-Matthei M.Ed.; kampaw@ucdavis.edu

African American & African Studies Staff (<https://aas.ucdavis.edu/staff/>)

## American History & Institutions

This University requirement can be satisfied by completion of AAS 010, AAS 100; listed in University Requirements (p. 36).

**Note:** Although a course may be listed more than once, such a course may satisfy only one requirement.

Code	Title	Units
Choose one of the following:		4
AAS 010	African-American Culture & Society	
AAS 012	Introduction to African Studies	
AAS 015	Introduction to African American Humanities	
AAS 017	Women in African Societies	
AAS 018	Introduction to Caribbean Studies	
AAS 080	Introduction to Black Politics	
Select any five upper division courses offered in African American & African Studies.		20
<b>Total Units</b>		<b>24</b>

## Agricultural & Environmental Chemistry (Graduate Group)

College of Agricultural & Environmental Sciences

Qi Zhang, Ph.D., Chair of the Group

### Group Office

4139 Meyer Hall; 530-752-4516; Agricultural & Environmental Chemistry (Graduate Group) (<http://agchem.ucdavis.edu/>); Faculty (<https://agchem.ucdavis.edu/faculty/>)

### Faculty

The focus of our group is applying chemistry to solve the problems of society. Our group has more than 50 faculty from over a dozen academic departments within the College of Agricultural & Environmental Sciences, the College of Letters & Science, the College of Engineering, the School of Medicine, and the School of Veterinary Medicine.

- Agricultural & Environmental Chemistry, Master of Science (p. 57)
- Agricultural & Environmental Chemistry, Doctor of Philosophy (p. 57)

## Agricultural & Environmental Chemistry, Master of Science

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Agricultural & Environmental Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in four areas: (1) Environmental & Analytical Chemistry, (2) Biological & Toxicological Chemistry, (3) Food & Wine Chemistry, and (4) Fiber & Polymer Chemistry. Detailed information regarding graduate study may be obtained at Agricultural & Environmental Chemistry (Graduate Group) (<http://agchem.ucdavis.edu/>).

### Graduate Advisors

C. Cappa (Civil & Environmental Engineering), P. G. Green (Civil & Environmental Engineering), M. J. Hengel (Environmental Toxicology), P. J. Hernes (Land, Air & Water Resources), H. Heymann (Viticulture &

Enology), Y.-L. Hsieh (Textiles & Clothing), A.E. Mitchell (Food Science & Technology), Q. Zhang (Environmental Toxicology), Tran Nguyen (Environmental Toxicology)

## Agricultural & Environmental Chemistry, Doctor of Philosophy

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Agricultural & Environmental Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in four areas: (1) Environmental & Analytical Chemistry, (2) Biological & Toxicological Chemistry, (3) Food & Wine Chemistry, and (4) Fiber & Polymer Chemistry. Detailed information regarding graduate study may be obtained at Agricultural & Environmental Chemistry (Graduate Group) (<http://agchem.ucdavis.edu/>).

### Graduate Advisors

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## Agricultural & Resource Economics

College of Agricultural & Environmental Sciences

Rachael E. Goodhue, Ph.D., Chair of the Department

### Department Office

1176 Social Sciences & Humanities Building; 530-752-1515; Graduate Program (<https://are.ucdavis.edu/phd/>); Faculty (<https://are.ucdavis.edu/people/faculty/>)

## Agricultural & Resource Economics Undergraduate Program in Managerial Economics B.S.

**Major Advisors.** Contact Managerial Economics Student Services at [manecon@primal.ucdavis.edu](mailto:manecon@primal.ucdavis.edu) or 530-754-9536.

### Major Program

See Managerial Economics (p. 58) undergraduate program.

## Graduate Programs

### Graduate Student Information

2121 Social Sciences & Humanities Building; 530-752-6185; Graduate Program (<https://are.ucdavis.edu/phd/>)

- Agricultural & Resource Economics, Master of Science (p. 58)
- Agricultural & Resource Economics, Master of Science/Master of Business Administration (p. 58)
- Agricultural & Resource Economics, Doctor of Philosophy (p. 58)
- Managerial Economics, Bachelor of Science (p. 58)
- Managerial Economics, Minor (p. 61)

## Agricultural & Resource Economics, Master of Science

### College of Agricultural & Environmental Sciences

The program is both an end in itself and a preparation for a Ph.D. degree in Applied Economics. The program includes courses emphasizing applications of economic theory and quantitative methods, along with elective field courses and a thesis option. The M.S. program prepares students for jobs in the academic industry and government. For more information, see M.S. program (<https://aremasters.ucdavis.edu/>).

## Agricultural & Resource Economics, Master of Science/Master of Business Administration

### College of Agricultural & Environmental Sciences

The program combines a course of study similar to the regular M.S. program with a complementary regime of M.B.A. courses similar to the regular M.B.A. program but with some savings in requirements and some synergy. This dual-degree program prepares students for a range of employment opportunities in business-oriented industries. For more information, see M.S./M.B.A. Joint Program (<https://aremasters.ucdavis.edu/>).

## Agricultural & Resource Economics, Doctor of Philosophy

### College of Agricultural & Environmental Sciences

The Ph.D. program provides intensive training in modern economic theory, econometrics, and mathematical programming, with elective fields such as natural resource and environmental economics, development economics, agricultural economics, and econometrics. Complementary fields in other areas of economics and management are also available. It is typically a four- or five-year course of study that prepares graduates for jobs in academia, government, near-government organizations, and the private sector.

## Managerial Economics, Bachelor of Science

### College of Agricultural & Environmental Sciences

## The Major Program

The Managerial Economics major at UC Davis is a disciplinary program combining strong preparation in microeconomic theory and quantitative methods. It prepares students for the analysis of management and policy issues in business, finance, marketing, production, agriculture, food distribution, natural resources, the environment, resource allocation, and international trade and development. Students in the Managerial Economics program develop valuable skills and strengths that lead to careers in business and government. Students specialize in one or more emphases selected from the following:

- *Business Economics* focuses on the economic aspects of managerial decision-making essential for solving problems in business, management, marketing, and finance.

- *International Business Economics* explores the economic drivers and policy challenges in the major emerging markets and focuses on how these markets are impacting the world economy.
- *Environmental & Resource Economics* concentrates on issues related to the use of resources and environmental quality.
- *Agribusiness Economics* focuses on the economic and policy aspects of the production and marketing of foods and fibers.

## Major Advisor

Contact Managerial Economics Student Services at [manecon@ucdavis.edu](mailto:manecon@ucdavis.edu) or 530-754-9536.

## Internships & Career Alternatives

Internships for students in Managerial Economics provide additional career experience, information, and preparation in a variety of business enterprises and governmental agencies. For more information, see Internship & Career Center (<http://icc.ucdavis.edu/>). Managerial Economics majors have established careers in every area of business and industry, including marketing, analysis, consulting, financial services, accounting, entrepreneurship, real estate and government. Many graduates have entered advanced degree programs in business management, accounting, finance, agricultural and resource economics, economics, public policy, and law.

## Study Abroad

The Agricultural & Resource Economics department encourages students to complement their Managerial Economics degree with a study abroad experience. Students must seek pre-approval from a Managerial Economics staff advisor for major-related courses. A total of two upper-division courses (maximum four units each) may be applied to major requirements. However, core courses (ARE 100A, ARE 100B, ARE 106, ARE 155, and ECN 101) are excluded. Students are expected to complete ARE 100A and STA 103 prior to taking upper-division classes abroad for the major.

## Domestic Institutions

Upper-division coursework taken at other four-year institutions for credit in the major must be reviewed by the Managerial Economics Lead Faculty Advisor.

## Graduate Study

Students who meet the admission requirements of Graduate Studies and the Department of Agricultural and Resource Economics may pursue studies leading to M.S. and Ph.D. degrees. For information on admission to graduate study and degree requirements, consult the Graduate Program Coordinator in the Department of Agricultural & Resource Economics (p. 57).

Code	Title	Units
<b>Major English Requirements</b>		
The following must be completed with minimum C- (or PASS) grades.		
Communication; choose one:		
CMN 001	Introduction to Public Speaking	4
<b>OR</b>		
CMN 003	Interpersonal Communication Competence	
or CMN 003Y	Interpersonal Communication Competence	
or CMN 003V	Interpersonal Communication Competence	
Business Writing; choose one:		
		4

UWP 104A	Writing in the Professions: Business Writing <sup>1,2</sup>	STA 103	Applied Statistics for Business & Economics
or UWP 104AY	Writing in the Professions: Business Writing	Preparatory Subject Matter Subtotal	39-42
Major English Requirements Subtotal	8	<b>Depth Subject Matter</b>	
<b>Preparatory Subject Matter</b>		<b>Core Courses</b>	20
All preparatory coursework must be completed with minimum C- (or PASS) grades:		<i>All core courses must be taken for a letter grade. It is recommended that students complete core courses during their third year.</i>	
<i>Business Law</i>	4	ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption (Must be completed with a minimum grade of C-) <sup>3</sup>
ARE 018	Business Law	ARE 100B	Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics <sup>4</sup>
Computer Science; choose one:	3-4	ARE 106	Econometric Theory & Applications
PLS 021	Application of Computers in Technology	ARE 155	Operations Research & Management Science
or PLS 021V	Application of Computers in Technology	ECN 101	Intermediate Macro Theory
ECS 032A	Introduction to Programming	<b>Restricted Electives; choose at least one of the emphases, below:</b>	
Management (Accounting)	8	Business Economics (p. 60)	
MGT 011A	Elementary Accounting	International Business Economics (p. 60)	
MGT 011B	Elementary Accounting	Environmental & Resource Economics (p. 60)	
<b>Economics</b>	8	Agribusiness Economics (p. 61)	
ECN 001A	Principles of Microeconomics	Depth Subject Matter Subtotal	52
or ECN 001AV	Principles of Microeconomics	Total Units	99-102
or ECN 001AY	Principles of Microeconomics	<sup>1</sup> May also count for English Composition.	
ECN 001B	Principles of Macroeconomics	<sup>2</sup> The upper-division composition exam will not satisfy this requirement.	
or ECN 001BV	Principles of Macroeconomics	<sup>3</sup> Note: ECN 100A is not accepted.	
Mathematics; choose a series:	8-10	<sup>4</sup> Note: ECN 100B is not accepted.	
The short calculus series, MAT 016A, MAT 016B, and MAT 016C is recommended for Managerial Economics majors. Other combinations of calculus classes will be accepted as outlined below.			
Choose 016 series:			
MAT 016A	Short Calculus		
& MAT 016B	and Short Calculus		
& MAT 016C	and Short Calculus		
OR choose 017 series:			
MAT 017A	Calculus for Biology & Medicine		
& MAT 017B	and Calculus for Biology & Medicine		
OR choose 021 Series:			
MAT 021A	Calculus	Code	Title
& MAT 021B	and Calculus	ARE 113	Fundamentals of Marketing Management
OR choose 017A and 016B & 016C:		ARE 135	Agribusiness Marketing Plan Development
MAT 017A	Calculus for Biology & Medicine	ARE 142	Personal Finance
& MAT 016B	and Short Calculus	ARE 147	Resource & Environment Policy Analysis
& MAT 016C	and Short Calculus	ARE 147M	Resource & Environmental Policy Analysis
OR choose 021A and 016B & 016C:		ECN 102	Analysis of Economic Data
MAT 021A	Calculus	ECN 134	Financial Economics
& MAT 016B	and Short Calculus	ECN 140	Econometrics
& MAT 016C	and Short Calculus	ECN 151A	Economics of the Labor Market
OR choose 017A and 021B:		ECN 162	International Economic Relations
MAT 017A	Calculus for Biology & Medicine		
& MAT 021B	and Calculus		
OR choose 021A and 017B:			
MAT 021A	Calculus		
& MAT 017B	and Calculus for Biology & Medicine		
Statistics	8		
STA 013	Elementary Statistics		
or STA 013Y	Elementary Statistics		

## Exceptions to All Emphases

The following courses do not apply toward any emphasis:

Code	Title	Units
ARE 113	Fundamentals of Marketing Management	4
ARE 135	Agribusiness Marketing Plan Development	2
ARE 142	Personal Finance	3
ARE 147	Resource & Environment Policy Analysis	3
ARE 147M	Resource & Environmental Policy Analysis	2
ECN 102	Analysis of Economic Data	4
ECN 134	Financial Economics	4
ECN 140	Econometrics	4
ECN 151A	Economics of the Labor Market	4
ECN 162	International Economic Relations	4

## Completing More Than One Emphasis

Courses may overlap between emphases. Requirements must be fulfilled as outlined in each emphasis with a minimum of 32 units.

## Major GPA

Students must attain a major GPA of at least a C average (2.000) in courses taken for depth subject matter (core and restricted electives). **These courses must be taken for a letter grade.** All restricted elective

courses taken will be calculated as part of the major GPA, including courses with F grades that have not been repeated.

## Business Economics Emphasis

Code	Title	Units
All restricted electives must be taken for a letter grade.		
Choose 16 units:		
ARE 107	Econometrics for Business Decisions	
ARE 112	Fundamentals of Organization Management	
ARE 118	Tax Accounting	
ARE 119	Intermediate Managerial Accounting	
ARE 136	Managerial Marketing	
ARE 157	Analysis for Operations & Production Management	
ARE 171	Principles of Finance <sup>1</sup>	
ARE 172	Financial Management of the Firm <sup>2</sup>	
ARE 173	Capital Markets	
Choose remaining 16 units from the above list or from:		
ARE/ECN 115A	Economic Development	
ARE 115B/115BY/	Economic Development	
ECN 115B/115BY		
ARE 130	Agricultural Markets	
ARE 132	Cooperative Business Enterprises	
ARE 133	Introduction to Behavioral Economics	
ARE 138	International Commodity & Resource Markets	
ARE 139	Futures & Options Markets	
ARE 140	Farm Management	
ARE 143	Investments	
ARE 144	Real Estate Economics	
ARE 145	Farm & Rural Resources Appraisal	
ARE 146	Business, Government Regulation, & Society	
ARE 150	Agricultural Labor	
ARE 156	Introduction to Mathematical Economics	
ARE 194HA	Special Study for Honors Students	
ARE 194HB	Special Study for Honors Students	
ECN 121A	Industrial Organization	
ECN 121B	Industrial Organization	
ECN 151B	Economics of Human Resources	
<b>Total Units</b>		<b>32</b>

<sup>1</sup> Formerly ARE 171A.

<sup>2</sup> Formerly ARE 171B.

## International Business Economics Emphasis

Code	Title	Units
All restricted electives must be taken for a letter grade.		
Choose 20 units:		
ARE 107	Econometrics for Business Decisions	
ARE/ECN 115A	Economic Development	
ARE 138	International Commodity & Resource Markets	
ARE 139	Futures & Options Markets	
ARE 146	Business, Government Regulation, & Society	
ARE 165	Emerging Economies & Globalization	
ARE 166	Economics of Global Poverty Reduction: What Works & Why	
ECN 160A	International Microeconomics	
ECN 160B	International Macroeconomics	
ECN 171	Economy of East Asia	
Choose the remaining 12 units from the above list or from:		
ARE 130	Agricultural Markets	
ARE 171	Principles of Finance <sup>1</sup>	
ARE 172	Financial Management of the Firm <sup>2</sup>	
ARE 173	Capital Markets	
ARE/ESP 175	Natural Resource Economics	
ARE 176	Environmental Economics	
ARE 194HA	Special Study for Honors Students	
ARE 194HB	Special Study for Honors Students	
ECN 121A	Industrial Organization	
ECN 121B	Industrial Organization	
POL 130	Recent U.S. Foreign Policy	
<b>Total Units</b>		<b>32</b>

<sup>1</sup> Formerly ARE 171A.

<sup>2</sup> Formerly ARE 171B.

## Environmental & Resource Economics Emphasis

Code	Title	Units
All restricted electives must be taken for a letter grade.		
Choose eight units:		
ARE/ESP 175	Natural Resource Economics	
ARE 176	Environmental Economics	
Choose 20 units:		
ARE 107	Econometrics for Business Decisions	
ARE 120	Agricultural Policy	
ARE 132	Cooperative Business Enterprises	
ARE 138	International Commodity & Resource Markets	
ARE 140	Farm Management	
ARE 145	Farm & Rural Resources Appraisal	
ARE 146	Business, Government Regulation, & Society	
ARE 150	Agricultural Labor	
ARE 156	Introduction to Mathematical Economics	
ARE 194HA	Special Study for Honors Students	
ARE 194HB	Special Study for Honors Students	
ECN 125	Energy Economics	
ECN 130	Public Microeconomics	

ESP 168A	Methods of Environmental Policy Analysis	
ESP 168B	Methods of Environmental Policy Evaluation	
ESP 178	Applied Research Methods	
Choose the remaining 4 units from the above list or from:		4
	Upper division in Agricultural & Resource Economics (ARE).	
	Upper division in Economics (ECN).	
ESP 160	The Policy Process	
ESP 161	Environmental Law	
ESP/ECI 163	Energy & Environmental Aspects of Transportation	
ESP 167	Energy Policy	
ESP 171	Urban & Regional Planning	
ESP 172	Public Lands Management	
ESP 173	Land Use & Growth Controls	
ETX 138	Legal Aspects of Environmental Toxicology	
<b>Total Units</b>		<b>32</b>

or MAT 017A-MAT 016B-MAT 016C or MAT 021A-MAT 016B-MAT 016C or  
MAT 017A-MAT 021B or MAT 021A-MAT 017B  
• STA 013 or STA 013Y & STA 103

All courses to satisfy the minor must be taken for a letter grade and students must attain a minor GPA of at least a C average (2.00). All upper division courses taken toward minor requirements will be calculated as part of the minor GPA, including courses with F grades that have not been repeated. A total of two upper division courses (maximum 4 units each) may be taken through UC Study Abroad, all other courses must be taken in residence. Students must seek pre-approval from a Managerial Economics staff advisor for any international courses.

Code	Title	Units
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption <sup>1</sup>	4
ARE 100B	Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics	4
ARE 106	Econometric Theory & Applications	4
Choose 12 units from the following:		12
ARE 107	Econometrics for Business Decisions	
ARE 112	Fundamentals of Organization Management	
ARE/ECN 115A	Economic Development	
ARE 130	Agricultural Markets	
ARE 136	Managerial Marketing	
ARE 138	International Commodity & Resource Markets	
ARE 139	Futures & Options Markets	
ARE 143	Investments	
ARE 145	Farm & Rural Resources Appraisal	
ARE 146	Business, Government Regulation, & Society	
ARE 150	Agricultural Labor	
ARE 155	Operations Research & Management Science	
ARE 156	Introduction to Mathematical Economics	
ARE 157	Analysis for Operations & Production Management	
ARE 165	Emerging Economies & Globalization	
ARE 171	Principles of Finance <sup>2</sup>	
ARE 172	Financial Management of the Firm <sup>3</sup>	
ARE 173	Capital Markets	
ARE/ESP 175	Natural Resource Economics	
ARE 176	Environmental Economics	

**Total Units** 24

## Agribusiness Economics Emphasis

Code	Title	Units
All restricted electives must be taken for a letter grade.		
Choose 8 units:		8
ARE 120	Agricultural Policy	
ARE 140	Farm Management	
ARE 150	Agricultural Labor	
Choose 16 units:		16
ARE 107	Econometrics for Business Decisions	
ARE 120	Agricultural Policy	
ARE 121	Economics of Agricultural Sustainability	
ARE 130	Agricultural Markets	
ARE 132	Cooperative Business Enterprises	
ARE 138	International Commodity & Resource Markets	
ARE 139	Futures & Options Markets	
ARE 140	Farm Management	
ARE 145	Farm & Rural Resources Appraisal	
ARE 150	Agricultural Labor	
Choose the remaining 8 units from the above list or from:		8
Upper division in Agricultural and Resource Economics (ARE).		
Upper division in Economics (ECN).		
<b>Total Units</b>		<b>32</b>

## Managerial Economics, Minor

### College of Agricultural & Environmental Sciences

Preparation for the minor includes the completion of the following courses with minimum C- grades:

- ECN 001A or ECN 001AV or ECN 001AY & ECN 001B or ECN 001BV
- MAT 016A-MAT 016B-MAT 016C or  
MAT 017A-MAT 017B or MAT 021A-MAT 021B

<sup>1</sup> Must be completed with a minimum grade of C-.

<sup>2</sup> Formerly ARE 171A

<sup>3</sup> Formerly ARE 171B

## American Studies

### College of Letters & Science

Julie Sze, Ph.D., Chair of the Department; term ends June 30, 2023

## Department Office

1200 Hart Hall; 530-752-6429; American Studies (<http://ams.ucdavis.edu/>); Faculty (<http://ams.ucdavis.edu/faculty/>)

## The Department

The Department of American Studies approaches the “American” in our field’s name as an important and complicated idea that comes with a range of feelings (from joy to fear to pride to sadness). American Studies explores the cultures of the United States, as well as their transnational exchanges and impact. In American Studies classes, students let their curiosities guide them through the process of analyzing pieces of American culture, including food, nature, childhood, and more, through the lenses of race, class, gender, and disability. American Studies is a place for students who want to know why things are the way they are and how they could be.

American Studies takes an interdisciplinary approach, answering research questions with tools from history, sociology, anthropology, literary criticism, media studies, and science and technology studies. American Studies majors are good critical thinkers, develop excellent writing and communication skills, and most importantly, “learn how to learn”—that is, they learn to figure out what intellectual tools and specialized knowledge they will need to perform a task or solve a problem.

- American Studies, Bachelor of Arts (p. 62)
- American Studies, Minor (p. 63)

## American Studies, Bachelor of Arts

College of Letters & Science

### The Major

American Studies provides an excellent, broad education in the liberal arts. American Studies majors create an emphasis devoted to the close study of social and cultural issues crucial to the practice of American Studies. Advanced work in at least two other departments or programs allows each student to study areas tailored to their own individual education goals. Sample emphases include Youth Education, Social Justice and Social Movements; Popular Culture; Comparative Racial and Ethnic Studies; Nature, Culture and the Environment; Militarism and Incarceration; Queer and Trans Studies; Disability, Health, and Illness; and Food and Culture. Students have the option of writing a senior thesis or completing a creative capstone project, are encouraged to study abroad or participate in other forms of global education, and are encouraged to explore new career possibilities through internships—all of which can count toward the major units with permission of the advisor.

### Career Alternatives

As an interdisciplinary major, American Studies offers students the choice of a variety of subject matter and approaches. This flexibility means that graduates are prepared to move into a broad range of career settings. Our alumni have become lawyers, teachers, social workers, urban planners, software engineers, filmmakers, professors, professional writers and comedians, marketing and communications professionals, librarians, museum curators, community organizers, and non-profit staff and leaders.

## Global Education & Study Abroad

Majors are encouraged to study abroad or engage in domestic opportunities off-campus; such as the UC Washington Program (p. 468), internships, and many other opportunities. Major requirements can be fulfilled with up to eight units from study abroad or other domestic off-campus opportunities with the permission of the undergraduate advisor.

## Faculty Advisor

J. DeCristo (<https://americanstudies.ucdavis.edu/ams-advising/>)

## Major Advisor

American Studies Advising (<https://americanstudies.ucdavis.edu/ams-advising/>); [ams-advising@ucdavis.edu](mailto:ams-advising@ucdavis.edu) or 530-752-6429.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
AMS 010	Introduction to American Studies	4
One additional lower division American Studies course. (p. 495)		4
Choose one:		4
AAS 010	African-American Culture & Society	
ASA 001	Historical Experience of Asian Americans	
CHI 010	Introduction to Chicana/o Studies	
NAS 001	Introduction to Native American Studies	
Or an equivalent course in racial and ethnic diversity.		
Choose one:		4-5
ANT 002	Cultural Anthropology	
SOC 002	Self & Society	
GSW 050	Introduction to Critical Gender Studies	
Or an equivalent course in social science approaches to culture.		
Choose one:		4
HIS 017A	History of the United States	
HIS 017B	History of the United States	
HIS 072A	Women & Gender in America, to 1865	
HIS 072B	Women & Gender in America, 1865-Present	
Choose one:		4
ENL 003	Introduction to Literature	
ENL 010A	Literatures in English I: To 1700	
ENL 010B	Literatures in English II: 1700-1900	
ENL 010C	Literatures in English III: 1900 to Present	
CDM 001	Introduction to Film Studies	
Or an equivalent course introducing critical approaches to literary and visual texts in the humanities.		
<b>Preparatory Subject Matter Subtotal</b>		24-25
<b>Depth Subject Matter</b>		
AMS 100	Methods in American Studies	4
AMS 160	Undergraduate Seminar in American Studies	4
<i>American Studies Elective</i>		
Three additional upper division American Studies courses.		12
<i>Emphasis</i>		

In consultation with the American Studies Undergraduate Advisor, the student designs a program of 20 units (typically five courses) of upper division course work around a unifying theme, period, or subject matter in American cultures. The courses should come from two or more departments or programs and may include up to 8 units of American Studies courses. Only 4 units of AMS 192 (internship) can be included in the emphasis. Students may choose the senior thesis option (AMS 190A & AMS 190B) for 8 units of the emphasis and take the remaining 12 units outside the department.

#### *Recommended*

College requirement in English composition.<sup>1</sup>

Depth Subject Matter Subtotal	40
<b>Total Units</b>	<b>64-65</b>

<sup>1</sup> Completion of the college requirement in English composition before enrollment in AMS 190A.

## American Studies, Minor

College of Letters & Science

### The Minor

The culture of the United States is a distinctive blend of traditions and institutions from around the globe with innovations and concepts unique to this country. The American studies program offers students an understanding of how America's many cultures contribute to the tapestry of American society. Through the study of interpretive works, folklore and folk life, and fine and popular culture, American studies minors celebrate the diversity of American experiences and examine difficult questions about race, gender, class and other factors that affect American lives.

#### Faculty Advisor

J. DeCristo (<https://americanstudies.ucdavis.edu/ams-advising/>)

#### Minor Advising

American Studies Advising (<https://americanstudies.ucdavis.edu/ams-advising/>); [ams-advising@ucdavis.edu](mailto:ams-advising@ucdavis.edu) or 530-752-6429

Code	Title	Units
Five upper division American Studies (AMS) courses		20
	No more than 8 units of AMS 192 may be counted toward this total.	
<b>Total Units</b>		<b>20</b>

## Animal Behavior (Graduate Group)

College of Biological Sciences

Gail L. Patricelli, Ph.D., Chairperson of the Group

### Group Office

227A Green Hall, formerly Life Sciences; 530-752-2981; Fax 530-752-8822; Animal Behavior Graduate Group (<http://anb.ucdavis.edu/>)

### Faculty

The Group includes faculty from 12 departments in five schools and colleges.

- Animal Behavior, Master of Science (p. 63)
- Animal Behavior, Doctor of Philosophy (p. 63)

## Animal Behavior, Master of Science

College of Biological Sciences

### Graduate Study

The Ph.D. program in Animal Behavior is an interdepartmental program focusing on the mechanisms underlying behavior, the evolution of behavior, and the applications of behavior to current problems in conservation biology and animal welfare. The program trains students for teaching and research in a variety of areas, including anthropology, animal science, ecology, entomology, neurobiology, psychology, physiology, veterinary science, wildlife biology, and zoology. Resources available to students, in addition to various departmental facilities, include those of the California National Primate Research Center, Bodega Marine Laboratory, and the UC Natural Reserve System.

The Master of Science degree is offered only en route to the Ph.D.

#### Graduate Advisor

Consult the Animal Behavior Graduate Group office or website (<http://anb.ucdavis.edu/>).

## Animal Behavior, Doctor of Philosophy

College of Biological Sciences

### Group Office

227A Green Hall, formerly Life Sciences; Faculty (<https://anb.ucdavis.edu/faculty/>)

### Graduate Study

The Ph.D. program in Animal Behavior is an interdepartmental program focusing on the mechanisms underlying behavior, the evolution of behavior, and the applications of behavior to current problems in conservation biology and animal welfare. The program trains students for teaching and research in a variety of areas, including anthropology, animal science, ecology, entomology, neurobiology, psychology, physiology, veterinary science, wildlife biology, and zoology. Resources available to students, in addition to various departmental facilities, include those of the California National Primate Research Center, Bodega Marine Laboratory, and the UC Natural Reserve System.

#### Graduate Advisor

Consult the Animal Behavior Graduate Group office or website (<http://anb.ucdavis.edu/>).

## Animal Biology (Graduate Group)

College of Agricultural & Environmental Sciences

James W. Oltjen, Ph.D., Chairperson of the Group

## Group Office

1249 Meyer Hall; 530-752-2382; Fax 530-752-0175; Animal Biology (Graduate Group) (<http://animalbiology.ucdavis.edu>); Faculty (<http://animalbiology.ucdavis.edu/people/>)

- Animal Biology, Master of Science (p. 64)
- Animal Biology, Doctor of Philosophy (p. 64)

# Animal Biology, Master of Science

College of Agricultural & Environmental Sciences

## Graduate Study

The Graduate Group in Animal Biology offers programs of study and research leading to M.S. and Ph.D. degrees. The Animal Biology Graduate Group focuses on integrated animal biology. Each student individually tailors his/her program of study to meet individual needs. The Animal Biology Graduate Group is unique in encouraging a multidisciplinary or interdisciplinary approach involving physiology, nutrition, genetics, ecology and/or behavior within the context of organismal animal biology.

### Preparation

Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including upper division coursework in most of the following subjects: biochemistry, genetics, nutrition, physiology, and integrative animal biology such as animal management.

### Graduate Advisors

R.C. Hovey, J. Larsen, E.A. Maga, M. Pitesky, K. Horback, A. Todgham, K. Horback, F. Lima

# Animal Biology, Doctor of Philosophy

College of Agricultural & Environmental Sciences

## Graduate Study

The Graduate Group in Animal Biology offers programs of study and research leading to M.S. and the Ph.D. degrees. The Animal Biology Graduate Group focuses on integrated animal biology. Each student individually tailors his/her program of study to meet individual needs. The Animal Biology Graduate Group is unique in encouraging a multidisciplinary or interdisciplinary approach involving physiology, nutrition, genetics, ecology and/or behavior within the context of organismal animal biology.

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### Graduate Advisors

R.C. Hovey, J. Larsen, E.A. Maga, M. Pitesky, A. Todgham, K. Horback, F. Lima

# Animal Science

College of Agricultural & Environmental Sciences

Anne Todgham, Ph.D., Chairperson of the Department

## Department Office

2223 Meyer Hall; 530-752-1251; Animal Science (<https://animalscience.ucdavis.edu>); Faculty (<https://animalscience.ucdavis.edu/people/faculty/>)

The Department of Animal Science offers five minor programs in Animal Science and one minor program in Avian Sciences open to students majoring in other disciplines who wish to complement their study programs with a minor in Animal Science or Avian Sciences. Some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

## Undergraduate Advising

1202 Meyer Hall; 530-754-7915; Advising Center (<https://animalscience.ucdavis.edu/academics/undergrad/advising/>)

**Advising** for the majors, minors, and course offerings (including peer advising) is located in the Animal Science Advising Center in 1202 Meyer Hall; 530-754-7915. Each student is assigned a faculty advisor through this office upon entering the major.

### Animal Science Lead Faculty Advisor

Russ Hovey, Ph.D.

### Animal Science & Management Lead Faculty Advisor

L. Allen Pettey, Ph.D.

### Agricultural & Environmental Education Lead Faculty Advisor

Deanne Meyer, Ph.D.

### Minor Advisor

Russ Hovey, Ph.D.

## Graduate Advising

1249 Meyer Hall; 530-752-2382; Faculty (<https://animalscience.ucdavis.edu/people/faculty/>)

- Agricultural & Environmental Education, Bachelor of Science (p. 64)
- Animal Science & Management, Bachelor of Science (p. 67)
- Animal Science, Bachelor of Science (p. 70)
- Animal Science, Minor (p. 72)
- Avian Sciences, Minor (p. 73)

# Agricultural & Environmental Education, Bachelor of Science

College of Agricultural & Environmental Sciences

## The Major Program

The major serves those interested in teaching agricultural and environmental sciences in K-12 classrooms or in nonformal settings such as food production and distribution systems, nature preserves, environmental camps, or other venues. This major prepares graduates to direct programs in the agricultural and environmental sciences as well as provides them with a skill set necessary to work within social science

careers related to these fields. This program of study meets state and federal requirements for entry into teacher preparation in agriculture and science, as well as requirements in Career Technical Education (CTE).

## The Program

The program is designed to provide students with a broad background in various agricultural and environmental science disciplines, e.g., animal science, environmental science, plant and soil science, agricultural engineering, business management, agro ecology, and horticulture. The program also focuses on the social sciences related to human resource development. The program provides students with practical experiences through fieldwork, school, and non-formal learning sites placements, or placement in sites related to a student's focus of study. Through this major students will have the opportunity to explore and then incorporate agricultural and environmental issues into educational and development settings.

## Career Alternatives

The need for scientists, technicians, and educators to assist in domestic and international agricultural development and environmental programs has created a continuing demand for qualified instructors and supervisory personnel. This major also provides general preparation for positions in banking, sales and service, rural recreation, related agricultural and environmental sectors. Students interested in obtaining breadth in both agricultural and environmental sciences will appreciate the scope and flexibility the major provides.

## Lead Faculty Advisor

Deanne Meyer, Professor of Cooperative Extension/Lecturer

## Major Advisors

Lynn Martindale, Lecturer/Supervisor School of Education

Code	Title	Units
<b>Government/U.S. Constitution</b>		
HIS 017A or POL 001	History of the United States American National Government	4
Subtotal		4
<b>Preparatory Subject Matter</b>		
Choose a minimum of 8 units in each area of Animal Science, Applied Biological Systems Technology, Agricultural Business & Economics, Environmental Horticulture, Environmental Science & Natural Resources, and Plant & Soil Science:		
<i>Animal Science</i>		
ANS 001	Domestic Animals & People	8
ANS 002	Introductory Animal Science	
ANS 021	Livestock & Dairy Cattle Judging	
ANS 041	Domestic Animal Production	
<i>Applied Biological Systems Technology</i>		
ABT 016	Metal Properties & Fabrication	9
ABT 049	Field Equipment Operation	
ABT 052	Field Equipment Welding	
ABT 101	Engine Technology	
<i>Agricultural Business &amp; Economics; choose ARE 015 and ECN 001A or 001B</i>		
ARE 015	Population, Environment & World Agriculture	8
ECN 001A	Principles of Microeconomics	

or ECN 001AV	Principles of Microeconomics	9
or ECN 001AY	Principles of Microeconomics	
or ECN 001B	Principles of Macroeconomics	
or ECN 001BV	Principles of Macroeconomics	
<i>Environmental Horticulture</i>		
ENH 001	(Discontinued)	9
ENH 006	Introduction to Environmental Plants	
PLS 005	(Discontinued)	
PLS 006	Flower Power; Art & Science of Flowers & Their Uses	
<i>Environmental Science &amp; Natural Resources</i>		
ESP 010	Current Issues in the Environment	9
ETX 010	Introduction to Environmental Toxicology	
HYD/SAS 010	Water, Power, Society	
<i>Plant &amp; Soil Science</i>		
PLS 001	Agriculture, Nature & Society	8
PLS 002	Botany & Physiology of Cultivated Plants	
PLS 015	Introduction to Sustainable Agriculture	
PLS 049	Organic Crop Production Practices	
VEN 002	Introduction to Viticulture	
VEN 003	Introduction to Winemaking	
Prepatory Subject Matter Subtotal		
<b>Science/Math Preparatory</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	10
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
<i>Chemistry</i>		
CHE 002A	General Chemistry	10
CHE 002B	General Chemistry	
<i>Geology</i>		
GEL 001	The Earth	6
GEL 020	Geology of California	
<i>Mathematics, choose a series:</i>		
MAT 016A	Short Calculus	6-8
MAT 016B	Short Calculus	
<i>OR</i>		
MAT 017A	Calculus for Biology & Medicine	
MAT 017B	Calculus for Biology & Medicine	
<i>OR</i>		
MAT 021A	Calculus	
MAT 021B	Calculus	
<i>Physics</i>		
PHY 007A	General Physics	8
PHY 007B	General Physics	
<i>Soil Science</i>		
SSC 010	Soils in Our Environment	3
Science/Math Preparatory Subtotal		
<b>Depth Subject Matter</b>		
<i>Agricultural Education</i>		
AED 100	Concepts in Agricultural & Environmental Education	6

AED 160	Vocational Education	
<i>Education</i>		10
EDU 110	Educational Psychology: General	
EDU 115	Educating Children with Disabilities	
EDU 142	Introduction to Environmental Education	
<i>Environmental Science &amp; Policy</i>		4
ESP 110	Principles of Environmental Science	
Depth Subject Matter Subtotal		20
<b>Focused Depth Subject Matter</b>		
The specialized focus will consist of a minimum of 16 units in one of the six areas listed below:		16
Agricultural Business & Economics (p. 66)		
Animal Science (p. 66)		
Applied Biological Systems Technology (p. 66)		
Environmental Horticulture (p. 66)		
Environmental Science & Natural Resources (p. 66)		
Plant & Soil Science (p. 67)		
Subtotal		16
<b>Restricted Electives</b>		
Choose at least four additional upper division courses (minimum 16 units; duplicate from Depth specialization courses not counted) selected with approval of an advisor to supplement or expand depth subject matter courses chosen from Animal Biology, Animal Genetics, Animal Science, Agricultural & Resource Economics, Avian Sciences, Environmental Horticulture, Environmental & Resource Sciences, Environmental Science & Policy, Food Science & Technology, International Agricultural Development, Nature and Culture, Neurobiology, Physiology, & Behavior, Nutrition, Plant Sciences, Plant Biology, or Viticulture & Enology.		16
Subtotal		16
<b>Total Units</b>		<b>150-152</b>

## Agricultural Business & Economics

Code	Title	Units
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption	4
ARE 100B	Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics	4
ARE 120	Agricultural Policy	4
ARE 130	Agricultural Markets	4
ARE 135	Agribusiness Marketing Plan Development	2
ARE 138	International Commodity & Resource Markets	4
ARE 140	Farm Management	4
ARE 150	Agricultural Labor	4
ARE/ESP 175	Natural Resource Economics	4
ARE 176	Environmental Economics	4

## Animal Science

Code	Title	Units
Choose upper division units from any Animal Genetics, Animal Science, or Avian Sciences courses. Or choose from:		16
ABI 102	Animal Biochemistry & Metabolism	

FST 109	Principles of Quality Assurance in Food Processing
NPB 101	Systemic Physiology
NPB 121	Physiology of Reproduction
NUT 115	Animal Nutrition
NUT 122	(Discontinued)
NUT 123	(Discontinued)

## Applied Biological Systems Technology

Code	Title	Units
ABT 121	Animal Housing & Environment Management	2
ABT/IAD 142	Equipment & Technology for Small Farms	2
ABT 161	Water Quality Management for Aquaculture	3
ABT/SAF 165	Irrigation Practices for an Urban Environment	3
ABT/HYD 182	Environmental Analysis Using GIS	4

## Environmental Horticulture

Code	Title	Units
ENH 102	Physiological Principles in Environmental Horticulture (Discontinued)	4
ENH 105	Taxonomy & Ecology of Environmental Plant Families	4
ENH 120	Management of Container Media	3
ENH 125	Greenhouse & Nursery Crop Production	5
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	4
ENH 160	Restoration Ecology	4
PLS 150	Sustainability & Agroecosystem Management	4

## Environmental Science & Natural Resources

Code	Title	Units
ESP 100	General Ecology	4
ESP/ANT 101	Ecology, Nature, & Society	4
ESP 110	Principles of Environmental Science	4
ESP 123	Introduction to Field & Laboratory Methods in Ecology	4
ESP 151	Limnology	4
ESP 161	Environmental Law	4
ESP 170	Conservation Biology Policy	4
EVE 101	Introduction to Ecology	4
EVE 115	Marine Ecology	4
PLS 101	Agriculture & the Environment	3
PLS 105	Concepts in Pest Management	3
WFC 110	Biology & Conservation of Wild Mammals	3
WFC 111	Biology & Conservation of Wild Birds	3
WFC 120	Biology & Conservation of Fishes	3
WFC 154	Conservation Biology	4

## Plant & Soil Science

Code	Title	Units
PLB/PLS 102	California Floristics	5
PLB 105	Developmental Plant Anatomy	5
PLB/PLS 116	Plant Morphology & Evolution	5
PLB/EVE 117	Plant Ecology	4
PLS 150	Sustainability & Agroecosystem Management	4
SSC 100	Principles of Soil Science	5
SSC 102	Environmental Soil Chemistry	3
SSC 118	Soils in Land Use & the Environment	4
VEN 101A	Viticultural Practices	3
VEN 101C	Viticultural Practices	3

## Animal Science & Management, Bachelor of Science

### College of Agricultural & Environmental Sciences

Anne Todgham, Ph.D., Chairperson of the Department

## The Major Program

The Animal Science & Management major combines a thorough education in the basic biology of domestic animal species with a strong background in agricultural economics. Graduates of this interdisciplinary major will be well positioned to adjust to our rapidly changing world and job market.

### The Program

The interdisciplinary program in Animal Science and Management combines a fundamental background in the natural sciences (chemistry, biology, physiology, nutrition, genetics, mathematics, and behavior), with an understanding of economics and humanities. After completing preparatory courses, students focus on both the animal species that interest them (horses, cattle, sheep, companion animals, goats, fish, crustaceans or mollusks, among others) and principles of managerial economics (marketing, finance, business organization, or systems analysis). Students preparing for medical or veterinary school can meet professional entrance requirements with those of this major if they plan ahead.

### Career Alternatives

Job opportunities for successful graduates are plentiful and include positions with banking and financial institutions, agribusiness, Peace Corps, and farms of all scales. Most Animal Science and Management graduates are well prepared for professional study (medical, law, veterinary, and graduate business schools) as well as graduate research programs leading to the M.S. or Ph.D. degrees. Advanced degrees open doors to work as extension specialists, farm advisors, and teachers, and prepare students for international service.

### Lead Faculty Advisor

L. Allen Pettey, Ph.D.

Code	Title	Units
<b>Written &amp; Oral Expression</b>		
Choose two; if not chosen for English College Requirement:		8

CMN 130	Group Communication	
CMN 136	Organizational Communication	
CMN 140	Introduction to Mass Communication	
UWP 101 or UWP 101V or UWP 101Y	Advanced Composition	
UWP 102A	Writing in the Disciplines: Special Topics	
UWP 102B	Writing in the Disciplines: Biology	
UWP 102C	Writing in the Disciplines: History	
UWP 102D	Writing in the Disciplines: International Relations	
UWP 102E	Writing in the Disciplines: Engineering	
UWP 102F	Writing in the Disciplines: Food Science & Technology	
UWP 102G	Writing in the Disciplines: Environmental Writing	
UWP 104A or UWP 104AY	Writing in the Professions: Business Writing	
UWP 104B	Writing in the Professions: Law	
UWP 104C	Writing in the Professions: Journalism	
UWP 104D	Writing in the Professions: Elementary & Secondary Education	
UWP 104E	Writing in the Professions: Science	
UWP 104F or UWP 104FY	Writing in the Professions: Health	
<b>Written &amp; Oral Expression Subtotal</b>		8
<b>Preparatory Subject Matter</b>		
<i>Animal Science</i>		8
ANS 001	Domestic Animals & People	
ANS 002	Introductory Animal Science	
<i>Biological Science</i>		15
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry</i>		16
CHE 002A	General Chemistry	
CHE 002B	General Chemistry	
CHE 008A	Organic Chemistry: Brief Course	
CHE 008B	Organic Chemistry: Brief Course	
Choose one:		3-4
PLS 021 or PLS 021V	Application of Computers in Technology	
ECS 015	(Discontinued)	
<i>Economics</i>		8
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics	
ECN 001B or ECN 001BV	Principles of Macroeconomics	

<b>Management</b>		<b>8</b>	Aquatic Animals (p. 69) Companion Animals (p. 69) Dairy (p. 69) Equine (p. 69) Livestock (p. 69) Poultry (p. 69) Individualized (p. 70)
MGT 011A	Elementary Accounting		
MGT 011B	Elementary Accounting		
<b>Mathematics; choose a series:</b>		<b>9-12</b>	
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus		
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine		
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus		
Choose one:		<b>4</b>	
PLS 120	Applied Statistics in Agricultural Sciences		
STA 100	Applied Statistics for Biological Sciences		
STA 103	Applied Statistics for Business & Economics		
Or other courses in quantitative skills with prior approval of the Master Advisor.			
<b>Preparatory Subject Matter Subtotal</b>		<b>71-75</b>	
<b>Depth Subject Matter</b>			
<i>Biological Science</i>			
BIS 101	Genes & Gene Expression		
<i>Nutrition</i>			
NUT 115	Animal Nutrition		
Choose one:		<b>5</b>	
NPB 101	Systemic Physiology		
ANS 100	Animal Physiology		
<b>Business Management</b>		<b>16</b>	
<i>Agricultural &amp; Resource Economics</i>			
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption		
Choose one:			
ARE 113	Fundamentals of Marketing Management		
ARE 130	Agricultural Markets		
ARE 136	Managerial Marketing		
ARE 138	International Commodity & Resource Markets		
Choose one:			
ARE 120	Agricultural Policy		
ARE 132	Cooperative Business Enterprises		
ARE 140	Farm Management		
ARE 145	Farm & Rural Resources Appraisal		
ARE 157	Analysis for Operations & Production Management		
Choose one:			
ANS 128	Agricultural Applications of Linear Programming		
ARE 155	Operations Research & Management Science		
<b>Depth Subject Matter Subtotal</b>		<b>29</b>	
<b>Area of Specializations</b>			
Choose one area of specialization below:		<b>14-16</b>	
Aquatic Animals (p. 69) Companion Animals (p. 69) Dairy (p. 69) Equine (p. 69) Livestock (p. 69) Poultry (p. 69) Individualized (p. 70)			
<b>Area of Specializations Subtotal</b>			
<b>Restricted Electives</b>			
Choose at least two additional courses with approval of advisor; minimum 8 units; duplicate from Depth Subject Matter courses not counted:			
ARE 018      Business Law			
ARE 112      Fundamentals of Organization Management			
ARE 113      Fundamentals of Marketing Management			
ARE 118      Tax Accounting			
ARE 120      Agricultural Policy			
ARE 130      Agricultural Markets			
ARE 132      Cooperative Business Enterprises			
ARE 136      Managerial Marketing			
ARE 138      International Commodity & Resource Markets			
ARE 140      Farm Management			
ARE 142      Personal Finance			
ARE 143      Investments			
ARE 144      Real Estate Economics			
ARE 145      Farm & Rural Resources Appraisal			
ARE 150      Agricultural Labor			
ARE 155      Operations Research & Management Science			
ARE 157      Analysis for Operations & Production Management			
ARE 176      Environmental Economics			
ANS 103      Animal Welfare			
ANS 104      Principles & Applications of Domestic Animal Behavior			
ANS 106      Domestic Animal Behavior Laboratory			
ANS 115      Advanced Horse Production			
ANS 118      Fish Production			
ANS 119      Invertebrate Aquaculture			
ANS 120      Principles of Meat Science			
ANS 120L      Meat Science Laboratory			
ANS 123      Animal Growth & Development			
ANS 124      Lactation			
ANS 125      Equine Exercise Physiology			
ANS 126      Equine Nutrition			
ANS 127      Advanced Equine Reproduction			
ANS 128      Agricultural Applications of Linear Programming			
ANS 129      Environmental Stewardship in Animal Production Systems			
ANS 131      Reproduction & Early Development in Aquatic Animals			

ANS 136	Techniques & Practices of Fish Culture
ANS 137	Techniques & Practices of Avian Culture
ANS 140	Management of Laboratory Animals
ANS 141	Equine Enterprise Management
ANS 142	Companion Animal Care & Management
ANS 143	Pig & Poultry Care & Management
ANS 144	Beef Cattle & Sheep Production
ANS 145	Meat Processing & Marketing
ANS 146	Dairy Cattle Production
ANS 147	Dairy Processing & Marketing
ANS 149	Farrier Science
ANS 170	Ethics of Animal Use
ANS 192	Internship in Animal Science
ANS 194	Research in Animal Science
ANS 194HA	Undergraduate Honors Thesis in Animal Science <sup>1</sup>
ANS 194HB	Undergraduate Honors Thesis in Animal Science <sup>1</sup>
ANS 194HC	Undergraduate Honors Thesis in Animal Science <sup>1</sup>
AVS 100	Avian Biology
AVS 103	Avian Development & Genomics
AVS 115	Raptor Biology
AVS 121	Avian Reproduction
AVS 123	Management of Birds
AVS 149	Egg Production Management
AVS 150	Nutrition of Birds
ANG 101	Animal Cytogenetics
ANG 105	Horse Genetics
ANG 107	Genetics & Animal Breeding
ANG 111	Molecular Biology Laboratory Techniques
NUT 122	(Discontinued)
NUT 123	(Discontinued)
NUT 123L	(Discontinued)
NUT 124	Nutrition & Feeding of Finfishes
ABI 102	Animal Biochemistry & Metabolism (strongly recommended)
ABI 103	Animal Biochemistry & Metabolism
ECS 124	Theory & Practice of Bioinformatics
MGT 100	Introduction to Financial Accounting
NPB 117	Avian Physiology
NPB 121	Physiology of Reproduction
NPB 121L	Physiology of Reproduction Laboratory
NPB 130	Physiology of the Endocrine Glands
WFC 120	Biology & Conservation of Fishes
WFC 120L	Laboratory in Biology & Conservation of Fishes
WFC 130	Physiological Ecology of Wildlife
<b>Restricted Electives Subtotal</b>	
<b>Total Units</b>	

## Aquatic Animals Specialization

Code	Title	Units
ANS 018	Introductory Aquaculture	4
Choose one:		4
ANS 118	Fish Production	
ANS 119	Invertebrate Aquaculture	
ANS 131	Reproduction & Early Development in Aquatic Animals	4
ANS 148	Enterprise Analysis in Animal Industries	4
<b>Total Units</b>		<b>16</b>

## Companion Animals Specialization

Code	Title	Units
ANS 042	Introductory Companion Animal Biology	4
ANS 140	Management of Laboratory Animals	4
ANS 142	Companion Animal Care & Management	4
ANS 148	Enterprise Analysis in Animal Industries	4
<b>Total Units</b>		<b>16</b>

## Dairy Specialization

Code	Title	Units
ANS 041	Domestic Animal Production	2
ANS 041L	Domestic Animal Production Laboratory	2
ANS 146	Dairy Cattle Production	5
ANS 147	Dairy Processing & Marketing	3
ANS 148	Enterprise Analysis in Animal Industries	4
<b>Total Units</b>		<b>16</b>

## Equine Specialization

Code	Title	Units
ANS 015	Introductory Horse Husbandry	3
ANS 115	Advanced Horse Production	4
ANS 141	Equine Enterprise Management	4
ANS 148	Enterprise Analysis in Animal Industries	4
<b>Total Units</b>		<b>15</b>

## Livestock Specialization

Code	Title	Units
ANS 041	Domestic Animal Production	2
ANS 041L	Domestic Animal Production Laboratory	2
Choose one:		4
ANS 143	Pig & Poultry Care & Management	
ANS 144	Beef Cattle & Sheep Production	
ANS 145	Meat Processing & Marketing	4
ANS 148	Enterprise Analysis in Animal Industries	4
<b>Total Units</b>		<b>16</b>

## Poultry Specialization

Code	Title	Units
AVS 011	Introduction to Poultry Science	3
ANS 143	Pig & Poultry Care & Management	4

<sup>1</sup> Only one quarter of ANS 194H series may be used.

ANS 145	Meat Processing & Marketing	4
ANS 148	Enterprise Analysis in Animal Industries	4
<b>Total Units</b>		<b>15</b>

## Individualized Specialization

Students may, with prior approval of their advisor and the Master Advisor, design their own individualized specialization within the major. The specialization will consist of four to six courses with one of the courses being ANS 148. The other courses will include an introduction, care and management, and processing and/or marketing aspects of the animal of interest.

# Animal Science, Bachelor of Science

## College of Agricultural & Environmental Sciences

Anne Todgham, Ph.D., Chairperson of the Department

## The Major Program

The Animal Science major is devoted to the sciences central to understanding biological function of domestic and captive animals, their care, management, and utilization by people for food, fiber, companionship, work, and recreation. Advances in science and technology, and an ever-growing human population, have increased the complexity of issues surrounding the care and management of animals. Specializations within the major allow students to develop a scientific appreciation of animals and their relationship to their environment. Graduates in Animal Science are able to advance the science and technology of animal care and management in an objective and effective manner for the betterment of animals and society.

## The Program

The curriculum provides depth in the biological and physiological sciences and allows students to specialize within the broad field of applied animal science. Study begins with introductory courses in animal science, biology, chemistry, mathematics, and statistics. Students undertake advanced courses in animal behavior, biochemistry, genetics, nutrition, and physiology and the integration of these sciences to animal growth, production, and performance. Students complete the curriculum by choosing a specialization in either an animal science discipline (behavior, biochemistry, genetics, nutrition, or physiology) or in the sciences particular to a class of animals (aquatic, avian, companion and captive, equine, laboratory, livestock and dairy, or poultry).

## Career Alternatives

A wide range of career opportunities are available to graduates. The primary goal of the major is to prepare students for graduate study leading to the M.S. and Ph.D. degrees; for continued study in a professional school such as veterinary medicine, human medicine, or dentistry; for careers in research, agricultural production, farm and ranch management, or positions in business, sales, financial services, health care, agricultural extension, consulting services, teaching, journalism, or laboratory technology.

## Graduate Study

The Animal Biology Graduate Group offers a program of study and research leading to M.S. or Ph.D. degrees in Animal Biology. See Animal Biology (Graduate Group) (p. 63); see also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Lead Faculty Advisor

Russ Hovey, Ph.D.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Animal Science</i>		12
ANS 001	Domestic Animals & People <sup>1</sup>	
ANS 002	Introductory Animal Science	
ANS 041	Domestic Animal Production <sup>2</sup>	
ANS 041L	Domestic Animal Production Laboratory <sup>2</sup>	
<i>Biological Science</i>		15
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry; choose the 002 &amp; 008 series, or the 118 series:</i>		
CHE 002A & CHE 002B	General Chemistry and General Chemistry	16-18
<b>AND</b>		
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
<b>OR</b>		
CHE 118A & CHE 118B	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<i>Mathematics; choose a series:</i>		
MAT 016A & MAT 016B	Short Calculus and Short Calculus	6-8
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B	Calculus and Calculus	
Choose one:		
PLS 120	Applied Statistics in Agricultural Sciences	4
STA 100	Applied Statistics for Biological Sciences	
Note: Some professional and graduate schools may require additional preparatory subject matter; consult the Advising Center.		
Preparatory Subject Matter Subtotal		
<b>Depth Subject Matter</b>		
<b>Biology</b>		
BIS 101	Genes & Gene Expression	44
ANG 107	Genetics & Animal Breeding	
ABI 102	Animal Biochemistry & Metabolism	
ABI 103	Animal Biochemistry & Metabolism	
NPB 101 or ANS 100	Systemic Physiology Animal Physiology	
ANS 104	Principles & Applications of Domestic Animal Behavior	
ANS 150	Animal Health & Disease	
ANS 170	Ethics of Animal Use	
NUT 115	Animal Nutrition	

NUT 141	Comparative Animal Nutrition & Metabolism	
<b>Integrative Animal Biology Restricted Electives:</b>		
For Companion & Captive, Disciplinary Focus-Behavior, Disciplinary Focus-Biochemistry, Disciplinary Focus-Genetics, Disciplinary Focus-Nutrition, Disciplinary Focus-Physiology, Equine Science, Laboratory Animals, and Livestock & Dairy specializations: must take two from the following list:	6-8	
ANS 123	Animal Growth & Development	
ANS 124	Lactation	
NPB 121	Physiology of Reproduction	
NPB 130	Physiology of the Endocrine Glands	
For Aquatic Animal specialization; must take two from the following list:		
ANS 123	Animal Growth & Development	
EVE 112	Biology of Invertebrates	
NPB 123/APC 100	Comparative Vertebrate Organology	
WFC 120	Biology & Conservation of Fishes	
For Avian Sciences & Poultry specializations; must take two from the following list:		
ANS 123	Animal Growth & Development	
AVS 100	Avian Biology	
NPB 117	Avian Physiology	
NPB 130	Physiology of the Endocrine Glands	
<i>Laboratory</i>		
Choose one:	2-6	
ANG 111	Molecular Biology Laboratory Techniques	
ANS 106	Domestic Animal Behavior Laboratory	
ANS 133	Animal Cell Culture Laboratory	
ANS 134	Animal Nutrition Laboratory	
ANS 135	Production Animal Laboratory	
ANS 136	Techniques & Practices of Fish Culture	
ANS 137	Techniques & Practices of Avian Culture	
ANS 139	Experimental Animal Physiology	
MCB 120L	Molecular Biology & Biochemistry Laboratory	
MCB 160L	Principles of Genetics Laboratory	
NPB 101L	Systemic Physiology Laboratory	
NPB 104L	Cellular Physiology/Neurobiology Laboratory	
PMI 126L	Immunology Laboratory	
Depth Subject Matter Subtotal	52-58	
<b>Area of Specialization</b>		
Choose one area of specialization below:	12	
The program of study must be approved in advance by your faculty advisor. Courses must be taken for a letter grade.		
Aquatic Animals (p. 71)		
Avian Sciences (p. 71)		
Companion & Captive Animals (p. 71)		
Disciplinary Focus—Behavior (p. 71)		
Disciplinary Focus—Biochemistry (p. 71)		
Disciplinary Focus—Genetics (p. 71)		
Disciplinary Focus—Nutrition (p. 71)		
Disciplinary Focus—Physiology (p. 71)		

Equine Science (p. 72)	
Laboratory Animals (p. 72)	
Livestock & Dairy (p. 72)	
Poultry (p. 72)	
Area of Specialization Subtotal	12
<b>Total Units</b>	<b>117-127</b>

<sup>1</sup> ANS 001 will be waived for junior transfer students.

<sup>2</sup> ANS 041, ANS 041L will be waived for junior transfer students.

## Aquatic Animals Specialization

Code	Title	Units
ANS 018	Introductory Aquaculture	4
Select additional upper division units with approval from your faculty advisor, to form a coherent series of courses.		

## Avian Sciences Specialization

Code	Title	Units
AVS 013	Birds, Humans & the Environment	3
Select additional upper division units with approval from your faculty advisor, to form a coherent series of courses.		

## Companion & Captive Animals Specialization

Code	Title	Units
ANS 042	Introductory Companion Animal Biology	4
ANS 142	Companion Animal Care & Management	4
Select additional upper division units with approval from your faculty advisor, to form a coherent series of courses.		

## Disciplinary Focus—Behavior Specialization

Code	Title	Units
	Select upper division units with approval from your faculty advisor, to form a coherent series of courses.	12

## Disciplinary Focus—Biochemistry Specialization

Code	Title	Units
	Select upper division units with approval from your faculty advisor, to form a coherent series of courses.	12

## Disciplinary Focus—Genetics Specialization

Code	Title	Units
	Select upper division units with approval from your faculty advisor, to form a coherent series of courses.	12

## Disciplinary Focus—Nutrition Specialization

Code	Title	Units
	Select upper division units with approval from your faculty advisor, to form a coherent series of courses.	12

## Disciplinary Focus—Physiology Specialization

Code	Title	Units
	Select upper division units with approval from your faculty advisor, to form a coherent series of courses.	12

## Equine Science Specialization

Code	Title	Units
ANS 015	Introductory Horse Husbandry	3
ANS 115	Advanced Horse Production	4
Select additional upper division units with approval from your faculty advisor, to form a coherent series of courses.		5

## Laboratory Animals Specialization

Code	Title	Units
ANS 042	Introductory Companion Animal Biology	4
ANS 140	Management of Laboratory Animals	4
Select additional upper division units with approval from your faculty advisor, to form a coherent series of courses.		4

## Livestock & Dairy Specialization

Code	Title	Units
Choose two:		8-9
ANS 143	Pig & Poultry Care & Management	
ANS 144	Beef Cattle & Sheep Production	
ANS 146	Dairy Cattle Production	
Select additional upper division units with approval from your faculty advisor, to form a coherent series of courses.		3-4

## Poultry Specialization

Code	Title	Units
AVS 011	Introduction to Poultry Science	3
ANS 143	Pig & Poultry Care & Management	4
Select additional upper division units with approval from your faculty advisor, to form a coherent series of courses.		5

# Animal Science, Minor

Anne Todgham, Ph.D., Chairperson of the Department

## The Program

The Department of Animal Science offers five minor programs open to students majoring in other disciplines who wish to complement their study programs with a minor in Animal Science. Some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

**Advising** for the minor and course offerings is located in the Animal Science Advising Center (<https://animalscience.ucdavis.edu/academics/undergrad/advising/>) in 1202 Meyer Hall; 530-754-7915.

## Minor Advisor

Russ Hovey, Ph.D.

## Animal Science—Animal Biology

Code	Title	Units
Choose ANS 015 or ANS 042, or ANS 041 & ANS 041L, or ANS 021 & ANS 041:		3-4
ANS 015	Introductory Horse Husbandry	
ANS 042	Introductory Companion Animal Biology	

ANS 041 & 041L	Domestic Animal Production and Domestic Animal Production Laboratory	
ANS 021 & ANS 041	Livestock & Dairy Cattle Judging and Domestic Animal Production	
Choose one:		4
ANS 103	Animal Welfare	
ANS 104	Principles & Applications of Domestic Animal Behavior	
Choose ANS 123 & ANS 124, or NPB 121 & NPB 121L:		5-8
ANS 123 & ANS 124	Animal Growth & Development and Lactation	
NPB 121 & 121L	Physiology of Reproduction and Physiology of Reproduction Laboratory	
Choose additional units to complete the 20-unit total: <sup>1</sup>		4-8
Upper Division Animal Science (ANS) courses.		
Animal Genetics (ANG) courses.		
NPB 121	Physiology of Reproduction	
NPB 121L	Physiology of Reproduction Laboratory	
NUT 115	Animal Nutrition	
NUT 122	(Discontinued)	
NUT 123	(Discontinued)	
NUT 123L	(Discontinued)	
<b>Total Units</b>		<b>16-24</b>

<sup>1</sup> Variable unit courses (092, 099, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

## Animal Science—Animal Genetics

Code	Title	Units
Choose ANS 015 & ANS 042, or ANS 041 & ANS 041L, or ANS 021 & ANS 041:		4-7
ANS 015 & ANS 042	Introductory Horse Husbandry and Introductory Companion Animal Biology	
ANS 041 & 041L	Domestic Animal Production and Domestic Animal Production Laboratory	
ANS 021 & ANS 041	Livestock & Dairy Cattle Judging and Domestic Animal Production	
<i>Animal Genetics</i>		9
ANG 107	Genetics & Animal Breeding	
ANG 111	Molecular Biology Laboratory Techniques	
<i>Additional Upper Division Courses</i>		
Choose additional units to complete the 20-unit total: <sup>1</sup>		7-8
Upper Division Animal Science (ANS) courses.		
Animal Genetics (ANG) courses.		
AVS 103	Avian Development & Genomics	
NPB 121	Physiology of Reproduction	
NPB 121L	Physiology of Reproduction Laboratory	
NUT 115	Animal Nutrition	
NUT 122	(Discontinued)	
NUT 123	(Discontinued)	

NUT 123L	(Discontinued)	
<b>Total Units</b>		<b>20-24</b>

<sup>1</sup> Variable unit courses (092, 099, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

## Animal Science—Aquaculture

Code	Title	Units
ANS 018	Introductory Aquaculture	4
ANS 118	Fish Production	4
ANS 119	Invertebrate Aquaculture	4
Additional upper division courses.		8
Choose additional units to complete the 20-unit total: <sup>1</sup>		
Upper division Animal Science (ANS) courses.		
Animal Genetics (ANG) courses.		
ABT 161	Water Quality Management for Aquaculture	
NUT 124	Nutrition & Feeding of Finfishes	
WFC 121	Physiology of Fishes	
<b>Total Units</b>		<b>20</b>

<sup>1</sup> Variable unit courses (092, 099, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

## Animal Science—Dairy/Livestock

Code	Title	Units
Choose ANS 041 & ANS 041L, or ANS 021:		2-4
ANS 041 & 041L	Domestic Animal Production and Domestic Animal Production Laboratory	
ANS 021	Livestock & Dairy Cattle Judging	
ANS 104	Principles & Applications of Domestic Animal Behavior	4
Additional upper division courses.		12
Choose 4 or 8 units:		4-8
ANS 143	Pig & Poultry Care & Management	
ANS 144	Beef Cattle & Sheep Production	
ANS 146	Dairy Cattle Production	
Choose additional units to complete the 20 unit total: <sup>1</sup>		
Upper division Animal Science (ANS) courses.		
Animal Genetics (ANG) courses.		
NPB 121	Physiology of Reproduction	
NPB 121L	Physiology of Reproduction Laboratory	
NUT 115	Animal Nutrition	
NUT 122	(Discontinued)	
NUT 123	(Discontinued)	
NUT 123L	(Discontinued)	
<b>Total Units</b>		<b>22-28</b>

<sup>1</sup> Variable unit courses (092, 099, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

## Animal Science—Equine

Code	Title	Units
ANS 015	Introductory Horse Husbandry	3
ANS 103 or ANS 104	Animal Welfare Principles & Applications of Domestic Animal Behavior	4
ANS 115	Advanced Horse Production	4
ANS 141	Equine Enterprise Management	4
ANS 125 or ANS 126	Equine Exercise Physiology Equine Nutrition	3
Choose additional units to complete the 20 unit total: <sup>1</sup>		2-3
Upper division Animal Science (ANS) courses.		
Animal Genetics (ANG) courses.		
NPB 121	Physiology of Reproduction	
NPB 121L	Physiology of Reproduction Laboratory	
NUT 115	Animal Nutrition	
NUT 122	(Discontinued)	
NUT 123	(Discontinued)	
NUT 123L	(Discontinued)	

**Total Units** **20-21**

<sup>1</sup> Variable unit courses (092, 099, 192, 197T, 198, 199) are not allowed for the completion of this requirement.

## Avian Sciences, Minor

### College of Agricultural & Environmental Sciences

Anne Todgham, Ph.D., Chairperson of the Department

## The Program

The flexibility of the program and the close personal interaction between students, faculty, and specialists in the field give students a large role in selecting and designing their own course work. Due to the infrequency of course offerings, students must meet with a Staff Advisor in the Animal Science Advising Center to pursue this minor.

## Internships & Career Alternatives

Independent study, undergraduate research, and internships are emphasized in the Avian Sciences program. Birds for laboratory or special study are housed within the main building as well as at the research farm and the experimental aviary.

## Advising

Advising for the minor and course offerings is located in the Animal Science Advising Center (<https://animalscience.ucdavis.edu/academics/undergrad/advising/>) in 1202 Meyer Hall; 530-754-7915.

**Minor Advisor.** Russ Hovey, Ph.D.

Code	Title	Units
Choose one:		2-3
AVS 011	Introduction to Poultry Science	
AVS 013	Birds, Humans & the Environment	
AVS 014L	Management of Captive Birds	

AVS 015L	Captive Raptor Management	
Choose remaining units from:		15-16
AVS 100	Avian Biology	
AVS 103	Avian Development & Genomics	
AVS 115	Raptor Biology	
AVS 121	Avian Reproduction	
AVS 123	Management of Birds	
AVS 149	Egg Production Management	
AVS 150	Nutrition of Birds	
AVS 160	Designing & Performing Experiments in Avian Sciences	
ANS 143	Pig & Poultry Care & Management	
NPB 117	Avian Physiology	
WFC 111	Biology & Conservation of Wild Birds	
WFC 136	Ecology of Waterfowl & Game Birds	
<i>Related Courses</i>		
ARE 130	Agricultural Markets	
ANS 143	Pig & Poultry Care & Management	
MCB 150	Developmental Biology	
NUT 123	(Discontinued)	
NUT 123L	(Discontinued)	
Total Units		17-19

human behavioral ecology, paleoanthropology, primatology, genetics, and conservation biology.

- *Archaeology* is the study of history or prehistory by analysis of a people's artifacts, or their material culture, with the goal of reconstructing culture history and human behavior.
- *Human behavioral ecology* is the study of how variation in ecology and social organization can help us understand variation in human behavior.
- *Paleoanthropology* is the study of human evolution through the fossil and archaeological records, drawing on relevant studies in biological anthropology, Paleolithic archaeology, genetics, and geology.
- *Primatology* is the study of the behavior, ecology, and morphology of primates to address questions about the evolution and function of behavioral and morphological patterns in nonhuman primates and to test models of the origins of human morphology and behavior.
- *Genetic anthropology* uses DNA to address anthropological questions about population histories, migrations, mixing, and adaptations to local contexts.
- *Conservation biology* explores the causes of loss of biological diversity—in this department, it focuses on threatened non-human primates and the conservation of natural resources by our rapidly growing human population.

A Bachelor of Arts degree provides broad training that includes all subfields of Anthropology.

## Sociocultural A.B.

*Sociocultural anthropologists* study the varied ways in which people around the world organize their lives and interpret the circumstances in which they operate. Their main method is extended field research, which combines attention to global issues with the close study of human relations and culture. Among the themes addressed in the department's undergraduate courses are globalization and transnationalism; human ecology and environmental change; cultures of healing, health & medicine, the anthropology of law & global legal processes, the study of resistance, rebellion, & social control, the global spread of media & technology; migration, multiculturalism and urban life; colonialism and neocolonialism development and post-development; race, class & gender; politics & the political; cultures of everyday life; language use & discourse; and self, identity and family. Sociocultural anthropology thus offers a rich set of resources for understanding and engaging pressing issues in a globalizing world characterized by new forms of international culture and community as well as by increasing material inequality and political volatility.

## General A.B.

The General emphasis in the Bachelor of Arts in Anthropology provides an interdisciplinary approach that integrates elements of both evolutionary and sociocultural anthropology into one curriculum. This emphasis allows students to take courses covering the spectrum of anthropological subdisciplines. This emphasis develops students' abilities to apply both evolutionary and cultural concepts within anthropology as well as providing a solid theoretical foundation for both approaches. Based on the broad anthropological education covered in this emphasis, students gain transferable skills to be better equipped for a variety of careers; e.g., international development, cultural resource management, primate conservation, etc.

# Anthropology

## College of Letters & Science

James Smith, Ph.D., Chairperson of the Department; July 1, 2021-June 30, 2024

## Department Office

328 Young Hall; 530-752-0745; Anthropology (<http://anthropology.ucdavis.edu>); Faculty (<http://anthropology.ucdavis.edu/directory-of-people/>)

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# Anthropology, Bachelor of Arts

## College of Letters & Science

## The A.B. Major

Anthropology is the systematic study of humans. The student of anthropology learns about human biology, ecology, and social life—past and present—and gains a broad understanding of humans and societies. It is a diverse field, and the courses, faculty, and degree programs at UC Davis are subdivided into two wings—*Evolutionary* and *Sociocultural*.

## Evolutionary A.B.

*Evolutionary anthropologists* are united by their common application of science and evolutionary theory to understand the behavior, ecology, history, and evolution of humans & non-human primates, as individuals and as societies. These topics may be approached through archaeology,

## The Program

The Bachelor of Arts program is divided into three emphasis areas: the *Evolutionary*, *Sociocultural*, and *General* emphases. The Evolutionary and Sociocultural emphases parallel the two wings described above while the General emphasis allows students to select courses from both wings. Students interested in the study of recent and contemporary human societies should follow the Sociocultural emphasis. To obtain an A.B. degree in sociocultural anthropology, each student is required to complete courses that provide: (1) foundational skills, (2) language & cultural skills, (3) comprehensive skills, and (4) specialized skills. Students interested in the study of archaeology, primate studies, or human biology, ecology or origins should follow the Evolutionary Track. The A.B. degree offered by the Evolutionary emphasis provides general training in anthropology from an evolutionary perspective. The A.B. degree offered by the General emphasis provides interdisciplinary training in anthropology from both an evolutionary and sociocultural perspective. The Evolutionary Track also offers a B.S. degree that requires lower division coursework in math and science and upper division coursework in biological anthropology and closely related disciplines. Students planning on pursuing jobs in medical and other health-related fields after graduation may be especially interested in the B.S. degree.

Students in both tracks are encouraged to gain practical experience through courses taken while studying abroad (under the administration of the Global Learning Hub (<https://globallearning.ucdavis.edu/>)) and through undergraduate research or internships performed for credit (under ANT 192, ANT 198, or ANT 199 units provided by the advising office). Students showing exceptional ability are welcome to seek permission from instructors to participate in graduate seminars offered by the department.

## Career Opportunities

A Bachelor of Arts degree in Anthropology is suited for students seeking a solid liberal arts education. With its broad goal to facilitate understanding across lines of cultural difference, sociocultural anthropology prepares students for lives that are influenced by increasingly pervasive cultural exchange, as well as cultural conflict, around the world. The program serves as excellent preparation for careers in which inter-cultural skills are increasingly needed, including social & environmental activism, business, diplomacy & social administration, journalism, law, education & international relations. Students who focus on evolutionary processes will be well prepared to enter fields such as medical or health anthropology, museum studies, cultural resource management, and wildlife conservation. A degree in anthropology with appropriate courses in education is good preparation for high school teaching in social, biological, and physical sciences. It also provides the foundation for advanced study leading to careers in college-level teaching and research.

## Major Advisor

Connect with our advising office (<https://anthropology.ucdavis.edu/undergraduate/advising/advising-office/>).

## Honors Program

Candidates for high or highest honors in Anthropology must write a senior thesis under the direction of a faculty member. The thesis project will have a minimum duration of two quarters. Honors candidates must take at least 6 units of Anthropology ANT 194H. Only students who, at the end of their junior year (135 units), have attained a cumulative grade point average of 3.500 in Anthropology courses will be eligible for the honors program. The quality of the thesis work will be the primary determinant

for designating high or highest honors at graduation. To learn more about participating in the ANT honors program, see Honors Program (<https://anthropology.ucdavis.edu/undergraduate/opportunities/honors-program/>).

## Teaching Credential Subject Representative

See the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

## Graduate Study

The Department offers a program of study leading to the M.A. and Ph.D. degrees in Anthropology. Further information regarding graduate study may be obtained at the Department website and at Graduate Studies (<https://grad.ucdavis.edu/>).

## A.B. Anthropology—Evolutionary Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
ANT 001 or ANT 001Y	Human Evolutionary Biology Human Evolutionary Biology (Hybrid Version)	4
ANT 002	Cultural Anthropology	5
ANT 003	Introduction to Archaeology	4
Choose one:		4-5
ANT 015	From Birth to Death: The Evolution of the Human Life Cycle	
ANT 023	Introduction to World Prehistory	
ANT 024	Ancient Crops & People	
ANT 054	Introduction to Primatology	
Choose one:		4-5
ANT 013	Scientific Method in Physical Anthropology	
SOC 056 or SOC 056Y	Introduction to Social Statistics Introduction to Social Statistics	
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
<b>Preparatory Subject Matter Subtotal</b>		21-23
<b>Depth Subject Matter</b>		
Choose one:		2-5
ANT/ESP 101	Ecology, Nature, & Society	
ANT 103	Indigenous Peoples & Natural Resource Conservation	
ANT 122A	Economic Anthropology	
ANT 128A	Kinship & Social Organization: From Clans to Countries	
ANT 154A	The Evolution of Primate Behavior	
ANT 154B	Primate Evolutionary Ecology	
ANT 154C	Primate Behavior: Methods & Experimental Design <sup>1</sup>	
ANT 154CL	Laboratory in Primate Behavior <sup>2</sup>	
ANT 155	Primate Conservation Biology	
ANT 158	The Evolution of Sex: A Biological Perspective	

ANT 178	Hunter-Gatherers		ANT 137	Meditation & Culture
Choose one:		4-5	ANT 138	Ethnographic Research Methods in Anthropology
ANT 151	Primate Evolution		ANT 139AN	Race, Class, Gender Systems
ANT 152	Human Evolution		ANT 139BN	Gender & Sexuality
ANT 153	Human Genetics: Mutation & Migration		ANT 140A	Cultures & Societies of West & Central Africa
ANT 160	Neandertals & Modern Human Origins		ANT 140B	Cultures & Societies of East & South Africa
<i>Archaeology</i>			ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region
Choose one:		4	ANT 142	Peoples of the Middle East
ANT 170	Archeological Theory & Method		ANT 143A	Ethnology of Southeast Asia
ANT 172	New World Prehistory: The First Arrivals		ANT 144	Contemporary Societies & Cultures of Latin America
ANT 174	European Prehistory		ANT 145	Performance, Embodiment, & Space in South Asia
ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors		ANT 146N	Topics in the Anthropology of Europe
ANT 176	California Archaeology		ANT 147/ MSA 131B/ CTS 146B	Modern South Asia Cinema
ANT 177	African Prehistory		ANT 148A	Culture & Political Economy in Contemporary China
ANT 179	Asian Prehistory		ANT 186A	Museum Studies: Analysis of Native American Basketry
ANT 180	Zooarchaeology		Choose 28 additional units from any upper division Evolutionary track ANT courses:	
ANT 181	Archaeological Field Methods		ANT/ESP 101	Ecology, Nature, & Society
ANT 181L	Field Course in Archeological Methods		ANT 103	Indigenous Peoples & Natural Resource Conservation
ANT 182	Archaeometry		ANT 122A	Economic Anthropology
ANT 183	Laboratory in Archeological Analysis		ANT 128A	Kinship & Social Organization: From Clans to Countries
ANT 184	Prehistoric Technology: The Material Aspects of Prehistoric Adaptation		ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region
ANT 185	Lithic Analysis		ANT 151	Primate Evolution
ANT 187	Cultural Resource Management in Archaeology		ANT 152	Human Evolution
<i>Sociocultural</i>			ANT 153	Human Genetics: Mutation & Migration
Choose one:		4	ANT 154A	The Evolution of Primate Behavior
ANT 100	Theory in Social-Cultural Anthropology		ANT 154B	Primate Evolutionary Ecology
ANT 104N	Cultural Politics of the Environment		ANT 154C	Primate Behavior: Methods & Experimental Design
ANT 107	Law, Power, Violence		ANT 154CL	Laboratory in Primate Behavior
ANT/STS 109	Visualization in Science: A Critical Introduction		ANT 155	Primate Conservation Biology
ANT 120	Language & Culture		ANT 156A	Human Osteology
ANT/STS 121	Special Topics in Medical Anthropology		ANT 156B	Advanced Human Osteology
ANT 122B	Capitalism & Power		ANT 157	Advanced Human Genetics
ANT 123AN	Resistance, Rebellion, & Popular Movements		ANT 157L	Advanced Human Genetics Lab
ANT 124	Religion in Society & Culture		ANT 158	The Evolution of Sex: A Biological Perspective
ANT 125A	Structuralism & Symbolism		ANT 159	Disease Outbreaks in Humans and Other Primates
ANT 125B	Postmodernism(s) & Culture		ANT 160	Neandertals & Modern Human Origins
ANT 126A	Anthropology of Development		ANT 170	Archeological Theory & Method
ANT 126B	Women & Development		ANT 172	New World Prehistory: The First Arrivals
ANT 127	Urban Anthropology		ANT 174	European Prehistory
ANT 128B	Self, Identity, & Family			
ANT/STS 129	Health & Medicine in a Global Context			
ANT 130A	Cultural Dimensions of Globalization			
ANT 131	Ecology & Politics			
ANT 132	Psychological Anthropology			
ANT 133	Anthropology of Ocean Worlds			
ANT 134	Buddhism in Global Culture			
ANT 135	Media Anthropology			
ANT 136	Ethnographic Film			

ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors	ANT 140A	Cultures & Societies of West & Central Africa
ANT 176	California Archaeology	ANT 140B	Cultures & Societies of East & South Africa
ANT 177	African Prehistory	ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region
ANT 178	Hunter-Gatherers	ANT 142	Peoples of the Middle East
ANT 179	Asian Prehistory	ANT 143A	Ethnology of Southeast Asia
ANT 180	Zooarchaeology	ANT 144	Contemporary Societies & Cultures of Latin America
ANT 181	Archaeological Field Methods	ANT 145	Performance, Embodiment, & Space in South Asia
ANT 181L	Field Course in Archeological Methods	ANT 146N	Topics in the Anthropology of Europe
ANT 182	Archaeometry	ANT 147/ MSA 131B/ CTS 146B	Modern South Asia Cinema
ANT 183	Laboratory in Archeological Analysis	ANT 148A	Culture & Political Economy in Contemporary China
ANT 184	Prehistoric Technology: The Material Aspects of Prehistoric Adaptation	Choose one of the following two options; see list below identifying upper division sociocultural courses; see list above identifying evolutionary track courses:	
ANT 185	Lithic Analysis	32	
ANT 186A	Museum Studies: Analysis of Native American Basketry		
ANT 187	Cultural Resource Management in Archaeology		
Depth Subject Matter Subtotal			
42-46			
<b>Total Units</b>		<b>63-69</b>	

<sup>1</sup> Must be taken concurrently with ANT 154CL.

<sup>2</sup> Must be taken concurrently with ANT 154C.

## A.B. Anthropology—Sociocultural Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
ANT 002	Cultural Anthropology	5
Choose two:		8
ANT 001 or ANT 001Y	Human Evolutionary Biology Human Evolutionary Biology (Hybrid Version)	
ANT 003	Introduction to Archaeology	
ANT 004	Introduction to Anthropological Linguistics	
Choose one of the following two options:		0-10
(1) Complete the equivalent to five quarters of course work in foreign language or provide proof of proficiency. Please refer to the "Sociocultural Emphasis Language Requirement" tab above to see course options. Students may take a combination of courses in different languages to fulfill this requirement as long as it is 5 quarters total.		
(2) Choose two lower division sociocultural courses:		
ANT 020	Comparative Cultures	
ANT 030	Sexualities	
ANT/STS 032	Drugs, Science & Culture	
ANT 034	Cultures of Consumerism	
ANT 036	Star Trek as Social Theory	
Preparatory Subject Matter Subtotal		13-23
<b>Depth Subject Matter</b>		
ANT 100	Theory in Social-Cultural Anthropology	4
Choose two upper division area-focus sociocultural track courses:		8
ANT 133	Anthropology of Ocean Worlds	

### Sociocultural Track Upper Division Courses

Note: Sociocultural track courses at the upper division level are those with numbers from 100 to 148A, with the exception of 101, 103, and 128A. Area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world.

ANT 100	Theory in Social-Cultural Anthropology
ANT 104N	Cultural Politics of the Environment
ANT 107	Law, Power, Violence
ANT/STS 109	Visualization in Science: A Critical Introduction
ANT 120	Language & Culture
ANT/STS 121	Special Topics in Medical Anthropology
ANT 122A	Economic Anthropology
ANT 122B	Capitalism & Power
ANT 123AN	Resistance, Rebellion, & Popular Movements
ANT 124	Religion in Society & Culture
ANT 125A	Structuralism & Symbolism
ANT 125B	Postmodernism(s) & Culture
ANT 126A	Anthropology of Development
ANT 126B	Women & Development
ANT 127	Urban Anthropology
ANT 128B	Self, Identity, & Family
ANT/STS 129	Health & Medicine in a Global Context
ANT 130A	Cultural Dimensions of Globalization
ANT 130BN	Migration & the Politics of Place & Identity
ANT 131	Ecology & Politics

ANT 132	Psychological Anthropology	Choose one methods course:	4-5
ANT 133	Anthropology of Ocean Worlds	ANT 013	Scientific Method in Physical Anthropology
ANT 134	Buddhism in Global Culture	SOC/CMN/PSC/ POL 012Y	Data Visualization in the Social Sciences
ANT 135	Media Anthropology	SOC 046	Introduction to Social Research Methods
ANT 136	Ethnographic Film	SOC 056	Introduction to Social Statistics
ANT 137	Meditation & Culture	or SOC 056Y	Introduction to Social Statistics
ANT 138	Ethnographic Research Methods in Anthropology	STA 013	Elementary Statistics
ANT 139AN	Race, Class, Gender Systems	or STA 013Y	Elementary Statistics
ANT 139BN	Gender & Sexuality	Preparatory Subject Matter Subtotal	
ANT 140A	Cultures & Societies of West & Central Africa	25-27	
ANT 140B	Cultures & Societies of East & South Africa	<b>Depth Subject Matter</b>	
ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region	Choose one of the sociocultural core courses:	
ANT 142	Peoples of the Middle East	ANT 100	Theory in Social-Cultural Anthropology
ANT 143A	Ethnology of Southeast Asia	or ANT 138	Ethnographic Research Methods in Anthropology
ANT 144	Contemporary Societies & Cultures of Latin America	Choose one of the evolutionary core courses:	
ANT 145	Performance, Embodiment, & Space in South Asia	ANT/ESP 101	Ecology, Nature, & Society
ANT 146N	Topics in the Anthropology of Europe	or ANT 152	Human Evolution
ANT 147/ MSA 131B/ CTS 146B	Modern South Asia Cinema	Choose a minimum of 16 units from any upper division Evolutionary ANT courses:	
ANT 148A	Culture & Political Economy in Contemporary China	ANT/ESP 101	Ecology, Nature, & Society
Depth Subject Matter Subtotal		ANT 103	Indigenous Peoples & Natural Resource Conservation
<b>Total Units</b>	<b>57-67</b>	ANT 122A	Economic Anthropology
1 Two courses may be in the evolutionary track; and up to 4 units can be ANT 192, ANT 194H, ANT 198, or ANT 199 units.		ANT 128A	Kinship & Social Organization: From Clans to Countries

1 Two courses may be in the evolutionary track; and up to 4 units can be ANT 192, ANT 194H, ANT 198, or ANT 199 units.

## A.B. Anthropology—General Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
ANT 001 or ANT 001Y	Human Evolutionary Biology Human Evolutionary Biology (Hybrid Version)	4
ANT 002	Cultural Anthropology	5
ANT 003	Introduction to Archaeology	4
Choose one lower division sociocultural course:		4
ANT 004	Introduction to Anthropological Linguistics	
ANT 020	Comparative Cultures	
ANT 030	Sexualities	
ANT/STS 032	Drugs, Science & Culture	
ANT 034	Cultures of Consumerism	
ANT 036	Star Trek as Social Theory	
Choose one lower division evolutionary course:		4-5
ANT 015	From Birth to Death: The Evolution of the Human Life Cycle	
ANT 023	Introduction to World Prehistory	
ANT 024	Ancient Crops & People	
ANT 054	Introduction to Primatology	

ANT 180	Zooarchaeology	ANT 145	Performance, Embodiment, & Space in South Asia	
ANT 181	Archaeological Field Methods	ANT 146N	Topics in the Anthropology of Europe	
ANT 181L	Field Course in Archeological Methods	ANT 147/ MSA 131B/ CTS 146B	Modern South Asia Cinema	
ANT 182	Archaeometry	ANT 148A	Culture & Political Economy in Contemporary China	
ANT 183	Laboratory in Archeological Analysis	ANT 186A	Museum Studies: Analysis of Native American Basketry	
ANT 184	Prehistoric Technology: The Material Aspects of Prehistoric Adaptation	Choose one course from the Regional Focus electives below:		
ANT 185	Lithic Analysis	ANT 133	Anthropology of Ocean Worlds	
ANT 186A	Museum Studies: Analysis of Native American Basketry	ANT 140A	Cultures & Societies of West & Central Africa	
ANT 187	Cultural Resource Management in Archaeology	ANT 140B	Cultures & Societies of East & South Africa	
Choose a minimum of 16 units from any upper division Sociocultural ANT courses		ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region	
ANT 100	Theory in Social-Cultural Anthropology	ANT 142	Peoples of the Middle East	
ANT 104N	Cultural Politics of the Environment	ANT 143A	Ethnology of Southeast Asia	
ANT 107	Law, Power, Violence	ANT 144	Contemporary Societies & Cultures of Latin America	
ANT/STS 109	Visualization in Science: A Critical Introduction	ANT 145	Performance, Embodiment, & Space in South Asia	
ANT 120	Language & Culture	ANT 146N	Topics in the Anthropology of Europe	
ANT/STS 121	Special Topics in Medical Anthropology	ANT 147/ MSA 131B/ CTS 146B	Modern South Asia Cinema	
ANT 122B	Capitalism & Power	ANT 148A	Culture & Political Economy in Contemporary China	
ANT 123AN	Resistance, Rebellion, & Popular Movements	ANT 172	New World Prehistory: The First Arrivals	
ANT 124	Religion in Society & Culture	ANT 174	European Prehistory	
ANT 125A	Structuralism & Symbolism	ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors	
ANT 125B	Postmodernism(s) & Culture	ANT 176	California Archaeology	
ANT 126A	Anthropology of Development	ANT 177	African Prehistory	
ANT 126B	Women & Development	ANT 178	Hunter-Gatherers	
ANT 127	Urban Anthropology	ANT 179	Asian Prehistory	
ANT 128B	Self, Identity, & Family	Depth Subject Matter Subtotal		
ANT/STS 129	Health & Medicine in a Global Context	44-45		
ANT 130A	Cultural Dimensions of Globalization	<b>Total Units</b>		
ANT 131	Ecology & Politics	<b>69-72</b>		
ANT 132	Psychological Anthropology	<b>Code</b>	<b>Title</b>	<b>Units</b>
ANT 133	Anthropology of Ocean Worlds	Complete the equivalent to five quarters of course work from the list below in foreign language or provide proof of proficiency. Students may take a combination of courses in different languages to fulfill this requirement as long as it is 5 quarters total.		
ANT 134	Buddhism in Global Culture	ARB 001	Elementary Arabic 1	5
ANT 135	Media Anthropology	ARB 001A	Accelerated Intensive Elementary Arabic	15
ANT 136	Ethnographic Film	ARB 002	Elementary Arabic 2	5
ANT 137	Meditation & Culture	ARB 003	Elementary Arabic 3	5
ANT 138	Ethnographic Research Methods in Anthropology	ARB 021	Intermediate Arabic 21	4
ANT 139AN	Race, Class, Gender Systems	ARB 021A	Accelerated Intensive Intermediate Arabic	15
ANT 139BN	Gender & Sexuality	ARB 022	Intermediate Arabic 22	4
ANT 140A	Cultures & Societies of West & Central Africa	ARB 023	Intermediate Arabic 23	4
ANT 140B	Cultures & Societies of East & South Africa	CHN 001	Elementary Chinese	5
ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region			
ANT 142	Peoples of the Middle East			
ANT 143A	Ethnology of Southeast Asia			
ANT 144	Contemporary Societies & Cultures of Latin America			

CHN 001A	Accelerated Intensive Elementary Chinese	15	ITA 023	Intermediate Italian	5
CHN 001BL	Accelerated Written Chinese I	5	ITA 031	Beginning Italian for Spanish Speakers	5
CHN 001CN	Mandarin for Cantonese Speakers I	5	ITA 031Y	Beginning Italian for Spanish Speakers	5
CHN 002	Elementary Chinese	5	ITA 032	Beginning Italian for Spanish Speakers	5
CHN 002BL	Accelerated Written Chinese II	5	ITA 032Y	Beginning Italian for Spanish Speakers	5
CHN 002CN	Mandarin for Cantonese Speakers II	5	JPN 001	Elementary Japanese	5
CHN 003	Elementary Chinese	5	JPN 001A	Accelerated Intensive Elementary Japanese	15
CHN 003BL	Accelerated Written Chinese III	5	JPN 002	Elementary Japanese	5
CHN 003CN	Mandarin for Cantonese Speakers III	5	JPN 003	Elementary Japanese	5
CHN 004	Intermediate Chinese	5	JPN 004	Intermediate Japanese	5
CHN 004A	Accelerated Intensive Intermediate Chinese	15	JPN 005	Intermediate Japanese	5
CHN 005	Intermediate Chinese	5	JPN 006	Intermediate Japanese	5
CHN 006	Intermediate Chinese	5	PER 001	Elementary Persian	5
FRE 001	Elementary French	5	PER 002	Elementary Persian	5
FRE 001A	Accelerated Intensive Elementary French	15	PER 003	Elementary Persian	5
FRE 002	Elementary French	5	PER 021	Intermediate Persian	4
FRE 003	Elementary French	5	PER 022	Intermediate Persian	4
FRE 021	Intermediate French	5	PER 023	Intermediate Persian	4
FRE 022	Intermediate French	5	POR 001	Elementary Portuguese	5
FRE 023	Intermediate French	5	POR 001A	Accelerated Intensive Elementary Portuguese	15
GER 001	Elementary German	5	POR 002	Elementary Portuguese	5
GER 001A	Accelerated Intensive Elementary German	15	POR 003	Elementary Portuguese	5
GER 002	Elementary German	5	POR 008	Elementary Portuguese Conversation	2
GER 003	Elementary German	5	POR 021	Intermediate Portuguese	5
GER 020	Intermediate German	4	POR 022	Intermediate Portuguese	5
GER 021	Intermediate German	4	POR 023	Portuguese Composition I	4
GER 022	Intermediate German	4	POR 028	Intermediate Portuguese Conversation	2
GRK 001	Elementary Greek	5	POR 031	Intermediate Portuguese for Spanish Speakers	4
GRK 002	Elementary Greek	5	HEB 001	Elementary Hebrew	5
GRK 003	Intermediate Greek	5	HEB 001A	Accelerated Intensive Elementary Hebrew	15
HEB 001	Elementary Hebrew	5	HEB 002V	Elementary Punjabi	5
HEB 001A	Accelerated Intensive Elementary Hebrew	15	HEB 003V	Elementary Punjabi	5
HEB 002	Elementary Hebrew	5	HEB 021	Intermediate Punjabi	4
HEB 003	Elementary Hebrew	5	HEB 022	Intermediate Punjabi	4
HEB 021	Intermediate Modern Hebrew I	4	HEB 023	Intermediate Punjabi	4
HEB 022	Intermediate Modern Hebrew II	4	HIN 001	Elementary Hindi/Urdu I	5
HEB 023	Intermediate Modern Hebrew III	4	HIN 001A	Accelerated Intensive Elementary Hindi	15
HIN 001	Elementary Hindi/Urdu I	5	HIN 002	Elementary Hindi/Urdu II	5
HIN 001A	Accelerated Intensive Elementary Hindi	15	HIN 003	Elementary Hindi/Urdu III	5
HIN 002	Elementary Hindi/Urdu II	5	HIN 021	Intermediate Hindi/Urdu I	4
HIN 003	Elementary Hindi/Urdu III	5	HIN 022	Intermediate Hindi/Urdu II	4
HIN 021	Intermediate Hindi/Urdu I	4	HIN 023	Intermediate Hindi/Urdu III	4
HIN 022	Intermediate Hindi/Urdu II	4	ITA 001	Elementary Italian	5
HIN 023	Intermediate Hindi/Urdu III	4	ITA 001A	Accelerated Intensive Elementary Italian	15
ITA 001	Elementary Italian	5	ITA 002	Elementary Italian	5
ITA 001A	Accelerated Intensive Elementary Italian	15	ITA 003	Elementary Italian	5
ITA 002	Elementary Italian	5	ITA 008A	Italian Conversation	3
ITA 003	Elementary Italian	5	ITA 008B	Italian Conversation	3
ITA 008A	Italian Conversation	3	ITA 021	Intermediate Italian	5
ITA 008B	Italian Conversation	3	ITA 022	Intermediate Italian	5
ITA 021	Intermediate Italian	5			
ITA 022	Intermediate Italian	5			

SPA 021	Intermediate Spanish	5
SPA 021V	Intermediate Spanish I	5
SPA 021Y	Intermediate Spanish	5
SPA 022	Intermediate Spanish	5
SPA 022V	Intermediate Spanish II	5
SPA 022Y	Intermediate Spanish	5
SPA 023	Spanish Composition I	4
SPA 024	Spanish Composition II	4
SPA 031	Intermediate Spanish for Native Speakers I	5
SPA 032	Intermediate Spanish for Native Speakers II	5
SPA 033	Intermediate Spanish for Native Speakers III	5

## Anthropology, Bachelor of Science

College of Letters & Science

### The B.S. Major

Anthropology is the systematic study of humans. The student of anthropology learns about human biology, ecology, and social life—past & present—and gains a broad understanding of humans and societies. *The Bachelor of Science degree in Anthropology* is interdisciplinary in nature since it requires lower division coursework in math & science and upper division coursework in biological anthropology and closely related disciplines.

### The Program

*Evolutionary anthropologists* are united by their common application of science and evolutionary theory to understand the behavior, ecology, history, and evolution of humans & non-human primates, as individuals and as societies. These topics may be approached through archaeology, human behavioral ecology, paleoanthropology, primatology, genetics, and conservation biology. *Archaeology* is the study of history or prehistory by analysis of a people's artifacts, or their material culture, with the goal of reconstructing culture history and human behavior. *Human behavioral ecology* is the study of how variation in ecology and social organization can help us understand variation in human behavior. *Paleoanthropology* is the study of human evolution through the fossil and archaeological records, drawing on relevant studies in biological anthropology, Paleolithic archaeology, genetics, and geology. *Primatology* is the study of behavior, ecology, and morphology of primates to address questions about the evolution and function of behavioral & morphological patterns in nonhuman primates and to test models of the origins of human morphology and behavior. *Genetic anthropology* uses DNA to address anthropological questions about population histories, migrations, mixing, and adaptations to local contexts. *Conservation biology* explores the causes of loss of biological diversity—in this department, it focuses on threatened non-human primates and the conservation of natural resources by a rapidly growing population. A Bachelor of Science degree, in addition to core evolutionary anthropology courses, includes the introductory sequences of biology, chemistry, organic chemistry, and calculus, as well as genetics and ecology.

Students are encouraged to gain practical experience through undergraduate research or internships performed for credit (under ANT 192, ANT 198, or ANT 199 units provided by the advising office). Students showing exceptional ability are welcome to seek permission from instructors to participate in graduate seminars offered by the department.

### Career Opportunities

A Bachelor of Science degree in Anthropology combines a solid liberal arts education with training in the life and physical sciences. Through its interdisciplinary nature, a Bachelor of Science degree in Anthropology provides the educational background for careers in the biological sciences and a variety of health professions including pre-medical, pre-dental, and pre-veterinary, fields which increasingly need professionals with training in the social and behavioral sciences. In addition, students will be well prepared to enter fields such as medical or health anthropology, forensic sciences, museum studies, cultural resource management, and wildlife conservation. A Bachelor of Science degree in Anthropology with appropriate courses in education is good preparation for high school teaching in social, biological, and physical sciences. It also provides the foundation for advanced study leading to careers in college-level teaching and research.

### Major Advisor

Connect with our advising office (<https://anthropology.ucdavis.edu/undergraduate/advising/advising-office/>).

### Honors Program

Candidates for high or highest honors in Anthropology must write a senior thesis under the direction of a faculty member. The thesis project will have a minimum duration of two quarters. Honors candidates must take at least 6 units of Anthropology ANT 194H. Only students who, at the end of their junior year (135 units), have attained a cumulative grade point average of 3.500 in Anthropology courses will be eligible for the honors program. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

### Teaching Credential Subject Representative

See the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

### Graduate Study

The Department offers a program of study leading to the M.A. and Ph.D. degrees in Anthropology. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies (<https://grad.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Anthropology</i>		
ANT 001 or ANT 001Y	Human Evolutionary Biology Human Evolutionary Biology (Hybrid Version)	4
ANT 002	Cultural Anthropology	5
ANT 003	Introduction to Archaeology	4
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
<i>General Chemistry</i>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
<i>Mathematics</i>		

Choose a series:	9-12	ANT 153	Human Genetics: Mutation & Migration	5
MAT 016A	Short Calculus	ANT 154A	The Evolution of Primate Behavior	5
MAT 016B	Short Calculus	ANT 154B	Primate Evolutionary Ecology	5
MAT 016C	Short Calculus	ANT 154C	Primate Behavior: Methods & Experimental Design	2
MAT 017A	Calculus for Biology & Medicine	ANT 154CL	Laboratory in Primate Behavior	4
MAT 017B	Calculus for Biology & Medicine	ANT 155	Primate Conservation Biology	4
MAT 017C	Calculus for Biology & Medicine	ANT 156A	Human Osteology	4
MAT 019A	Calculus for Data-Driven Applications	ANT 156B	Advanced Human Osteology	4
MAT 019B	Calculus for Data-Driven Applications	ANT 157	Advanced Human Genetics	2
MAT 019C	Calculus for Data-Driven Applications	ANT 157L	Advanced Human Genetics Lab	4
MAT 021A	Calculus	ANT 158	The Evolution of Sex: A Biological Perspective	4
MAT 021B	Calculus	ANT 159	Disease Outbreaks in Humans and Other Primates	4
MAT 021C	Calculus	ANT 160	Neandertals & Modern Human Origins	4
Choose one:	4-5	ANT 180	Zooarchaeology	4
ANT 013	Scientific Method in Physical Anthropology	ANT 182	Archaeometry	4
SOC 056 or SOC 056Y	Introduction to Social Statistics Introduction to Social Statistics	ANT 185	Lithic Analysis	4
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	ABI 102	Animal Biochemistry & Metabolism	5
STA 032	Gateway to Statistical Data Science	ABI 103	Animal Biochemistry & Metabolism	5
STA 100	Applied Statistics for Biological Sciences	APC 100/NPB 123	Comparative Vertebrate Organology	4
Preparatory Subject Matter Subtotal	51-55	BIS 102	Structure & Function of Biomolecules	3
<b>Depth Subject Matter</b>		BIS 103	Bioenergetics & Metabolism	3
Choose one:	4-5	CHA 101/EXB 106	Human Gross Anatomy	4
ANT 151	Primate Evolution	CHA 101L/EXB 106L	Human Gross Anatomy Laboratory	3
ANT 152	Human Evolution	ESP 100	General Ecology	4
ANT 160	Neandertals & Modern Human Origins	EVE 101	Introduction to Ecology	4
Choose one:	3-5	EVE 102	Population & Quantitative Genetics	4
ANT 153	Human Genetics: Mutation & Migration	EVE 103	Phylogeny, Speciation & Macroevolution	4
EVE 131	Human Genetic Variation & Evolution	EVE 104	Community Ecology	4
Choose one:	5	EVE 105	Phylogenetic Analysis of Vertebrate Structure	4
ANT 154A	The Evolution of Primate Behavior	EVE 138	Ecology of Tropical Latitudes	5
ANT 154B	Primate Evolutionary Ecology	EVE 141	Principles of Systematics	3
ANT 155	Primate Conservation Biology	EVE 147	Biogeography	4
ANT 159	Disease Outbreaks in Humans and Other Primates	EVE 149	Evolution of Ecological Systems	4
Three additional upper division ANT courses.	9-12	EVE 175	Computational Genetics	3
<i>Biological Science</i>		GEL 107	Earth History: Paleobiology	3
BIS 101	Genes & Gene Expression	GEL 107L	Earth History: Paleobiology Laboratory	2
<i>Evolution &amp; Ecology</i>		GEL 108	Earth History: Paleoclimates	3
EVE 100	Introduction to Evolution	GEL 144	Historical Ecology	3
<i>Additional Units</i>		GEL 146	Radiogenic Isotope Geochemistry & Cosmochemistry	3
Additional units from the list below to achieve a minimum of 45 upper division units. (p. 82)	10-16	HDE/ENT 117	Longevity	4
Depth Subject Matter Subtotal	39-51	MIC 102	Introductory Microbiology	3
<b>Total Units</b>	<b>90-106</b>	MIC 103L	Introductory Microbiology Laboratory	2
<b>Additional Units</b>				
<b>Code</b>	<b>Title</b>	<b>Units</b>		
ANT 128A	Kinship & Social Organization: From Clans to Countries	4	MCB 120	Molecular Biology & Biochemistry Laboratory Associated Lecture
ANT 151	Primate Evolution	4	MCB 120L	Molecular Biology & Biochemistry Laboratory
ANT 152	Human Evolution	5	MCB 121	Advanced Molecular Biology
			MCB 150	Developmental Biology

MCB 160L	Principles of Genetics Laboratory	5	ANT 155	Primate Conservation Biology
MCB 162	Human Genetics & Genomics	3	ANT 157	Advanced Human Genetics
MCB 163	Developmental Genetics	3	ANT 158	The Evolution of Sex: A Biological Perspective
MCB 164	Advanced Eukaryotic Genetics	3	Choose one:	
NPB 101	Systemic Physiology	5	ANT 170	Archeological Theory & Method
NPB 101L	Systemic Physiology Laboratory	3	ANT 172	New World Prehistory: The First Arrivals
NPB 102	Animal Behavior	3	ANT 174	European Prehistory
NPB 123/APC 100	Comparative Vertebrate Organology	4	ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors
NPB/PSC 124	Comparative Neuroanatomy	3	ANT 176	California Archaeology
NPB 150/PSC 122	Advanced Animal Behavior	4	ANT 177	African Prehistory
NPB 152/PSC 123	Hormones & Behavior	3	ANT 179	Asian Prehistory
PSC 101	Introduction to Biological Psychology	4	ANT 180	Zooarchaeology
PSC 113	Developmental Psychobiology	4	ANT 181	Archaeological Field Methods
PSC 121	Physiological Psychology	4	ANT 182	Archaeometry
PSC 122/NPB 150	Advanced Animal Behavior	4	ANT 183	Laboratory in Archeological Analysis
PSC 123/NPB 152	Hormones & Behavior	3	ANT 184	Prehistoric Technology: The Material Aspects of Prehistoric Adaptation
PSC/NPB 124	Comparative Neuroanatomy	3	ANT 185	Lithic Analysis
SPH 101	Introduction to Public Health	3	ANT 187	Cultural Resource Management in Archaeology
SPH 102	Introduction to Human Epidemiology	4	Choose one from below or any other sociocultural track course that refers in its title to one or more peoples or regions of the world:	
STA 100	Applied Statistics for Biological Sciences	4	ANT 133	Anthropology of Ocean Worlds
STA 104	Applied Statistical Methods: Nonparametric Statistics	4	ANT 140A	Cultures & Societies of West & Central Africa
STA 106	Applied Statistical Methods: Analysis of Variance	4	ANT 140B	Cultures & Societies of East & South Africa
STA 108	Applied Statistical Methods: Regression Analysis	4	ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region
STA 130A	Mathematical Statistics: Brief Course	4	ANT 142	Peoples of the Middle East
STA 130B	Mathematical Statistics: Brief Course	4	ANT 143A	Ethnology of Southeast Asia
STS 131	Darwin	4	ANT 144	Contemporary Societies & Cultures of Latin America
WFC 141	Behavioral Ecology	4	ANT 145	Performance, Embodiment, & Space in South Asia
WFC 154	Conservation Biology	4	ANT 146N	Topics in the Anthropology of Europe
			ANT 147/ MSA 131B/ CTS 146B	Modern South Asia Cinema
			ANT 148A	Culture & Political Economy in Contemporary China
			ANT 178	Hunter-Gatherers
Choose one:		Choose two:		8
ANT/ESP 101	Ecology, Nature, & Society	2-5	ANT 100	Theory in Social-Cultural Anthropology
ANT 103	Indigenous Peoples & Natural Resource Conservation		ANT 104N	Cultural Politics of the Environment
ANT 122A	Economic Anthropology		ANT 107	Law, Power, Violence
ANT 128A	Kinship & Social Organization: From Clans to Countries		ANT/STS 109	Visualization in Science: A Critical Introduction
ANT 151	Primate Evolution		ANT 120	Language & Culture
ANT 152	Human Evolution		ANT/STS 121	Special Topics in Medical Anthropology
ANT 153	Human Genetics: Mutation & Migration		ANT 122A	Economic Anthropology
ANT 154A	The Evolution of Primate Behavior		ANT 122B	Capitalism & Power

## Anthropology, Minor

College of Letters & Science

### Minor Advisor

For more information about the Anthropology minor options, contact our Advising Office (<https://anthropology.ucdavis.edu/undergraduate/advising/advising-office/>).

### General Emphasis

Code	Title	Units
Choose one:		2-5
ANT/ESP 101	Ecology, Nature, & Society	
ANT 103	Indigenous Peoples & Natural Resource Conservation	
ANT 122A	Economic Anthropology	
ANT 128A	Kinship & Social Organization: From Clans to Countries	
ANT 151	Primate Evolution	
ANT 152	Human Evolution	
ANT 153	Human Genetics: Mutation & Migration	
ANT 154A	The Evolution of Primate Behavior	

ANT 123AN	Resistance, Rebellion, & Popular Movements	
ANT 124	Religion in Society & Culture	
ANT 125A	Structuralism & Symbolism	
ANT 125B	Postmodernism(s) & Culture	
ANT 126A	Anthropology of Development	
ANT 126B	Women & Development	
ANT 127	Urban Anthropology	
ANT 128B	Self, Identity, & Family	
ANT/STS 129	Health & Medicine in a Global Context	
ANT 130A	Cultural Dimensions of Globalization	
ANT 130BN	Migration & the Politics of Place & Identity	
ANT 131	Ecology & Politics	
ANT 132	Psychological Anthropology	
ANT 133	Anthropology of Ocean Worlds	
ANT 134	Buddhism in Global Culture	
ANT 135	Media Anthropology	
ANT 136	Ethnographic Film	
ANT 137	Meditation & Culture	
ANT 138	Ethnographic Research Methods in Anthropology	
ANT 139AN	Race, Class, Gender Systems	
ANT 139BN	Gender & Sexuality	
<b>Total Units</b>		<b>18-21</b>

## Evolutionary Emphasis

Code	Title	Units
	Any five upper division Evolutionary Anthropology courses; Evolutionary track courses at the upper division level are ANT 101, ANT 103, ANT 122A, ANT 128A, ANT 141C, & ANT 151-ANT 187.	18-25
<b>Total Units</b>		<b>18-25</b>

## Global Human Health Emphasis

Code	Title	Units
ANT 015	From Birth to Death: The Evolution of the Human Life Cycle	5
Choose four; minimum 16 upper division units:		14-21
ANT 101	Ecology, Nature, & Society	
ANT 104N	Cultural Politics of the Environment	
ANT/STS 121	Special Topics in Medical Anthropology	
ANT/STS 129	Health & Medicine in a Global Context	
ANT 132	Psychological Anthropology	
ANT 138	Ethnographic Research Methods in Anthropology	
ANT 139BN	Gender & Sexuality	
ANT 152	Human Evolution	
ANT 153	Human Genetics: Mutation & Migration	
ANT 154A	The Evolution of Primate Behavior	
ANT 156A	Human Osteology	
ANT 156B	Advanced Human Osteology	
ANT 157	Advanced Human Genetics <sup>1</sup>	
ANT 157L	Advanced Human Genetics Lab <sup>2</sup>	
ANT 158	The Evolution of Sex: A Biological Perspective	
ANT 159	Disease Outbreaks in Humans and Other Primates	
<b>Total Units</b>		<b>19-26</b>

<sup>1</sup> Must be taken with ANT 157L for 6 units total.

<sup>2</sup> Must be taken with ANT 157 for 6 units total.

## Sociocultural Emphasis

Code	Title	Units
ANT 100	Theory in Social-Cultural Anthropology	4
	One upper division area-focus Sociocultural track course; area-focus Sociocultural track courses are ANT 140A-ANT 148A.	4
	One additional upper division Sociocultural Anthropology course. Sociocultural track courses at the upper division level are numbered ANT 100-ANT 148A, with the exception of ANT 101, ANT 103, & ANT 128A.	4
Choose two:		8
ANT 104N	Cultural Politics of the Environment	
ANT 107	Law, Power, Violence	
ANT/STS 109	Visualization in Science: A Critical Introduction	
ANT 120	Language & Culture	

<b>Total Units</b>	<b>20</b>
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ANT/STS 121	Special Topics in Medical Anthropology
ANT 122A	Economic Anthropology
ANT 122B	Capitalism & Power
ANT 123AN	Resistance, Rebellion, & Popular Movements
ANT 124	Religion in Society & Culture
ANT 125A	Structuralism & Symbolism
ANT 125B	Postmodernism(s) & Culture
ANT 126A	Anthropology of Development
ANT 126B	Women & Development
ANT 127	Urban Anthropology
ANT 128B	Self, Identity, & Family
ANT/STS 129	Health & Medicine in a Global Context
ANT 130A	Cultural Dimensions of Globalization
ANT 130BN	Migration & the Politics of Place & Identity
ANT 131	Ecology & Politics
ANT 132	Psychological Anthropology
ANT 133	Anthropology of Ocean Worlds
ANT 134	Buddhism in Global Culture
ANT 135	Media Anthropology
ANT 136	Ethnographic Film
ANT 137	Meditation & Culture
ANT 138	Ethnographic Research Methods in Anthropology
ANT 139AN	Race, Class, Gender Systems
ANT 139BN	Gender & Sexuality
<b>Total Units</b>	<b>20</b>

## Anthropology, Master of Arts

College of Letters & Science

### Graduate Study

The Department offers a program of study leading to M.A. and Ph.D. degrees in Anthropology. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies (<https://grad.ucdavis.edu/>).

## Anthropology, Doctor of Philosophy

College of Letters & Science

### Graduate Study

The Department offers a program of study leading to M.A. and Ph.D. degrees in Anthropology. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies (<https://grad.ucdavis.edu/>).

## Applied Mathematics (Graduate Group)

College of Letters & Science

### Group Office

1130 Mathematical Sciences Bldg.; 530-754-0823; gradadvisor ([gradadvisor@math.ucdavis.edu](mailto:gradadvisor@math.ucdavis.edu))@math.ucdavis.edu ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)); Applied Mathematics Graduate Group (<http://appliedmath.ucdavis.edu/>)

### Faculty

The Group includes approximately 90 faculty members, of whom about one-third are in the Department of Mathematics. Membership comprises chemists, biologists, physicists, geologists, statisticians, computer scientists, and engineers. Research interests include biology, atmospheric sciences, mechanics, solid and fluid dynamics, optimization and control, theoretical chemistry, computer and engineering sciences, mathematical physics, signal and image processing, harmonic analysis, numerical analysis and nonlinear partial differential equations. A complete list of faculty and their research areas are available at Applied Mathematics People (<http://appliedmath.ucdavis.edu/people/>).

- Applied Mathematics, Master of Science (p. 85)
- Applied Mathematics, Doctor of Philosophy (p. 86)

## Applied Mathematics, Master of Science

College of Letters & Science

### Graduate Study

Students prepare for careers where mathematics is applied to problems in the physical and life sciences, engineering, and management. The degree requirements consist of rigorous training in applied mathematics, including course work and a research dissertation under the direction of a member of the Graduate Group in Applied Mathematics. The M.S. degree provides preparation for further study in applied mathematics or an application area, or for a career in industry or public service. The Ph.D. degree provides preparation for a career in research and/or teaching, or in industrial or national research laboratories. For further information, please contact gradadvisor ([gradadvisor@math.ucdavis.edu](mailto:gradadvisor@math.ucdavis.edu))@math.ucdavis.edu ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)) or 530-754-0823.

New applicants are admitted to the fall quarter only.

### Preparation

The program admits qualified students with a bachelor's degree in mathematics, physics, chemistry, engineering, economics, the life sciences and related fields. General and Subject GRE scores are required, and applicants should display evidence of strong quantitative skills. Undergraduate courses should include calculus (including vector calculus), linear algebra, and ordinary differential equations. Advanced calculus (introduction to real analysis) is strongly recommended. Additional background in probability, partial differential equations, and/or numerical analysis is a plus. The ability to program in a high-level computer programming language (e.g., C, MATLAB, Python, R, etc.) is assumed.

### Graduate Advisor

Contact the Student Services Office at 530-754-0823 or [gradadvisor@math.ucdavis.edu](mailto:gradadvisor@math.ucdavis.edu).

## Courses

For a list of the courses in applied mathematics and mathematics, see Mathematics (p. 296).

# Applied Mathematics, Doctor of Philosophy

College of Letters & Science

## Graduate Study

Students prepare for careers where mathematics is applied to problems in the physical and life sciences, engineering, and management. The degree requirements consist of rigorous training in applied mathematics, including course work and a research dissertation under the direction of a member of the Graduate Group in Applied Mathematics. The M.S. degree provides preparation for further study in applied mathematics or an application area, or for a career in industry or public service. The Ph.D. degree provides preparation for a career in research and/or teaching, or in industrial or national research laboratories. For further information, please contact [gradadvisor@math.ucdavis.edu](mailto:gradadvisor@math.ucdavis.edu) or 530-754-0823.

New applicants are admitted to the fall quarter only.

## Preparation

The program admits qualified students with a bachelor's degree in mathematics, physics, chemistry, engineering, economics, the life sciences and related fields. General and Subject GRE scores are required, and applicants should display evidence of strong quantitative skills. Undergraduate courses should include calculus (including vector calculus), linear algebra, and ordinary differential equations. Advanced calculus (introduction to real analysis) is strongly recommended. Additional background in probability, partial differential equations, and/or numerical analysis is a plus. The ability to program in a high-level computer programming language (e.g., C, MATLAB, Python, R, etc.) is assumed.

## Graduate Advisor

Contact the Student Services Office at 530-754-0823 or at [gradadvisor@math.ucdavis.edu](mailto:gradadvisor@math.ucdavis.edu).

## Courses

For a list of the courses in applied mathematics and mathematics, see Mathematics (p. 296).

# Art History & Art Studio

College of Letters & Science

## Art History

Katharine Burnett, Ph.D., Chairperson of the Department; July 1, 2022-June 30, 2025

## Department Office

101 Art Building 530-752-0105; Art History (<http://arthistory.ucdavis.edu>); Faculty (<http://arts.ucdavis.edu/art-history-people/>)

## Art Studio

Annabeth Rosen, M.F.A., Chairperson of the Department; term ends June 30, 2023

## Department Office

101 Art Building; 530-752-0105; Art Studio (<http://art.ucdavis.edu>); Faculty (<http://arts.ucdavis.edu/art-studio-faculty/>)

- Art History, Bachelor of Arts (p. 86)
- Art History, Minor (p. 88)
- Art History, Master of Arts (p. 89)
- Art Studio, Bachelor of Arts (p. 89)
- Art Studio, Minor (p. 90)
- Art Studio, Master of Fine Arts (p. 91)
- Museum Studies, Minor (p. 91)

# Art History, Bachelor of Arts

College of Letters & Science

## The Major Program

Art History studies the changing visual expression of values, beliefs and experiences across diverse cultures and over time. It provides training in historical, social and aesthetic understanding, critical thinking, scholarly research, and lucid, thoughtful analysis and writing. More than any other discipline art history sharpens its students' visual acuity and deepens their visual literacy. In so doing, it prepares them to face the increasingly complex visual world we find ourselves in today.

## The Program

The major begins with a series of courses that surveys major landmarks in the history of visual culture, art and architecture in Asia, Europe, and the United States. More advanced lecture courses and seminars focus on particularly important periods and issues. Students are encouraged to personalize their training with internships, independent study, and focused upper division study. Top students considering graduate study are encouraged to engage in more advance study by pursuing a senior honors thesis.

## Career Options

A major in Art History develops critical thinking and the integration of research, interpretation and understanding. It provides an excellent liberal arts basis for professions as far ranging as advertising, law, medicine, politics and business. The major prepares students for advanced study in Art History, Architecture, Museum Studies and Cultural Studies. It also serves as the foundation for careers in teaching, arts, administration, museums, galleries, historic preservation, art libraries, publishing, journalism, advertising, art conservation, and art investment. As the world becomes increasingly flooded with images, the critical visual literacy gained through the study of art history becomes more important for a wide variety of careers.

## Honors Program

The Honors Program in Art History is encouraged for Art History majors who are considering attending graduate school. To be eligible for the program, a student must have completed at least 135 units and have a grade point average of 3.500 GPA overall, consent of both the prospective thesis advisor, who must be a member of the Art History faculty and the major advisor. In addition to meeting the standard major requirements,

the honors student completes one additional undergraduate seminar (course 100 or 190A-L), researches and writes an honors thesis (courses 194HA and 194HB), supervised by the prospective thesis advisor. Students participating in this Program are candidates for Departmental recommendation for graduation with High or Highest Honors. See Academic Information (p. 34), Letters & Science honors section (<https://lettersandscience.ucdavis.edu/deans-honors-list-and-graduation-honors/>), and consult Art History (<http://arthistory.ucdavis.edu/>).

## Teaching Credential Subject Representative

Department Chairperson; see the Teacher Education program (<https://education.ucdavis.edu/teaching-credentialma/>).

## Graduate Study

The Program in Art History offers studies leading to the Master of Arts degree in History of Art as preparation for further graduate study or professional work. For more information, contact the Graduate Staff Advisor at 530-752-8710, or see Art History (<http://arthistory.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose four:		16-17
AHI 001A	Ancient Mediterranean Art	
AHI 001B	Medieval & Renaissance Art	
AHI 001C	Baroque to Modern Art	
AHI 001E	Islamic Art & Architecture	
AHI 005	Understanding Visual Culture	
AHI 025	Understanding Architecture	
AHI 001D	Arts of Asia	
or AHI 001DY	Arts of Asia	
Any lower division Art Studio (ART) course except ART 030:		4
ART 001	Introduction to Studio Art Practice	
ART 002	Beginning Drawing	
ART 005	Beginning Sculpture	
ART 007	Beginning Painting	
ART 008	Beginning Ceramic Sculpture	
ART 009	Beginning Photography	
ART 010D	Contemporary Art Appreciation	
ART 010F	Contemporary Art Appreciation	
ART 011	Beginning Printmaking	
ART 012	Beginning Video	
ART 024	Introduction to Experimental Video & Film	
Preparatory Subject Matter Subtotal		20-21
<b>Depth Subject Matter</b>		
<i>Distribution Areas</i>		
Choose six from at least five of the following areas:		24
(1) The Ancient World		
AHI 152	Arts of Oceania & Prehistoric Europe	
AHI/CLA 172A	Early Greek Art & Architecture	
AHI/CLA 172B	Later Greek Art & Architecture	
AHI/CLA 173	Roman Art & Architecture	
AHI/CLA 175	Architecture & Urbanism in Mediterranean Antiquity	
(2) Asia		

AHI/RST 154	The Hindu Temple
AHI 157/RST 171	Buddhist Art
AHI 163A	Early Chinese Art
AHI 163B	Chinese Painting
AHI 163C	Early Modern Chinese Painting
AHI 163D	Art from China 1900 to the Present
AHI 164	The Arts of Japan
(3) The Middle Ages to 1700	
AHI 155	The Islamic City
AHI 156	Arts of the Islamic Book
AHI 178B	Early Italian Renaissance Art & Architecture
AHI 178C	High & Late Italian Renaissance Art & Architecture
AHI 179B	Baroque Art
(4) Western Art 1700 to 1900	
AHI 130	Landscape, Nature, & Art
AHI 168	Great Cities
AHI 182	British Art & Culture (1750-1900)
AHI 183A	Art in the Age of Revolution, 1750-1850
AHI 183B	Impressionism & Post-Impressionism: Manet to 1900
AHI 188C	American Art to 1910
(5) World Art 20 <sup>th</sup> Century to the Present	
AHI 122	Sex & Space
AHI 163D	Art from China 1900 to the Present
AHI 183C	Modernism in France, 1880-1940
AHI 185	Avant-Gardism & its Aftermath, 1917-1960
AHI 186	Contemporary Art 1960-Present
AHI 189	Photography in History
(6) Art & Issues Across Chronologies	
AHI 110	Cultural History of Museums
AHI/HMR 120A	Art, Architecture, & Human Rights
AHI 121	Politics of Public Art
AHI 123	The Museum in the Age of Spectacle
AHI 181	Latin American Art & Architecture
AHI 188A	The American Home
<i>Undergraduate Seminar in Art History, (AHI 190A-AHI 190L)</i>	
Choose one:	4
AHI 190A	Undergraduate Seminar in Art History: Mediterranean Antiquity
AHI 190B	Undergraduate Seminar in Art History: Medieval
AHI 190C	Undergraduate Seminar in Art History: Renaissance
AHI 190D	Undergraduate Seminar in Art History: American
AHI 190E	Undergraduate Seminar in Art History: Gendering of Culture
AHI 190F	Undergraduate Seminar in Art History: Chinese
AHI 190G	Undergraduate Seminar in Art History: Japanese
AHI 190H	Undergraduate Seminar in Art History: Modern-Contemporary

AHI 190I	Undergraduate Seminar in Art History: 17th-18th Century	
AHI 190J	Undergraduate Seminar in Art History: Islamic	
AHI 190K	Undergraduate Seminar in Art History: 19th Century	
AHI 190L	Undergraduate Seminar in Art History: Architecture & Heritage	
<i>Electives</i>		
Choose any three additional AHI upper division courses or seminars.		12
Depth Subject Matter Subtotal		40
<b>Emphasis; choose one to reach total units:</b>		
Architectural History (p. 88)		60
Museum Studies (p. 88)		72-73

## Emphasis in Architectural History

Emphasis in Architectural History follows the same requirements as for the Art History major above, applying at least six of the following to their respective required areas or as electives:

Code	Title	Units
Choose at least six of the following:		24
AHI 025	Understanding Architecture	
AHI 110	Cultural History of Museums	
AHI/HMR 120A	Art, Architecture, & Human Rights	
AHI 122	Sex & Space	
AHI 123	The Museum in the Age of Spectacle	
AHI 152	Arts of Oceania & Prehistoric Europe	
AHI/RST 154	The Hindu Temple	
AHI 155	The Islamic City	
AHI 163A	Early Chinese Art	
AHI 168	Great Cities	
AHI/CLA 172A	Early Greek Art & Architecture	
AHI/CLA 172B	Later Greek Art & Architecture	
AHI/CLA 173	Roman Art & Architecture	
AHI/CLA 175	Architecture & Urbanism in Mediterranean Antiquity	
AHI 178B	Early Italian Renaissance Art & Architecture	
AHI 178C	High & Late Italian Renaissance Art & Architecture	
AHI 181	Latin American Art & Architecture	
AHI 184	20th-Century Architecture	
AHI 187	Contemporary Architecture	
AHI 188A	The American Home	
AHI 188B	Architecture of the United States	
<b>Total Units</b>		<b>24</b>

Fulfilling the undergraduate seminar requirement (AHI 192) through an architectural topic is highly recommended.

## Emphasis in Museum Studies

The Emphasis in Museum Studies consists of five upper-division courses (20 units) incorporated into the 60-unit major in Art History. Two core courses for the Emphasis in Museum Studies (8 units) take the place of upper division electives in the major. Three additional electives (12 units)

are chosen to complete the Emphasis. Beyond these requirements, one or more internships (AHI 192) are highly recommended.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose four:		16-17
AHI 001A	Ancient Mediterranean Art	
AHI 001B	Medieval & Renaissance Art	
AHI 001C	Baroque to Modern Art	
AHI 001E	Islamic Art & Architecture	
AHI 005	Understanding Visual Culture	
AHI 025	Understanding Architecture	
AHI 001D	Arts of Asia	
or AHI 001DY Arts of Asia		
Any lower division Art Studio (ART) course except:		4
ART 030	Introduction to Contemporary Visual Culture	
<b>Preparatory Subject Matter Subtotal</b>		20-21
<b>Depth Subject Matter</b>		
Distribution Areas; same as for the Art History Major, above.		24
Undergraduate Seminar; same as for the Art History Major above.		4
Elective; one additional AHI upper-division course or seminar.		4
Depth Subject Matter Subtotal		32
<b>Depth Subject Matter—Museum Studies</b>		
Five courses not already counted toward the Major.		
Required Courses:		8
AHI 101	Understanding Museum Practices	
AHI 110	Cultural History of Museums	
Required Courses:		12
AHI 102	Exhibition Practicum	
AHI/HMR 120A	Art, Architecture, & Human Rights	
AHI 123	The Museum in the Age of Spectacle	
AHI 190L	Undergraduate Seminar in Art History: Architecture & Heritage	
ANT 186A	Museum Studies: Analysis of Native American Basketry	
ARE 113	Fundamentals of Marketing Management	
CMN 131	Strategic Communication in Public Relations	
DES 185	Exhibition Design	
DES 187	Narrative Environments	
DRA 124A	Principles of Theatrical Design: Scenery	
DRA 124C	Principles of Theatrical Design: Lighting	
UWP 102J	Writing in the Disciplines: Fine Arts	
UWP 112A	Introduction to Professional Editing	
<b>Depth Subject Matter—Museum Studies Subtotal</b>		20
<b>Total Units</b>		<b>72-73</b>

## Art History, Minor

### College of Letters & Science

Art History studies the changing visual expression of values, beliefs and experiences across diverse cultures and over time. It provides training in historical, social and aesthetic understanding, critical thinking, scholarly

research, and lucid, thoughtful analysis and writing. More than any other discipline art history sharpens its students' visual acuity and deepens their visual literacy. In so doing, it prepares them to face the increasingly complex visual world we find ourselves in today.

Code	Title	Units
<b>Five Upper Division Courses</b>		
Choose one course from four of the following areas:		
(1) The Ancient World		16
AHI 152	Arts of Oceania & Prehistoric Europe	
AHI/CLA 172A	Early Greek Art & Architecture	
AHI/CLA 172B	Later Greek Art & Architecture	
AHI/CLA 173	Roman Art & Architecture	
AHI/CLA 175	Architecture & Urbanism in Mediterranean Antiquity	
(2) Asia		
AHI/RST 154	The Hindu Temple	
AHI 157/RST 171	Buddhist Art	
AHI 163A	Early Chinese Art	
AHI 163B	Chinese Painting	
AHI 163C	Early Modern Chinese Painting	
AHI 164	The Arts of Japan	
(3) The Middle Ages to 1700		
AHI 155	The Islamic City	
AHI 156	Arts of the Islamic Book	
AHI 178B	Early Italian Renaissance Art & Architecture	
AHI 178C	High & Late Italian Renaissance Art & Architecture	
AHI 179B	Baroque Art	
(4) Western Art 1700 to 1900		
AHI 130	Landscape, Nature, & Art	
AHI 168	Great Cities	
AHI 182	British Art & Culture (1750-1900)	
AHI 183A	Art in the Age of Revolution, 1750-1850	
AHI 183B	Impressionism & Post-Impressionism: Manet to 1900	
AHI 188C	American Art to 1910	
(5) World Art 20 <sup>th</sup> Century to the Present		
AHI 122	Sex & Space	
AHI 163D	Art from China 1900 to the Present	
AHI 183C	Modernism in France, 1880-1940	
AHI 185	Avant-Gardism & its Aftermath, 1917-1960	
AHI 186	Contemporary Art 1960-Present	
AHI 189	Photography in History	
(6) Art & Issues Across Chronologies		
AHI 110	Cultural History of Museums	
AHI/HMR 120A	Art, Architecture, & Human Rights	
AHI 121	Politics of Public Art	
AHI 123	The Museum in the Age of Spectacle	
AHI 181	Latin American Art & Architecture	
AHI 188A	The American Home	
<b>Elective</b>		
Choose any additional upper division Art History (AHI) course or seminar.		4

Art History (AHI) courses. (p. 537)

<b>Total Units</b>	20
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## Art History, Master of Arts

### College of Letters & Science

The Program in Art History offers studies leading to the Master of Arts degree in History of Art as preparation for further graduate study or professional work. For more information, contact the Graduate Staff Advisor at 530-752-8710, or see Art History (<http://arthistory.ucdavis.edu>).

## Art Studio, Bachelor of Arts

### College of Letters & Science

## The Major Program

The Art Studio major provides the studio experience necessary for a broad understanding of the practice and interpretation of the visual arts.

### The Program

The Art Studio program is designed to deliver a broad range of hands-on studio practices to the art major. Areas of focus include painting, sculpture, drawing, photography, ceramics, printmaking, and time-based media. Course choices/sequences are determined by the student according to major distribution requirements. Students are encouraged to explore a broad range of disciplines and are expected to take advantage of beginning classes which provide a critical introduction to the research possibilities within the major, across disciplines. In addition to studio classes, students are encouraged to participate in a distinguished visiting artist lecture series, professional practice seminars, student exhibitions/competitions, internships, and benefit from exposure to cultural events and exhibitions in Davis, Sacramento, and the Greater Bay Area.

### Major Advisor

Information on the current Academic Advisor can be obtained by contacting the Art Department main office at 530-752-0105 or Arts Group Advising Center (<http://arts.ucdavis.edu/arts-group-undergraduate-advising/>).

### Portfolio

While portfolios are not required for admission to the art major, students at all levels are expected to maintain current portfolios of completed work in order to qualify and compete for the numerous internships, fellowships, grants, awards, and exhibitions the program has to offer, as well as to better prepare for the rigors of graduate school and/or an independent studio practice.

### Career Options

Graduates of the Art Studio Program attend prestigious post-baccalaureate and graduate programs in studio art. Alumni often go on to develop professional studio practices. Commitment to the development of one's studio work leads to exhibition opportunities as well as accomplishments in the realm of fellowships, commissions, collaborations, and a host of other professional projects and opportunities. For the student wishing to explore additional arts-related trajectories, in the private or public sector, a studio arts education provides a strong foundation for careers and/or graduate work in K-12 art education, art therapy, arts administration, curatorial studies, set design,

architecture, culinary arts, design, film, animation, art criticism/journalism among others.

## Teaching Credential Subject Representative

See the Teacher Education program (<https://education.ucdavis.edu/teaching-credentialma/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose five lower division courses in the practice of art:		24-25
ART 001	Introduction to Studio Art Practice	
ART 002	Beginning Drawing	
ART 005	Beginning Sculpture	
ART 007	Beginning Painting	
ART 008	Beginning Ceramic Sculpture	
ART 009	Beginning Photography	
ART 011	Beginning Printmaking	
ART 012	Beginning Video	
Choose one lower division theory or history course:		4
ART 010D	Contemporary Art Appreciation	
ART 010F	Contemporary Art Appreciation	
ART 024	Introduction to Experimental Video & Film	
ART 030	Introduction to Contemporary Visual Culture	
AHI 001A	Ancient Mediterranean Art	
AHI 001B	Medieval & Renaissance Art	
AHI 001C	Baroque to Modern Art	
AHI 001D	Arts of Asia	
AHI 001DY	Arts of Asia	
AHI 001E	Islamic Art & Architecture	
AHI 005	Understanding Visual Culture	
AHI 025	Understanding Architecture	
Preparatory Subject Matter Subtotal		28-29
<b>Depth Subject Matter</b>		
40 upper division units in Art Studio (ART)		40
Choose any one upper division theory or history course:		4
Art History (AHI) (p. 537)		
Cinema & Digital Media (CDM) (p. 633)		
Design (DES) (p. 712)		
Music (MUS) (p. 1125)		
Theatre & Dance (DRA) (p. 723)		
Depth Subject Matter Subtotal		44
<b>Total Units</b>		<b>72-73</b>

which provide a critical introduction to the research possibilities within studio art. In addition to studio classes, students are encouraged to participate in the department's distinguished visiting artist lecture series, professional practice seminars, student exhibitions/competitions, internships, and benefit from exposure to cultural events and exhibitions in Davis, Sacramento, and the Greater Bay Area.

Prerequisite courses must be taken prior to enrollment in upper division courses. Independent study courses are not applicable.

Code	Title	Units
Upper division Art Studio courses in two of the following areas:		
Area 1; Painting, Drawing, Printmaking		20
ART 102A	Advanced Painting: Studio Projects	
ART 102C	Advanced Painting: Special Topics	
ART 103C	Intermediate Drawing: 3 Dimensions	
ART 105A	Advanced Drawing: Studio Projects	
ART 125A	Intermediate Printmaking: Relief	
ART 125B	Intermediate Printmaking: Intaglio	
ART 125C	Intermediate Printmaking: Lithography	
ART 125D	Intermediate Printmaking: Screenprinting	
ART 129	Advanced Printmaking	
ART/CHI 171	Mexican & Chicano Mural Workshop	
Area 2; Sculpture & Ceramic Sculpture		
ART 142A	Intermediate Ceramic Sculpture: Industrial Production Methods	
ART 142B	Intermediate Ceramic Sculpture: Material Study	
ART 142C	Intermediate Ceramic Sculpture: Ceramics & the Painted Surface	
ART 143	Advanced Ceramic Sculpture: Studio Projects	
ART 151	Intermediate Sculpture	
ART 152A	Advanced Sculpture: Studio Projects	
ART 152B	Advanced Sculpture: Material Explorations	
ART 152C	Advanced Sculpture: Concepts	
ART 152D	Advanced Sculpture: Metals	
ART 152E	Advanced Sculpture: Site Specific Public Sculpture	
ART 152F	Advanced Sculpture: Figure	
ART 152G	Advanced Sculpture: The Miniature & Gigantic	
Area 3; Photography & Video		
ART 110A	Intermediate Photography: Black & White Analog	
ART 110B	Intermediate Photography: Digital Imaging	
ART 111A	Advanced Photography: Special Topics	
ART 111B	Advanced Photography: Digital Imaging	
ART 114A	Intermediate Video: Animation	
ART 114B	Intermediate Video: Experimental Documentary	
ART 114C	Intermediate Video: Performance Strategies	
ART 117	Advanced Video & Electronic Arts	
<b>Total Units</b>		<b>20</b>

## Art Studio, Minor

College of Letters & Science

## The Minor Program

The Art Studio program delivers a broad range of hands-on studio practices to the art minor. Areas of focus include painting, sculpture, drawing, photography, ceramics, printmaking, and time-based media. Course choices/sequences are determined by the student according to minor requirements. Students are encouraged to explore different areas of focus and are expected to take advantage of beginning classes

# Art Studio, Master of Fine Arts

College of Letters & Science

## Graduate Study

The Department of Art offers programs of study and research leading to the M.F.A. degree in the practice of art. For more information contact the Graduate Staff Advisor at 530-752-8710 or see Art Studio Graduate Program (<http://arts.ucdavis.edu/art-studio-graduate-program/>).

# Museum Studies, Minor

College of Letters & Science

The Minor in Museum Studies combines study of the history of collecting and museum theory with practical training in curatorship, interpretive writing, and exhibition development. The minor introduces students to the historical development and current practices of all types of museums, including museums of natural history, science, anthropology, art, and heritage sites. Students develop an understanding of issues shared by all types of museums: organization and interpretation of exhibitions, audience engagement, the ethics of display and conservation, the political position of museums in their communities and the role of museums as shapers of culture. Students gain practical skills related to careers in museums, galleries, and other cultural institutions. Students take three electives from a list of twelve choices. The electives divide into roughly five areas representing different aspects of museum work, (1) practices of contemporary museums, (2) issues of cultural property and heritage, (3) public relations and marketing, (4) writing skills relevant to museum work, (5) skills related to exhibition planning, design, and installation.

Code	Title	Units
<b>Required Courses</b>		
AHI 101	Understanding Museum Practices	4
AHI 110	Cultural History of Museums	4
Required Courses Subtotal		8
<b>Electives</b>		
Choose three:		12
AHI 102	Exhibition Practicum	
AHI/HMR 120A	Art, Architecture, & Human Rights	
AHI 123	The Museum in the Age of Spectacle	
AHI 190L	Undergraduate Seminar in Art History: Architecture & Heritage	
ANT 186A	Museum Studies: Analysis of Native American Basketry	
ARE 113	Fundamentals of Marketing Management	
CMN 131	Strategic Communication in Public Relations	
DES 185	Exhibition Design	
DES 187	Narrative Environments	
DRA 124A	Principles of Theatrical Design: Scenery	
DRA 124C	Principles of Theatrical Design: Lighting	
UWP 102J	Writing in the Disciplines: Fine Arts	
UWP 112A	Introduction to Professional Editing	
Electives Subtotal		12
<b>Total Units</b>		20

# Asian American Studies

College of Letters & Science

Susette Min, Ph.D., Interim Chairperson of the Department; term ends June 30, 2023

Robyn Rodriguez, Ph.D., Co-Chairperson of the Department; term ends June 30, 2023

## Department Office

3102 Hart Hall; 530-752-2069; Asian American Studies (<https://asa.ucdavis.edu/>); Facebook (<https://www.facebook.com/UCDavisAsianAmericanStudies/>); Faculty (<https://asa.ucdavis.edu/faculty/>)

## Department Background

Born out of social and global justice movements of the late 1960s, the Department of Asian American Studies at UC Davis is one of the very first programs in Asian American studies established nationally. The Department provides unique learning opportunities about the historical and contemporary experiences of Asian Americans in local and global contexts. We seek to develop and advance knowledge about the diversity of Asian American populations as immigrants and refugees, as ethnic minorities, and as a racial group in U.S. society. In examining the complexity of Asian American experiences, we foster critical thinking and comprehensive analyses of formations of race, ethnicity, class, gender, religion, and sexuality that are manifested not only in the United States but also in other regions and nations across the globe.

A distinct feature of our department is our emphasis on applied knowledge. Our curriculum, for instance, encourages students to work in close collaboration with community groups that advance social justice and transformative social change. Many of our faculty are community-engaged scholars who work closely with Asian American and Pacific Islander (API) organizations and help to facilitate linkages between students and the broader API community. Moreover, the faculty and staff in our department are consistently recognized for their strong mentorship and close engagement with students' academic and personal growth. Our faculty and courses also focus on diverse Asian American populations as we seek to be inclusive of underrepresented Asian American groups and highlight cutting-edge research. Finally, our department has close relationships with its alumni who also help to support students and the overall curriculum.

The Department houses the George Kagiwada Library and Digital Media Lab. This unique library holds a vast collection of scholarly texts in Asian American studies as well as an archive of Asian American community newspapers and other primary source publications not found elsewhere. The Digital Media Lab helps to support course-based as well as individual students' independent projects such as podcasts, videos and the like.

Asian American Studies also offers research opportunities in Filipinx and Vietnamese Studies through the Bulosan Center for Filipinx Studies and the New Vietnam Studies Initiative (NVSI).

- Asian American Studies, Bachelor of Arts (p. 92)
- Asian American Studies, Minor (p. 93)
- Social, Ethnic & Gender Relations, Minor (p. 94)

# Asian American Studies, Bachelor of Arts

College of Letters & Science

## The Major Program

Offering both an undergraduate major and minor, our curriculum emphasizes multidisciplinary, comparative, transnational, and intersectional perspectives; original empirically-based scholarship; cultural production and analyses; and community engagement.

In consultation with our faculty and staff advisors, students in the major have the exciting opportunity to select an emphasis or specialty organized around our faculty's core areas of intellectual focus including –Immigration, Labor, and Transnationalism; Visual, Literary, and Cultural Studies; and Public/Community-Engaged Scholarship. The department is also developing an emphasis on Health through its emerging partnerships. Each emphasis incorporates a diverse array of thematic, theoretical, disciplinary, and methodological approaches—as well as a focus on a broad range of Asian American communities—allowing students to choose a course of study that aligns with their particular academic and career interests.

In order to enhance students' intellectual development and postgraduate preparation, our curriculum also requires that all majors complete an off-campus community internship. This requirement seeks to ensure students experience a deeper and more comprehensive liberal arts education that connects classroom education to real life contexts that foster the development of new forms of knowledge and practical skills. The Department also offers an optional two-quarter thesis writing seminar for students in the major and minor that progresses through each stage of designing and completing an individualized undergraduate thesis project based on original research, which helps prepare students interested in applying for graduate school.

## Career Alternatives

With the multidisciplinary emphasis of our program, an Asian American studies major provides excellent preparation for a diverse range of careers. Our alumni have established successful careers in the arts, community-based and non-profit organizations, government and politics, human rights, journalism, international relations, law, K-12 education, public health, public policy, social work, and student affairs in higher education. Others have gone on to pursue postgraduate degrees in a wide variety of fields that include education, ethnic studies, fine arts, feminist & queer studies, history, law, literature, political science, public policy, sociology, and social work. Our department has fostered close relationships with our alumni who are committed to supporting our majors with their career plans.

## General Education Requirements

A large number of the courses offered by the Department fulfill a wide range of general education topical breadth and core literacy requirements that include:

### Topical Breadth

- Arts & Humanities
- Social Sciences

### Core Literacy

#### Literacy with Words & Images

- Writing Experience
- Oral Skills
- Visual Literacy

#### Civic & Cultural Literacy

- American Cultures, Governance, & History
- Domestic Diversity
- World Cultures

### Major Advisor

Joe Nguyen ([jovnguyen@ucdavis.edu](mailto:jovnguyen@ucdavis.edu)), Student Academic Advisor (SAA); 530-752-8617

Substitutions for disciplinary track courses will be considered by the Department Chair on a case-by-case basis. Likewise, any substitutions of Major/Minor criteria will be considered by the Department Chair.

Direct questions pertaining to the following courses to the instructor or to the Department of Asian American Studies in 3102 Hart Hall; 530-752-2069. Also find relevant contact information at Asian American Studies (<https://asa.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
ASA 001	Historical Experience of Asian Americans	4
ASA 002	Contemporary Issues of Asian Americans	4
ASA 003	Methods in Asian American Studies	4
ASA 004	Asian American Cultural Studies	4
Choose at least two lower division courses from the following departments or programs:		8
All lower division courses of at least 4 units are acceptable except those numbered 092, 097T, 098, 099.		
African American & African Studies (AAS) (p. 476)		
American Studies (AMS) (p. 495)		
Chicana/o Studies (CHI) (p. 619)		
Gender, Sexuality, & Women's Studies (GSW) (p. 860)		
Middle East & South Asia Studies (MSA) (p. 1112)		
Native American Studies (NAS) (p. 1138)		
Women's Studies (WMS) (p. 1392)		
<i>Methodology</i>		
Choose at least two courses from any of the following methods courses:		8
AAS 101 Introduction to Research in the Afro-American Community		
AMS 100 Methods in American Studies		
ANT 013 Scientific Method in Physical Anthropology		
AHI 005 Understanding Visual Culture		
AHI 100 Methods of Art History		
ART 030 Introduction to Contemporary Visual Culture		
CHI 023 Qualitative Research Methods		
ENL 042 Approaches to Reading		
ENL 110A Introduction to Literary Theory		
ENL 110B Introduction to Modern Literary & Critical Theory		

HIS 101	Introduction to Historical Thought & Writing	ASA 194 & ASA 195	Asian American Studies Capstone Course and Asian American Studies Senior Thesis Seminar <sup>2</sup>
HDE 120	Research Methods in Human Development	ASA 198	Directed Group Study <sup>3</sup>
PHI 005	Critical Reasoning	ASA 199	Special Study for Advanced Undergraduates <sup>3</sup>
POL 051	Scientific Study of Politics		
PSC 041	Research Methods in Psychology		
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics		
WMS 104	Feminist Research		
Preparatory Subject Matter Subtotal	32		At least two upper division elective courses from other departments or programs that relate to chosen emphasis.
<b>Depth Subject Matter</b>			Two courses (of up to 8 units) from Study Abroad can be substituted for major requirements upon approval from the SAO or faculty advisor.
ASA 192	Internships <sup>1</sup>	4	Substitutions for disciplinary track courses will be considered by the Department Chair on a case by case basis. Likewise, any substitutions of Major/Minor criteria will be considered by the Department Chair.
Choose at least six upper division Asian American Studies (ASA) courses:	24		
ASA 100	Asian American Communities		Depth Subject Matter Subtotal
ASA 102	Theoretical Perspective in Asian American Studies		36-44
ASA 112	Asian American Women		<b>Total Required Units: 68</b>
ASA 113	Asian American Sexuality		
ASA 114	Asian Diasporas		<b>Total Units</b>
ASA 115	Multiracial Asian Pacific American Issues		68-76
ASA 116	Asian American Youth		
ASA 121	Asian American Performance		
ASA 130	Asian American Literature		
ASA 131	Ethnicity, Culture, & the Self		
ASA/SPH 132	Health Issues Confronting Asian Americans & Pacific Islanders		
ASA 141	Asian Americans & the Political Culture of Fashion in the U.S. & Asia		
ASA 150	Filipino American Experience		
ASA 150B	Japanese American Experience		
ASA 150C	Chinese American Experience		
ASA 150D	Korean American Experience		
ASA 150E	Southeast Asian American Experience		
ASA 150F	South Asian American History, Culture, & Politics		
ASA 155	Asian American Legal History		
ASA 189A	Topics in Asian American Studies: History		
ASA 189B	Topics in Asian American Studies: Culture		
ASA 189C	Topics in Asian American Studies: Physical & Mental Health		
ASA 189D	Topics in Asian American Studies: Policy & Community		
ASA 189E	Topics in Asian American Studies: Comparative Racial Studies		
ASA 189F	Topics in Asian American Studies: Asian Studies & Asian American Studies		
ASA 189G	Topics in Asian American Studies: Race, Class, Gender, & Sexuality		
ASA 189H	Topics in Asian American Studies: Society & Institutions		
ASA 189I	Topics in Asian American Studies: Politics & Social Movements		

## Asian American Studies, Minor

College of Letters & Science

### Department Background

Our curriculum emphasizes multidisciplinary, comparative, transnational, and intersectional perspectives; original empirically-based scholarship; cultural production and analyses; and community engagement.

In consultation with our faculty and staff advisors, students in the minor have the exciting opportunity to select an emphasis or specialty organized around our faculty's areas of intellectual focus including –Immigration, Labor, & Transnationalism; Visual, Literary, & Cultural Studies; and Public/Community-Engaged Scholarship. The department is also developing an emphasis on Health through its emerging partnerships. Each emphasis incorporates a diverse array of thematic, theoretical, disciplinary, and methodological approaches—as well as a focus on a broad range of Asian American communities—allowing students to choose a course of study that aligns with their particular academic and career interests. The minor in Asian American studies can complement a range of majors. In the past and currently our minors have majored in areas of academic study that range across the social sciences and humanities (Sociology, Anthropology, History, English and others) as well as the STEM (Science, Technology, Engineering & Mathematics) fields.

### Career Alternatives

With the multidisciplinary emphasis of our program, an Asian American studies minor provides excellent preparation for a diverse range of careers. Our alumni have established successful careers in the arts, community-based and non-profit organizations, government and politics, human rights, journalism, international relations, law, K-12 education, public health, public policy, social work, and student affairs in higher

<sup>1</sup> ASA 192 required.

<sup>2</sup> ASA 194 & ASA 195 is a series of courses taken consecutively in two quarters; students enrolling in ASA 194 must also enroll in ASA 195 the following quarter to complete the series.

<sup>3</sup> Up to 6 units in ASA 198 and/or ASA 199 can be used to satisfy the Asian American Studies upper division course requirements.

education. Others have gone on to pursue postgraduate degrees in a wide variety of fields that include education, ethnic studies, fine arts, feminist & queer studies, history, law, literature, political science, public policy, sociology, and social work. Our department has fostered close relationships with our alumni who are committed to supporting our minors with their career plans.

## General Education Requirements

A large number of the courses offered by the Department fulfill a wide range of general education topical breadth and core literacy requirements that include:

### Topical Breadth

- Arts & Humanities
- Social Sciences

### Core Literacy

#### Literacy with Words & Images

- Writing Experience
- Oral Skills
- Visual Literacy

#### Civic & Cultural Literacy

- American Cultures, Governance, & History
- Domestic Diversity
- World Cultures

### Minor Advisor

Joe Nguyen (jovnguyen@ucdavis.edu), Student Academic Advisor (SAA); 530-752-8617.

Substitutions for disciplinary track courses will be considered by the Department Chair on a case-by-case basis. Likewise, any substitutions of Major/Minor criteria will be considered by the Department Chair.

Direct questions pertaining to the following courses to the instructor or to the Department of Asian American Studies in 3102 Hart Hall; 530-752-2069. Also find relevant contact information at Asian American Studies (<https://asa.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose two:		8
ASA 001	Historical Experience of Asian Americans	
ASA 002	Contemporary Issues of Asian Americans	
ASA 003	Methods in Asian American Studies	
ASA 004	Asian American Cultural Studies	
Preparatory Subject Matter Total		8
Choose five:		20
ASA 100	Asian American Communities	
ASA 102	Theoretical Perspective in Asian American Studies	
ASA 112	Asian American Women	
ASA 113	Asian American Sexuality	
ASA 114	Asian Diasporas	
ASA 115	Multiracial Asian Pacific American Issues	
ASA 116	Asian American Youth	
ASA 121	Asian American Performance	
ASA 130	Asian American Literature	

ASA 131	Ethnicity, Culture, & the Self
ASA/SPH 132	Health Issues Confronting Asian Americans & Pacific Islanders
ASA 141	Asian Americans & the Political Culture of Fashion in the U.S. & Asia
ASA 150	Filipino American Experience
ASA 150B	Japanese American Experience
ASA 150C	Chinese American Experience
ASA 150D	Korean American Experience
ASA 150E	Southeast Asian American Experience
ASA 150F	South Asian American History, Culture, & Politics
ASA 155	Asian American Legal History
ASA 189A	Topics in Asian American Studies: History
ASA 189B	Topics in Asian American Studies: Culture
ASA 189C	Topics in Asian American Studies: Physical & Mental Health
ASA 189D	Topics in Asian American Studies: Policy & Community
ASA 189E	Topics in Asian American Studies: Comparative Racial Studies
ASA 189F	Topics in Asian American Studies: Asian Studies & Asian American Studies
ASA 189G	Topics in Asian American Studies: Race, Class, Gender, & Sexuality
ASA 189H	Topics in Asian American Studies: Society & Institutions
ASA 189I	Topics in Asian American Studies: Politics & Social Movements
ASA 192	Internships <sup>1</sup>
ASA 198	Directed Group Study <sup>2</sup>
ASA 199	Special Study for Advanced Undergraduates <sup>3</sup>

**Total Units** 28

<sup>1</sup> No more than 4 units of ASA 192 may be counted toward this total.

<sup>2</sup> No more than 4 units of ASA 198 may be counted toward this total.

<sup>3</sup> No more than 4 units of ASA 199 may be counted toward this total.

## Social, Ethnic & Gender Relations, Minor

### College of Letters & Science

The interdisciplinary minor in Social, Ethnic & Gender Relations explores the racial, ethnic, class, and gender aspects of human relations in the modern world. Students study human societies and cultures from a multi-ethnic perspective and across established academic departmental lines. The minor is jointly sponsored by African American & African Studies, American Studies, Asian American Studies, Chicana/o Studies, Native American Studies, and Gender, Sexuality & Women's Studies.

### Advising

Katherine Ampaw-Matthei, kampaw@ucdavis.edu; Jeremiah Thompson, thomspo@ucdavis.edu (jthomspo@ucdavis.edu)

Code	Title	Units
Choose one upper division course from five of the following six groups to total 20 units:		20
(1) African American & African Studies. (p. 476)		
(2) Asian American Studies. (p. 554)		
(3) Chicana/o Studies. (p. 619)		
(4) Gender, Sexuality & Women's Studies. (p. 860)		
(5) Native American Studies. (p. 1138)		
(6) American Studies; with Domestic Diversity GE designation. (p. 495)		
<i>Restriction</i>		
No more than one course applied toward the satisfaction of a major may be offered in satisfaction of the minor.		
<b>Total Units</b>		<b>20</b>

## Atmospheric Science (Graduate Group)

College of Agricultural & Environmental Sciences

Paul Ullrich, Ph.D., Chairperson of the Group; 530-400-9817

### Group Office

1152 Plant & Environmental Sciences Building; 530-752-1669;  
Atmospheric Science (<http://atm.ucdavis.edu>); Faculty (<http://atm.ucdavis.edu/people/faculty/>)

- Atmospheric Science, Master of Science (p. 95)
- Atmospheric Science, Doctor of Philosophy (p. 95)

## Atmospheric Science, Master of Science

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Atmospheric Science offers both M.S. and Ph.D. degree programs. A student may place emphasis on graduate work in one or more of the following fields: air quality meteorology, atmospheric chemistry, cloud physical processes, biometeorology, micrometeorology, numerical weather prediction, remote sensing, climate dynamics, large-scale dynamics, meso-scale and boundary-layer meteorology, computational geosciences, extreme weather, and climate change impacts. The diverse and extensive backgrounds of the faculty allow opportunities for interdisciplinary training and research.

### Preparation

The Group encourages applications from all interested students with backgrounds in the physical or natural sciences. Basic qualifications for students entering the Atmospheric Science graduate program include mathematics to the level of vector calculus and partial differential equations, and one year of college-level physics. Flexibility may be allowed for students with high academic potential, but it is expected that deficiencies in preparatory material and in key undergraduate atmospheric science courses be completed within the first year of graduate study.

### Graduate Advisor

Erwan Monier, Ph.D., Ian Falloona, Ph.D., Da Yang, Ph.D.

### Graduate Admissions Officer

Matthew R. Igel, Ph.D.

## Atmospheric Science, Doctor of Philosophy

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Atmospheric Science offers both M.S. and Ph.D. degree programs. A student may place emphasis on graduate work in one or more of the following fields: air quality meteorology, atmospheric chemistry, cloud physical processes, biometeorology, micrometeorology, numerical weather prediction, remote sensing, climate dynamics, large-scale dynamics, meso-scale and boundary-layer meteorology, computational geosciences, extreme weather, and climate change impacts. The diverse and extensive backgrounds of the faculty allow opportunities for interdisciplinary training and research.

### Preparation

The Group encourages applications from all interested students with backgrounds in the physical or natural sciences. Basic qualifications for students entering the Atmospheric Science graduate program include mathematics to the level of vector calculus and partial differential equations, and one year of college-level physics. Flexibility may be allowed for students with high academic potential, but it is expected that deficiencies in preparatory material and in key undergraduate atmospheric science courses be completed within the first year of graduate study.

### Graduate Advisor

Erwan Monier, Ph.D., Ian Falloona, Ph.D., Da Yang, Ph.D.

### Graduate Admissions Officer

Matthew R. Igel, Ph.D.

## Avian Sciences (Graduate Group)

College of Agricultural & Environmental Sciences

Annie King, Ph.D., Chairperson of the Group

### Group Office

1249 Meyer Hall; 530-752-2382; Avian Sciences (<https://aviansciences.ucdavis.edu/>); Faculty (<http://aviansciences.ucdavis.edu/people/faculty.html>)

- Avian Sciences, Master of Science (p. 95)

## Avian Sciences, Master of Science

College of Agricultural & Environmental Sciences

## Graduate Study

The Graduate Group in Avian Sciences offers the M.S. degree program to students who wish to pursue specialized advanced work on avian species. Specializations students may choose include behavior, nutrition, physiology, reproduction, pathology, immunology, toxicology, food chemistry, management, ecology, genetics, comparative incubation, environmental physiology, and cellular and developmental studies using wild and domestic birds as experimental animals. Both master's degree plans, thesis and comprehensive examination, are available.

## Preparation

Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including courses in most of the following subjects: general biology, general and organic chemistry, biochemistry, avian biology, genetics, nutrition, physiology, and statistics.

## Graduate Advisors

A.J. King, R.A. Blatchford

## Biochemistry, Molecular, Cellular & Developmental Biology (Graduate Group)

### Graduate Studies

Ben Montpetit, Ph.D., Chairperson of the Group;  
[benmontpetit@ucdavis.edu](mailto:benmontpetit@ucdavis.edu)

## Group Office

227D Green Hall, formerly Life Sciences; 530-752-9091; Biochemistry, Molecular, Cellular & Developmental Biology (<http://bmcdb.ucdavis.edu/>); Faculty (<http://bmcdb.ucdavis.edu/faculty/>)

- Biochemistry, Molecular, Cellular & Developmental Biology, Master of Science (p. 96)
- Biochemistry, Molecular, Cellular & Developmental Biology, Doctor of Philosophy (p. 96)

## Biochemistry, Molecular, Cellular & Developmental Biology, Master of Science

### Graduate Studies

## Graduate Study

The Graduate Group in Biochemistry, Molecular, Cellular & Developmental Biology offers programs of study and research leading to M.S. and Ph.D. degrees. While an M.S. may be obtained while pursuing a Ph.D., only Ph.D. applications will be accepted. Biochemistry, Molecular, Cellular & Developmental Biology is a broad, interdepartmental program.

**Master's degree offered only en route to Ph.D.**

## Preparation

Appropriate preparation is an undergraduate degree in a biological or physical science. Preparation should include a year of calculus, physics,

general chemistry and organic chemistry, and courses in statistics, biochemistry, genetics and cell biology.

## Graduate Advisors

E. Baldwin (Molecular & Cellular Biology), S. Collins (Microbiology & Molecular Genetics), E. Diaz (Med: Pharmacology), B. Draper (Molecular & Cellular Biology), J. Engebrecht (Molecular & Cellular Biology), C. Fraser (Molecular & Cellular Biology), P. Ghosh (Med: Urologic Surgery), Q. Gong (Med: Cell Biology & Human Anatomy), M. Huisng (Neurobiology, Physiology & Behavior), F. McNally (Molecular & Cellular Biology), J. Sack (Med: Physiology & Membrane Biology), S. Simo (Med: Cell Biology & Human Anatomy), M. Singer (Microbiology & Molecular Genetics), D. Starr (Molecular & Cellular Biology), P. Zerbe (Plant Biology)

## Biochemistry, Molecular, Cellular & Developmental Biology, Doctor of Philosophy

### Graduate Studies

## Graduate Study

The Graduate Group in Biochemistry, Molecular, Cellular & Developmental Biology offers programs of study and research leading to M.S. and Ph.D. degrees. While an M.S. may be obtained while pursuing a Ph.D., only Ph.D. applications will be accepted. Biochemistry, Molecular, Cellular & Developmental Biology is a broad, interdepartmental program.

## Preparation

Appropriate preparation is an undergraduate degree in a biological or physical science. Preparation should include a year of calculus, physics, general chemistry and organic chemistry, and courses in statistics, biochemistry, genetics and cell biology.

## Graduate Advisors

E. Baldwin (Molecular & Cellular Biology), S. Collins (Microbiology & Molecular Genetics), E. Diaz (Med: Pharmacology), B. Draper (Molecular & Cellular Biology), J. Engebrecht (Molecular & Cellular Biology), C. Fraser (Molecular & Cellular Biology), P. Ghosh (Med: Urologic Surgery), Q. Gong (Med: Cell Biology & Human Anatomy), M. Huisng (Neurobiology, Physiology & Behavior), F. McNally (Molecular & Cellular Biology), J. Sack (Med: Physiology & Membrane Biology), S. Simo (Med: Cell Biology & Human Anatomy), M. Singer (Microbiology & Molecular Genetics), D. Starr (Molecular & Cellular Biology), P. Zerbe (Plant Biology)

## Biological & Agricultural Engineering

### College of Agricultural & Environmental Sciences

Fadi Fathallah, Ph.D., Chair of the Department; term ends June 30, 2026

## Department Office

2030 Bainer Hall; 530-752-0102; Biological & Agricultural Engineering; Faculty (<https://bae.ucdavis.edu/people/>)

## Major Programs & Graduate Study

For the Bachelor of Science program, see the major in Biological Systems Engineering (p. 101); for graduate study, see also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Minor Programs

The Department of Biological & Agricultural Engineering offers two minors through the College of Agricultural & Environmental Sciences: Geographic Information Systems (p. 110) and Precision Agriculture (p. 110).

The minor in Geographic Information Systems (p. 110) is open to all majors, including those in engineering. This minor is for students interested in information processing of spatial data related to remote sensing for geographical and environmental planning and related areas.

The minor in Precision Agriculture (p. 110) is open to all majors, including those in engineering, and acquaints students with recent developments and their applications to agriculture, in geographic information systems, global positioning systems, and variable rate technologies.

The Department of Biological & Agricultural Engineering also administers three minors through the College of Engineering in Energy Science & Technology (p. 109), Energy Efficiency (p. 109), and Energy Policy (p. 109).

## Courses

Courses are listed under Applied Biological Systems Technolog (ABT) (p. 530), Agricultural & Environmental Technolog (TAE) (p. 483) and Biological Systems Engineering (EBS) (p. 574).

- Agricultural & Environmental Technology, Bachelor of Science (p. 97)
- Biological Systems Engineering, Bachelor of Science (p. 101)
- Biological Systems Engineering, Bachelor of Science/Master of Science Integrated (p. 106)
- Biological Systems Engineering, Master of Engineering (p. 106)
- Biological Systems Engineering, Master of Science (p. 107)
- Biological Systems Engineering, Doctor of Engineering (p. 108)
- Biological Systems Engineering, Doctor of Philosophy (p. 108)
- Energy Efficiency, Minor (p. 109)
- Energy Policy, Minor (p. 109)
- Energy Science & Technology, Minor (p. 109)
- Geographic Information Systems, Minor (p. 110)
- Precision Agriculture, Minor (p. 110)

## Agricultural & Environmental Technology, Bachelor of Science

College of Agricultural & Environmental Sciences

### The Major Program

The technological transformation of agriculture that began more than a century ago continues with recent advances made in sensing, data management, information processing, communications, control, modeling and simulation, gene manipulation, automation, artificial intelligence, and robotics that can radically alter resource demand and improve

environmental, social and economic sustainability when appropriately implemented.

The Agricultural & Environmental Technology (AET) major aims to bridge the disciplines of agriculture, management, technology, and applied engineering, and to train students in integrating technology, leadership and design in solving complex problems in the agricultural and environmental sciences.

A key aspect of the major is to help students develop an understanding of how the next generation of technologies (including cyber#physical and knowledge#based) interact with animals, plants, and their environments, and technologies for the production and management of bio#based products and sustainable food, feed, fiber, and energy.

### The Program

Learn how to integrate the next generation of technologies such as big data, robotics, digital technology, AI and machine learning for more advanced, efficient and sustainable food, fiber and energy production.

Students specialize within the major through selection of a track. Tracks are regularly reviewed and updated by program faculty to ensure relevancy to current societal needs. As of the 2022-23 academic year, we offer tracks in **Digital Agriculture, Bioproducts and Wearable Technologies, Energy and Environment**. Students choose one of the three tracks, and in the **Digital Agriculture** track, they also choose an area of emphasis.

As a new major, courses are still in the process of being approved. These are noted as "Pending" in the requirements. Please contact the staff advisor for more information.

### Career Alternatives

Graduates of the AET major will gain technical skills and experience in technology systems management, bio#based product innovation, environmental quality, energy efficiency, power systems, the next generation of smart agricultural machinery, GIS/GPS remote sensing and geo#informatics#based control, irrigation and water control, precision agriculture and other features of the diverse developing technologies in agriculture.

Opportunities for employment include **managers and entrepreneurs** to bridge between science, engineering and application, **skilled operators** to interface with smart machines and smart technologies, and **scholars and educators** to help train others.

Graduate study for the AET student may lead to M.S. or Ph.D. degrees in agricultural technology, data science, agriculture and life sciences, and related fields such as bioproducts, plant science, environmental science and policy, agricultural chemistry, and biochemistry.

### Advising

**Staff Advisor.** The Advising Center (<https://www.bftv.ucdavis.edu/functional-area/advising/>) for the AET major is located in 1204 Robert Mondavi Institute (RMI), South Building; [bftvadvising@ucdavis.edu](mailto:bftvadvising@ucdavis.edu)

**Master Faculty Advisor.** Ali Moghimi, Ph.D. (<https://bae.ucdavis.edu/people/ali-moghimi/>)

**Department Chair.** Fadi Fathallah, Professor & Department Chair (<https://bae.ucdavis.edu/people/fadi-fathallah/>)

Faculty Website (<https://bae.ucdavis.edu/people/>)

Code	Title	Units		
<b>Preparatory Subject Matter</b>				
Accounting		4	or UWP 101Y	Advanced Composition
MGT 011A	Elementary Accounting		UWP 102G	Writing in the Disciplines: Environmental Writing
Agricultural & Environmental Technology		7	UWP 104A	Writing in the Professions: Business Writing
TAE 010	Introduction to Agricultural & Environmental Technologies		or UWP 104AY	Writing in the Professions: Business Writing
TAE 030	Mobile Communication & Computing Technologies for Agriculture & the Environment		UWP 104E	Writing in the Professions: Science
Chemistry		10	UWP 104T	Writing in the Professions: Technical Writing
CHE 002A	General Chemistry		Depth Subject Matter Subtotal	
CHE 002B	General Chemistry		27	
Communication		4	<b>Total Units</b>	
CMN 001	Introduction to Public Speaking		86	
<b>Economics</b>				
ECN 001A	Principles of Microeconomics		<b>Tracks</b>	
or ECN 001AV	Principles of Microeconomics		<b>Bioproducts &amp; Wearable Technologies</b>	
or ECN 001AY	Principles of Microeconomics		Code	Title
ECN 001B	Principles of Macroeconomics		<b>Bioproducts &amp; Wearable Technologies</b>	
or ECN 001BV	Principles of Macroeconomics		Agricultural & Environmental Technology	62
Geology		4	(Pending Approval)	16
GEL 001	The Earth		TAE 014	(Pending Approval)
<b>Mathematics</b>			TAE 130A	(Pending Approval)
MAT 017A	Calculus for Biology & Medicine		TAE 130B	(Pending Approval)
or MAT 021A	Calculus		TAE 130C	(Pending Approval)
MAT 017B	Calculus for Biology & Medicine		Chemistry	17
or MAT 021B	Calculus		CHE 002C	General Chemistry
MAT 017C	Calculus for Biology & Medicine		CHE 118A	Organic Chemistry for Health & Life Sciences
or MAT 021C	Calculus		CHE 118B	Organic Chemistry for Health & Life Sciences
Physics		6	CHE 118C	Organic Chemistry for Health & Life Sciences
PHY 001A	Principles of Physics		Design	4
PHY 001B	Principles of Physics		DES 143	History of Fashion
<b>Statistics</b>			Management	4
STA 013	Elementary Statistics		ARE 113	Fundamentals of Marketing Management
or STA 013Y	Elementary Statistics		Social Science	9
Preparatory Subject Matter Subtotal		59	ANT 002	Cultural Anthropology
<b>Depth Subject Matter</b>			SOC 002	Self & Society
Agricultural & Environmental Technology			<b>Restricted Electives</b>	
TAE 100	Smart Control Systems for Agricultural & Environmental Technologies	8	Choose 12 units if not previously chosen for Depth Subject Matter Requirements:	
TAE 180	(Pending Approval)		TAE 092	(Pending Approval)
Management; choose 15 units:			TAE 099	Special Study for Lower Division Students
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption	15	TAE 170A	(Pending Approval)
ESM 121	Water Science & Management		TAE 170B	(Pending Approval)
MGT 120	Managing & Using Information Technology		TAE 192	(Pending Approval)
MGT 140	Marketing for the Technology-Based Enterprise		TAE 199	Special Study for Upper Division Students (Pending Approval)
MGT 150	Technology Management	4	ARE 100B	Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics
Writing; choose one:			ARE 112	Fundamentals of Organization Management
UWP 101	Advanced Composition		ARE 136	Managerial Marketing
or UWP 101V	Advanced Composition			

## Tracks

## **Bioproducts & Wearable Technologies**

Code	Title	Units
<b>Bioproducts &amp; Wearable Technologies</b>		<b>62</b>
Agricultural & Environmental Technology  (Pending Approval)		16
TAE 014	(Pending Approval)	
TAE 130A	(Pending Approval)	
TAE 130B	(Pending Approval)	
TAE 130C	(Pending Approval)	
Chemistry		17
CHE 002C	General Chemistry	
CHE 118A	Organic Chemistry for Health & Life Sciences	
CHE 118B	Organic Chemistry for Health & Life Sciences	
CHE 118C	Organic Chemistry for Health & Life Sciences	
Design		4
DES 143	History of Fashion	
Management		4
ARE 113	Fundamentals of Marketing Management	
Social Science		9
ANT 002	Cultural Anthropology	
SOC 002	Self & Society	
<b>Restricted Electives</b>		<b>12</b>
Choose 12 units if not previously chosen for Depth Subject Matter Requirements:		
TAE 092	(Pending Approval)	
TAE 099	Special Study for Lower Division Students	
TAE 170A	(Pending Approval)	
TAE 170B	(Pending Approval)	
TAE 192	(Pending Approval)	
TAE 199	Special Study for Upper Division Students (Pending Approval)	
ARE 100B	Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics	
ARE 112	Fundamentals of Organization Management	
ARE 136	Managerial Marketing	

ARE 155	Operations Research & Management Science	Philosophy	4
DES 040A/ SAS 043	Energy, Materials, & Design Over Time	PHI 013G	Minds, Brains, & Computers with Discussion
DES 077	Introduction to Structural Design for Fashion	Science & Society; choose three units:	3
DES 127A	Sustainable Design	SAS 002	Feeding the World: Influences on the Global Food Supply
DES 178	Design & Wearable Technology	or SAS 002V	Feeding the World: Influences on the Global Food Supply
MGT 120	Managing & Using Information Technology	SAS 004	(Discontinued)
MGT 140	Marketing for the Technology-Based Enterprise	SAS/ESM 008	Water Quality at Risk
MGT 160	Financing New Business Ventures	SAS 009	Crisis in the Environment
MGT 170	Management Accounting & Control	SAS/HYD 010	Water, Power, Society
MGT 180	Supply Chain Planning & Management	SAS/PLS 012	Plants & Society
<b>Total Units</b>	<b>124</b>	SAS 014	Forests & Society
		SAS 020	Genetics & Society
		SAS 025	Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences
		or SAS 025V	Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences

Note: For students considering graduate study in Bioproducts, the following additional preparatory subject matter is recommended; substitute PHY 007A & PHY 007B for PHY 001A & PHY 001B.

Code	Title	Units
Physical Chemistry		6
CHE 107A	Physical Chemistry for the Life Sciences	
CHE 107B	Physical Chemistry for the Life Sciences	
Physics		12
PHY 007A	General Physics	
PHY 007B	General Physics	
PHY 007C	General Physics	

## Digital Agriculture

Code	Title	Units
Digital Agriculture		62
Agricultural & Environmental Technology		7
HYD 006	(Pending Approval)	
TAE 060	(Pending Approval)	
Biology		10
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
Geographic Information Systems		4
ABT/LDA 150	Introduction to Geographic Information Systems (or TAE 150 Pending Approval)	
Management; choose 4 units if not chosen previously from Depth Subject Matter Requirements:		4
ARE 112	Fundamentals of Organization Management	
ARE 113	Fundamentals of Marketing Management	
ARE 120	Agricultural Policy	
ARE 121	Economics of Agricultural Sustainability	
ARE 140	Farm Management	
MGT 120	Managing & Using Information Technology	
MGT 140	Marketing for the Technology-Based Enterprise	
MGT 150	Technology Management	

## Emphasis

Digital Agricultural track students must choose one of the following three emphases:

### Animal Agriculture Emphasis

Code	Title	Units
<b>Animal Agriculture Emphasis</b>		30
<i>Required Courses</i>		21
Choose 3 units:		3
ANS 015	Introductory Horse Husbandry	
ANS 041	Domestic Animal Production	
ANS 041L	Domestic Animal Production Laboratory	
ANS 042	Introductory Companion Animal Biology	
Choose 5 units:		5
ANS 100	Animal Physiology	
NPB 101	Systemic Physiology	
ANS 103	Animal Welfare	4
ANS 104	Principles & Applications of Domestic Animal Behavior	4
NPB 121	Physiology of Reproduction	4
NPB 121L	Physiology of Reproduction Laboratory	1
<i>Restricted Electives</i>		9
Choose 9 units: <sup>1</sup>		9
TAE 092	(Pending Approval)	
TAE 099	Special Study for Lower Division Students	
TAE 192	(Pending Approval)	
TAE 199	Special Study for Upper Division Students (Pending Approval)	
ABT 161	Water Quality Management for Aquaculture	
ANG 107	Genetics & Animal Breeding	
ANS 115	Advanced Horse Production	
ANS 125	Equine Exercise Physiology	
ANS 126	Equine Nutrition	
ANS 141	Equine Enterprise Management	
ANS 143	Pig & Poultry Care & Management	

ANS 144	Beef Cattle & Sheep Production	PLB 143	Evolution of Crop Plants
ANS 146	Dairy Cattle Production	PLB/PLP 148	Introductory Mycology
ANS 148	Enterprise Analysis in Animal Industries	PLP 120	Introduction to Plant Pathology
AVS 103	Avian Development & Genomics	PLP 140	(Discontinued)
BIS 101	Genes & Gene Expression	PLS 100AL	Metabolic Processes of Cultivated Plants Laboratory
NUT 115	Animal Nutrition	PLS 100BL	Growth & Yield of Cultivated Plants Laboratory

<sup>1</sup> Note that some ANS and ANG courses require ANS 015, ANS 041, BIS 101 and/or NUT 115 as prerequisites. Students choosing these courses should take the required prerequisites as part of their required courses or restricted electives accordingly.

#### Plant Agriculture Emphasis

Code	Title	Units
<b>Plant Agriculture Emphasis</b>		<b>30</b>
<i>Required Courses</i>		13
Choose 4 units:		4
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
PLS 002	Botany & Physiology of Cultivated Plants	
Choose 9 or 10 units:		9-10
PLS 100A	Metabolic Processes of Cultivated Plants	
PLS 100B	Growth & Yield of Cultivated Plants	
PLS 100C	Environmental Interactions of Cultivated Plants	
<b>OR</b>		
BIS 101	Genes & Gene Expression	
PLB 112	Plant Growth & Development	
PLB 113	Molecular & Cellular Biology of Plants	
<i>Restricted Electives</i>		17
Choose 17 units:		17
ABT 182	Environmental Analysis Using GIS	
TAE 092	(Pending Approval)	
TAE 099	Special Study for Lower Division Students	
TAE 192	(Pending Approval)	
TAE 199	Special Study for Upper Division Students (Pending Approval)	

BIS 101 Genes & Gene Expression (4)		
BIT 160	Principles of Plant Biotechnology	
BIT 161B	Plant Genetics & Biotechnology Laboratory	
ENH 125	Greenhouse & Nursery Crop Production	
ENH 150	Genetics & Plant Conservation: The Biodiversity Crisis	
FST 104	Food Microbiology	
FST 109	Principles of Quality Assurance in Food Processing	
FST 131	Food Packaging	
HYD 124	Plant-Water-Soil Relationships	
PLB/PLS 102	California Floristics	
PLB/EVE 108	Systematics & Evolution of Angiosperms	
PLB/EVE 117	Plant Ecology	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	

PLB 143	Evolution of Crop Plants
PLB/PLP 148	Introductory Mycology
PLP 120	Introduction to Plant Pathology
PLP 140	(Discontinued)
PLS 100AL	Metabolic Processes of Cultivated Plants Laboratory
PLS 100BL	Growth & Yield of Cultivated Plants Laboratory
PLS 100CL	Environmental Interactions of Cultivated Plants Laboratory
PLS 101	Agriculture & the Environment
PLS 105	Concepts in Pest Management
PLS 110	Crop Management Systems for Vegetable Production
PLS 112	Forage Crop Production
PLS 113	Biological Applications in Fruit Tree Management
PLS 114	Biological Applications in Fruit Production
PLS 141	Ethnobotany
PLS 147	California Plant Communities
PLS 147L	California Plant Communities Field Study
PLS 152	Plant Genetics
PLS 154	Introduction to Plant Breeding
PLS 170A	Fruit & Nut Cropping Systems
PLS 170B	Fruit & Nut Cropping Systems
PLS 171	Principles & Practices of Plant Propagation
PLS 172	Biology and Quality of Harvested Crops
PLS 173	Molecular & Cellular Aspects of Postharvest Biology (Discontinued)
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables
PLS 176	Introduction to Weed Science
PLS 196	Postharvest Technology of Horticultural Crops
SSC 100	Principles of Soil Science

#### Individualized Emphasis Option

Code	Title	Units
<b>Individualized Emphasis Option</b>		<b>30</b>
Choose a minimum of 30 upper division units, with approval from a faculty advisor, to form a coherent program of study resulting in expertise and competence in a sub-discipline of courses in the College of Agricultural & Environmental Sciences		

#### Energy & Environmental Technology

Code	Title	Units
<b>Energy &amp; Environmental Technology</b>		<b>62</b>
<i>Agricultural &amp; Environmental Technology</i>		<b>20</b>
TAE 020	Sustainable Energy Technologies	
TAE 128	(Pending Approval)	
ABT 101	Engine Technology (or TAE 125 Pending Approval)	
ABT 121	Animal Housing & Environment Management	
or TAE 121	Controlled Environments for Plants & Animals	

ABT 212	Path to Zero Net Energy (or TAE 212 Pending Approval)		ETX 130	Role & Applications of Toxicology in Modern Industry
<i>Geographic Information Systems &amp; Remote Sensing</i>		11	ETX 131	Environmental Toxicology of Air Pollutants
ABT/LDA 150	Introduction to Geographic Information Systems (or TAE 150 Pending Approval)		ETX 135	Health Risk Assessment of Toxicants
ABT 182	Environmental Analysis Using GIS (or TAE 182 Pending Approval)		ETX 138	Legal Aspects of Environmental Toxicology
ESM 108	Environmental Monitoring		ETX 146	Exposure & Dose Assessment
ESM 186	Environmental Remote Sensing		FST 102A	Malting & Brewing Science
<i>Science, Management, &amp; Policy</i>		15	FST 104	Food Microbiology
Choose 15 units; if not chosen previously for Depth Subject Matter Requirements		15	FST 110	Food Processing
ATM 116	Modern Climate Change		FST 123	Introduction to Enzymology
ESM 120	Global Environmental Interactions		GEL 018	Energy & the Environment or GEL 018V Energy & the Environment
ESP 110	Principles of Environmental Science		GEL 130	Non-Renewable Natural Resources
ESP 167	Energy Policy		LDA 003	Sustainable Development: Theory & Practice
ESP/ARE 175	Natural Resource Economics		LDA 140	Green Building, Design, & Materials
ECN 125	Energy Economics		MGT 160	Financing New Business Ventures
MGT 120	Managing & Using Information Technology		MGT 170	Management Accounting & Control
MGT 140	Marketing for the Technology-Based Enterprise		MGT 180	Supply Chain Planning & Management
<i>Restricted Electives</i>		16	PHY 010C	Physics of California or PHY 010CY Physics of California
TAE 092	(Pending Approval)		PHY 112	Thermodynamics & Statistical Mechanics
TAE 099	Special Study for Lower Division Students		PHY 129A	Introduction to Nuclear Physics
TAE 192	(Pending Approval)		PHY 129B	Nuclear Physics, Extensions & Applications
TAE 199	Special Study for Upper Division Students (Pending Approval)		PLS 100A	Metabolic Processes of Cultivated Plants
ATM 005	Global Climate Change		PLS 101	Agriculture & the Environment
BIS 002A	Introduction to Biology: Essentials of Life on Earth		PLS 162	Urban Ecology
BIS 103	Bioenergetics & Metabolism		POL 012B	Climate Change & Politics
BIS 105	Biomolecules & Metabolism		POL 171	The Politics of Energy
CHE 002C	General Chemistry		SAS/PLS 012	Plants & Society
CHE 118A	Organic Chemistry for Health & Life Sciences		SAS 025	Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences
DES 127A	Sustainable Design		or SAS 025V	Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences
DES 136A	Lighting Technology & Design		SAS 043/DES 040A	Energy, Materials, & Design Over Time
DES 136B	Designing with Light—Industrial Design		SOC 160	Sociology of the Environment
DES 137A	Daylighting & Interior Design		SSC 010	Soils in Our Environment
DES 138	Materials & Methods in Interior Design		SSC 100	Principles of Soil Science
ENH 125	Greenhouse & Nursery Crop Production		SSC 102	Environmental Soil Chemistry
ESM/SAS 008	Water Quality at Risk		WFC 130	Physiological Ecology of Wildlife
ESM 100	Principles of Hydrologic Science		WFC 144	Marine Conservation Science
ESM 121	Water Science & Management		WFC 168	Climate Change Ecology
ESM 131	Air as a Resource			
ESP 001	Environmental Analysis			
ESP/EVE 111	Marine Environmental Issues			
ESP/GEL 116N	Oceanography			
ESP/ECI 163	Energy & Environmental Aspects of Transportation			
ESP 165	Climate Policy			
ESP 166	Ocean & Coastal Policy			
ESP 179	Environmental Impact Assessment			

## Biological Systems Engineering, Bachelor of Science

College of Engineering

### The Biological Systems Engineering Undergraduate Program

Biological Systems Engineering is an engineering major that uses life sciences as its main scientific base. With rapid advances in biology

and biotechnology, engineers are needed to work side by side with life scientists to bring laboratory developments into commercial production or field application. Industries in food and fiber production, bioenergy, bioprocessing, biotechnology, food processing, agriculture, forestry, aquaculture, plant and animal production, natural resource management, and waste reduction all need engineers with strong training in biology. In the first two years, the Biological Systems Engineering major requires sequences of courses in mathematics, physics, chemistry, engineering science, and humanities, similar to all accredited engineering programs. In addition to these courses, the major also includes courses in the life sciences and the application to engineering. Exclusive of General Education units, the Biological Systems Engineering major requires a minimum of 163 units (86 units in the lower division; 77 units in the upper division).

Biological Systems Engineering graduates take jobs in biotechnology, energy, food, and medical industries, work for federal, state and local agencies, and pursue graduate work. Students can also use the program as a pathway to professional schools in medicine, veterinary medicine, education, law, or business.

The Biological Systems Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

## Lower Division Required Courses

See the Degree Requirements section.

## Upper Division Requirements

If your career objective is a professional degree in the health sciences (e.g., medicine, veterinary medicine, nursing, or dentistry), you should consult with advisors from the appropriate school to plan for successful admission and to ensure that you take specific courses that may be required and that you have the necessary experience. Advisors in the Office of Health Professions Advising can also assist students planning to pursue degrees in these areas.

## Areas of Specialization

Biological Systems Engineering is a broad major with many possible areas of specialization, with some examples below. Each area of specialization includes recommended electives for planning purposes. Students in the major are NOT required to select or follow an area of specialization. Following the recommended electives for a specialization does not result in specialization or concertation notation on a student's transcript or diploma.

- Biotechnical Engineering.
- Agricultural & Natural Resources Engineering.
- Food Engineering.

## Required Courses

### Lower Division Required Courses

Code	Title	Units	
<b>Mathematics</b>			
MAT 021A	Calculus	4	
MAT 021B	Calculus	4	
MAT 021C	Calculus	4	
			<b>Total Units</b>
			<b>86-88</b>
<b>Upper Division Required Courses</b>			
Code	Title	Units	
<b>Engineering</b>			
ENG 100	Electronic Circuits & Systems	3	

ENG 102	Dynamics	4	EXB 125	Neuromuscular & Behavioral Aspects of Motor Control		
ENG 104	Mechanics of Materials	4	EXB 148	Theory & Practice of Exercise Testing		
ENG 105	Thermodynamics	4	All 190-199			
ENG 106	Engineering Economics (Winter only)	4	May also be taken as biological science electives:			
<b>Biological Systems Engineering</b>						
EBS 103/HYD 103N or ENG 103	Fluid Mechanics Fundamentals Fluid Mechanics	4	ABT 161	Water Quality Management for Aquaculture		
EBS 125	Heat Transfer in Biological Systems (Spring only)	4	ANS 118	Fish Production		
EBS 127	Mass Transfer & Kinetics in Biological Systems (Fall only)	4	ANS 143	Pig & Poultry Care & Management		
EBS 130	Modeling of Dynamic Processes in Biological Systems (Winter only)	4	ANS 144	Beef Cattle & Sheep Production		
EBS 165	Bioinstrumentation & Control (Fall only)	4	ANS 146	Dairy Cattle Production		
EBS 170A	Engineering Design & Professional Responsibilities (Fall only)	3	ATM 133	Biometeorology		
EBS 170B	Engineering Projects: Design (Winter only)	2	AVS 100	Avian Biology		
EBS 170BL	Engineering Projects: Design Laboratory (Winter only)	1	BIS 002B	Introduction to Biology: Principles of Ecology & Evolution		
EBS 170C	Engineering Projects: Design Evaluation (Spring only)	1	BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life		
EBS 170CL	Engineering Projects: Design Evaluation (Spring only)	2	CHA 101/EXB 106	Human Gross Anatomy		
<b>Statistics</b>			CHA 101L/EXB 106L	Human Gross Anatomy Laboratory		
STA 100	Applied Statistics for Biological Sciences	4	ENT 100	General Entomology		
<b>Biological Systems Engineering Electives</b>			ENH 102	Physiological Principles in Environmental Horticulture (Discontinued)		
Choose a minimum of 4 units from all upper division Biological Systems Engineering courses not otherwise required, with the exception of:			ESM 120	Global Environmental Interactions		
EBS 189 series			ESP 100	General Ecology		
EBS 199	Special Study for Advanced Undergraduates		ESP 110	Principles of Environmental Science		
<b>Engineering Electives</b>			ESP 155	Wetland Ecology		
Choose a minimum of 8 units; all upper division courses offered by the College of Engineering may be taken as engineering electives with the exception of the following:			ETX 101	Principles of Environmental Toxicology		
ECI 123	Urban Systems & Sustainability		ETX 131	Environmental Toxicology of Air Pollutants		
ECS 188	Ethics in an Age of Technology		FST 102A	Malting & Brewing Science		
ENG 103	Fluid Mechanics		FST 104L	Food Microbiology Laboratory		
ENG/PHY 160	Environmental Physics & Society		FST 119	Chemistry & Technology of Milk & Dairy Products		
All courses 190-197, 199; except ENG 190, may be taken for 2 units of engineering elective credit			FST/ETX 128	Food Toxicology		
<b>Biological Science Electives</b>			FST 159	New Food Product Ideas		
All upper division courses in the College of Biological Sciences may be used as biological science electives; with the exception of:			IDI 141	Infectious Diseases of Humans		
EVE 175	Computational Genetics		SSC 100	Principles of Soil Science		
EXB 102	Introduction to Motor Learning & the Psychology of Sport & Exercise		WFC 121	Physiology of Fishes		
EXB 112	Clinical Exercise Physiology		Students may choose other upper division courses with substantial biological content offered by the College of Agricultural & Environmental Sciences; consultation with a faculty advisor and approval by petition is required.			
EXB 115	Biomechanical Bases of Movement					
EXB 121	Advanced Sport Psychology					
EXB 124	Physiology of Maximal Human Performance					
<b>Upper Division Composition Requirement</b>						
Choose one; a grade of C- or better is required:						
UWP 101 or UWP 101V or UWP 101Y						
Advanced Composition Advanced Composition Advanced Composition						
UWP 102B						
Writing in the Disciplines: Biology						
UWP 102E						
Writing in the Disciplines: Engineering						
UWP 102F						
Writing in the Disciplines: Food Science & Technology						
UWP 102G						
Writing in the Disciplines: Environmental Writing						
UWP 104A						
Writing in the Professions: Business Writing						

or UWP 104AY	Writing in the Professions: Business Writing	MIC 115	Recombinant DNA Cloning & Analysis	3
UWP 104E	Writing in the Professions: Science	MCB 120L	Molecular Biology & Biochemistry Laboratory	3
UWP 104F	Writing in the Professions: Health	MCB 121	Advanced Molecular Biology	3
or UWP 104FY	Writing in the Professions: Health	MCB 126	Plant Biochemistry	3
UWP 104T	Writing in the Professions: Technical Writing	MCB 162	Human Genetics & Genomics	3
The Upper Division Composition Exam administered by the College of Letters & Sciences cannot be used to satisfy the upper division composition requirement for students in the Biological Systems Engineering program.		MCB 182	Principles of Genomics	3
		PLS 152	Plant Genetics	4

**Total Units** 77

**Total Units: 163-165**

## Areas of Specialization

**Code** **Title** **Units**  
 Biological Systems Engineering is a broad major with many possible areas of specialization, with some examples below. Each area of specialization includes recommended electives for planning purposes. Students in the major are NOT required to select or follow an area of specialization. Following the recommended electives for a specialization does not result in specialization or concertation notation on a student's transcript or diploma.

### Biotechnical Engineering

Biotechnology involves the handling and manipulation of living organisms or their components to produce useful products. Students specializing in biotechnical engineering integrate analysis and design with applied biology to solve problems in renewable energy production, bioprocessing, control of biological systems, and production of biomaterials and bioproducts.

Students may focus on the mechanisms and processes for the sustainable production and use of energy from renewable biological sources. Students may also focus on the challenges in scaling up laboratory developments to industrial production, including production, packaging, and application of biocontrol agents for plant pests and diseases; genetically altered plants; plant materials and food products; and microbial production of biological products, tissue culture, and bioremediation. Students may also focus on the development of biosensors to detect microorganisms and specific substances useful in the development of products based on biological processes and materials.

Biotechnical engineers work in the biotech industries on process design and operation, scale-up, and instrumentation, sensing, automation, and control.

### Recommended Biological Science Electives

<b>Code</b>	<b>Title</b>	<b>Units</b>
BIS 101	Genes & Gene Expression	4
BIS 102	Structure & Function of Biomolecules	3
BIS 103	Bioenergetics & Metabolism	3
BIT 160	Principles of Plant Biotechnology	3
BIT 161A	Genetics & Biotechnology Laboratory	6
BIT 161B	Plant Genetics & Biotechnology Laboratory	4
MIC 102	Introductory Microbiology	3
MIC 103L	Introductory Microbiology Laboratory	2

### Recommended Engineering Electives

<b>Code</b>	<b>Title</b>	<b>Units</b>
BIM 109	Biomaterials	4
BIM 117	Modeling Strategies for Biomedical Engineering	4
BIM 118	Microelectromechanical Systems	4
BIM 140	Protein Engineering	4
BIM 143	Biomolecular Systems Engineering: Synthetic Biology	4
BIM 151	Mechanics of DNA	3
BIM 152	Molecular Control of Biosystems	4
BIM 161A	Biomolecular Engineering	4
BIM 162	Introduction to the Biophysics of Molecules & Cells	4
EBS 135	Bioenvironmental Engineering	4
EBS 161	Kinetics & Bioreactor Design	4
ECH 160	Fundamentals of Biomanufacturing	3
ECI 148A	(Discontinued)	4
ECI 149	Air Pollution	4
ECI 150	(Discontinued)	4
ECI 153	Deterministic Optimization & Design	4
ENG 180	Engineering Analysis	4

### Suggested Advisors

J. de Moura Bell, J. Fan, Y.-L. Hsieh, B. Jenkins, T. Jeoh, J. Mullin, D. Slaughter, G. Sun, R. Zhang

### Agricultural & Natural Resources Engineering

With the world population continuing to grow over the next several decades, grand challenges exist in food security and social, economic, and environmental sustainability. Meeting the needs of agriculture and the effective use of natural resources will require continuing innovation. Students specializing in agricultural and natural resources engineering combine analysis and design with applied biology to solve problems in producing, transporting, and processing biological products to provide food, fiber, energy, pharmaceuticals, and other human needs.

Students may focus on automation and control of field operations and engineered systems, robotics, and the biomechanics of humans and animals. They may also focus on engineering issues related to the sustainable use of natural resources, particularly energy and water, but also land and air.

Agricultural and natural resources engineers are employed as practicing professionals and managers with agricultural producers, equipment manufacturers, irrigation districts, food processors, consulting engineering firms, start-up companies, and government agencies. Graduates with interest in biomechanics work in industry on the design,

and construction of medical devices, prosthetics, and orthotics.

evaluation, and application of human-centered devices and systems, as well as on improving worker health and safety.

### Recommended Biological Science Electives

Code	Title	Units
<b>Animal Emphasis</b>		
AVS 100	Avian Biology	3
ANS 112	Sustainable Animal Agriculture	3
ANS 143	Pig & Poultry Care & Management	4
ANS 144	Beef Cattle & Sheep Production	4
ANS 146	Dairy Cattle Production	5
NPB 101	Systemic Physiology	5
SSC 100	Principles of Soil Science	5
<b>Aquaculture Emphasis</b>		
ANS 118	Fish Production	4
ANS 131	Reproduction & Early Development in Aquatic Animals	4
ABT 163	Aquaculture Systems Engineering	3
WFC 120	Biology & Conservation of Fishes	3
WFC 121	Physiology of Fishes	4
<b>Biomechanics Emphasis</b>		
BIS 102	Structure & Function of Biomolecules	3
NPB 101	Systemic Physiology	5
CHA 101/EXB 106	Human Gross Anatomy	4
<b>Plant Emphasis</b>		
ENT 100	General Entomology	4
ENH 102	Physiological Principles in Environmental Horticulture (Discontinued)	4
ESP 100	General Ecology	4
ETX 101	Principles of Environmental Toxicology	4
HYD 124	Plant-Water-Soil Relationships	4
MIC 120	Microbial Ecology	3
PLB 111	Plant Physiology	3
SSC 100	Principles of Soil Science	5
PLS 101	Agriculture & the Environment	3
PLS 114	Biological Applications in Fruit Production	2
<b>Recommended Engineering Electives</b>		
Code	Title	Units
EBS 128	Biomechanics & Ergonomics	4
EBS 145	Irrigation & Drainage Systems	4
BIM 109	Biomaterials	4
BIM 116	Physiology for Biomedical Engineers	5
BIM 126	Tissue Mechanics	3
ECI 141	Engineering Hydraulics	3
ECI 142	Engineering Hydrology	4
ECI 144	Groundwater Systems Design	4
ECI 145	Hydraulic Structure Design	4
ECI 148A	(Discontinued)	4
ECI 171	Soil Mechanics	4
ENG 111	Electric Machinery Fundamentals	4
ENG 121	Fluid Power Actuators & Systems	4
ENG 180	Engineering Analysis	4

### Additional Recommended Electives (Do not count towards major requirements)

Code	Title	Units
ABT 150	Introduction to Geographic Information Systems	4
ABT 161	Water Quality Management for Aquaculture	3
ABT 163	Aquaculture Systems Engineering	3
ABT 165	Irrigation Practices for an Urban Environment	3

### Suggested Advisors

A. Daccache, I. Donis-Gonzalez, M. Earles, F. Fathallah, J. Fernandez-Bayo, T-C. Hung, B. Jenkins, F. Khorsandi, I. Kisekka, K. Kornbluth, P. Larbi, A. Pourreza, D. Slaughter, S. Vougioukas

### Food Engineering

Producing the food we eat every day constitutes the largest industrial sector of the U.S. economy, and this production involves the work of engineers in a wide variety of food industries, both at home and around the world. Students specializing in food engineering design food processes and operate equipment and facilities for production of high quality, safe, and nutritious food with minimal impact of these operations on the environment.

Students learn to apply engineering principles and concepts to handle, store, process, package, and distribute food and related products. In addition to engineering principles, the food engineering specialization provides an understanding of the chemical, biochemical, microbiological, and physical characteristics of food. Students study concepts of food refrigeration, freezing, thermal processing, drying, and other food operations, food digestion, and health and nutrition in food system design.

Food engineers work as practicing engineers, scientists, and managers in the food industry.

### Recommended Biological Science Electives

Code	Title	Units
ANS 112	Sustainable Animal Agriculture	3
BIS 101	Genes & Gene Expression	4
BIS 102	Structure & Function of Biomolecules	3
BIS 103	Bioenergetics & Metabolism	3
FST 100A	Food Chemistry	4
FST 100B	Food Properties	4
FST 101A	Food Chemistry Laboratory	3
FST 101B	Food Properties Laboratory	2
FST 102A	Malting & Brewing Science	4
FST 104	Food Microbiology	3
FST 104L	Food Microbiology Laboratory	4
FST 107	Food Sensory Science	4
FST 117	Design & Analysis for Sensory Food Science	4
FST 119	Chemistry & Technology of Milk & Dairy Products	4
FST 123	Introduction to Enzymology	3
FST 123L	Enzymology Laboratory	2
FST/ETX 128	Food Toxicology	3
MIC 102	Introductory Microbiology	3

MIC 103L	Introductory Microbiology Laboratory	2
PLS 172	Biology and Quality of Harvested Crops	4
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables	3
PLS 196	Postharvest Technology of Horticultural Crops	3

**Recommended Engineering Electives**

Code	Title	Units
EBS 135	Bioenvironmental Engineering	4
EBS 161	Kinetics & Bioreactor Design	4
ECH 160	Fundamentals of Biomanufacturing	3
ENG 180	Engineering Analysis	4

**Suggested Advisors**

G. Bornhorst, J. de Moura Bell, I. Donis-Gonzalez, T. Jeoh, N. Nitin, Z. Pan, D. Slaughter

**Master Undergraduate Advisor**

S. Vougioukas

Students graduating with a B.S. degree in Biological Systems Engineering from UC Davis are prepared to:

- Apply life sciences in engineering at the biochemical, cellular, organism, and macro levels.
- Solve biological systems engineering problems while employed in the private or public sector.
- Consider the environmental, economic, and social consequences of their engineering activities.
- Communicate effectively with professional colleagues and public constituencies.
- Act in an ethical manner.
- Continue their education to adapt and thrive in a changing professional world.

## Biological Systems Engineering, Bachelor of Science/Master of Science Integrated

College of Engineering

### The Graduate Program in Biological Systems Engineering

Integrated B.S./M.S., M.S., M.Engr., D.Engr., and Ph.D. in Biological Systems Engineering

Designated Ph.D. emphasis available in Biotechnology

Graduate students in Biological Systems Engineering focus on finding economically and environmentally sustainable solutions to many of the most important global issues of our time-the safety, security and abundance of our food, detection of pathogens, development of bioenergy and other sustainable energy systems, control of insect-borne disease and damage, as well as the preservation of our land, air and water resources.

We enjoy the strategic advantage of being located in California, the national leader in agricultural production and crop diversity, and a major center for biotechnology. With the unique status of belonging

to both the College of Engineering and the College of Agricultural & Environmental Sciences, the program benefits from a wide diversity of collaborations across multiple disciplines. We interact with colleagues in both engineering and the life sciences to create multidisciplinary approaches to our teaching and research. Students benefit from this dynamic environment that combines the strengths of nationally ranked engineering, agricultural and environmental programs.

Financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

## Research Highlights

- Automation & Control
- Bioenvironmental engineering
- Renewable energy
- Industrial biotechnology
- Food safety
- Biosensors
- Bioprocess engineering
- Bioinstrumentation
- Ergonomics, health & safety
- Aquacultural engineering
- Ecological systems engineering
- Food engineering
- Forest & fiber engineering
- Postharvest engineering
- Remote sensing
- Robotics & autonomous systems
- Soil and water engineering
- Machine systems and precision agriculture

## Research Facilities & Partnerships

- Agricultural Ergonomics Research Center
- Fish Conservation & Culture Laboratory
- GIS Visualization Lab
- Energy & Efficiency Institute
- Bodega Marine Lab
- Western Center for Agricultural Equipment

Complete information is available on the departmental website (<https://bae.ucdavis.edu/>).

## Biological Systems Engineering, Master of Engineering

College of Engineering

### The Graduate Program in Biological Systems Engineering

Integrated B.S./M.S., M.S., M.Engr., D.Engr., and Ph.D. in Biological Systems Engineering

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## Biological Systems Engineering, Master of Science

College of Engineering

## The Graduate Program in Biological Systems Engineering

Integrated B.S./M.S., M.S., M.Engr., D.Engr., and Ph.D. in Biological Systems Engineering

Designated Ph.D. emphasis available in Biotechnology

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- Soil & water engineering
- Machine systems & precision agriculture

## Research Facilities & Partnerships

- Agricultural Ergonomics Research Center
- Fish Conservation & Culture Laboratory
- GIS Visualization Lab
- Energy Institute
- Bodega Marine Lab
- Western Center for Agricultural Equipment

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## **Biological Systems Engineering, Doctor of Engineering**

College of Engineering

### **The Graduate Program in Biological Systems Engineering**

Integrated B.S./M.S., M.S., M.Engr., D.Engr., and Ph.D. in Biological Systems Engineering

Designated Ph.D. emphasis available in Biotechnology

Graduate students in Biological Systems Engineering focus on finding economically and environmentally sustainable solutions to many of the most important global issues of our time—the safety, security and abundance of our food, detection of pathogens, development of bioenergy and other sustainable energy systems, control of insect-borne disease and damage, as well as the preservation of our land, air and water resources.

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### **Research Highlights**

- Automation & Control
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- Remote sensing
- Robotics & autonomous systems
- Soil & water engineering
- Machine systems & precision agriculture

## **Research Facilities & Partnerships**

- Agricultural Ergonomics Research Center
- Fish Conservation & Culture Laboratory
- GIS Visualization Lab
- Energy & Efficiency Institute
- Bodega Marine Lab
- Western Center for Agricultural Equipment

Complete information is available on the departmental website (<https://bae.ucdavis.edu/>).

## **Biological Systems Engineering, Doctor of Philosophy**

College of Engineering

### **The Graduate Program in Biological Systems Engineering**

Integrated B.S./M.S., M.S., M.Engr., D.Engr., and Ph.D. in Biological Systems Engineering

Designated Ph.D. emphasis available in Biotechnology

Graduate students in Biological Systems Engineering focus on finding economically and environmentally sustainable solutions to many of the most important global issues of our time—the safety, security and abundance of our food, detection of pathogens, development of bioenergy and other sustainable energy systems, control of insect-borne disease and damage, as well as the preservation of our land, air and water resources.

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## Research Facilities & Partnerships

- Agricultural Ergonomics Research Center
- Fish Conservation & Culture Laboratory
- GIS Visualization Lab
- Energy & Efficiency Institute
- Bodega Marine Lab
- Western Center for Agricultural Equipment

Complete information is available on the departmental website (<https://bae.ucdavis.edu/>).

## Energy Efficiency, Minor

College of Engineering

### Energy Minor Programs

There is an urgent need to develop and commercialize technologies for the sustainable conversion and use of energy. The goal of these minors is to prepare students for careers that require training in energy science and technology, efficiency, and policy. Clean technologies and green technologies including energy are some of the fastest-growing markets for new investments. Well-trained individuals in all related fields are needed to provide the level of expertise required to advance technology and policy and to satisfy national and global objectives for greater energy sustainability. The minors are designed to accommodate persons of diverse backgrounds with educational interests in areas that may include engineering, science, policy, economics, planning, and management.

#### Energy Efficiency Minor

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements with an overall GPA in the required minor courses of 2.000 or better. Only one course overlap is allowed between major and minor.

#### Minor Faculty Advisors

F. Loge (Civil & Environmental Engineering)

#### Minor Staff Advising

The Biological & Agricultural Engineering staff advisor is available to help students create academic plans for this minor and submit minor declarations. For more information, see Undergraduate Advising.

Code	Title	Units
ENG 188	Science & Technology of Sustainable Power Generation	4
ECI 125	Building Energy Performance	4
Choose 12 units:		12
ESP 167	Energy Policy	4
Choose 10 units:		10
ECI 125	Building Energy Performance	4
ESP 171	Urban & Regional Planning	4
ESP/ECI 163	Energy & Environmental Aspects of Transportation	4
ESP 168A	Methods of Environmental Policy Analysis	4
POL 105	The Legislative Process	4
POL 109	Public Policy & the Governmental Process	4
POL 122	International Law	4
POL 162	Elections & Voting Behavior	4
POL 164	Public Opinion	4
<b>Total Units</b>		<b>18</b>

DES 137A Daylighting & Interior Design

**Total Units**

**20**

## Energy Policy, Minor

College of Engineering

### Energy Minor Programs

There is an urgent need to develop and commercialize technologies for the sustainable conversion and use of energy. The goal of these minors is to prepare students for careers that require training in energy science and technology, efficiency, and policy. Clean technologies and green technologies including energy are some of the fastest-growing markets for new investments. Well-trained individuals in all related fields are needed to provide the level of expertise required to advance technology and policy and to satisfy national and global objectives for greater energy sustainability. The minors are designed to accommodate persons of diverse backgrounds with educational interests in areas that may include engineering, science, policy, economics, planning, and management.

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements with an overall GPA in the required minor courses of 2.000 or better. Only one course overlap is allowed between major and minor.

#### Minor Faculty Advisor

F. Fathallah (Department of Biological & Agricultural Engineering); K. Kornbluth (Department of Biological & Agricultural Engineering)

#### Minor Staff Advising

The Biological & Agricultural Engineering staff advisor is available to help students create academic plans for this minor and submit minor declarations. More information can be found on the departmental website (<https://bae.ucdavis.edu/undergraduate/undergraduate-advising/>).

Code	Title	Units
ENG 188	Science & Technology of Sustainable Power Generation	4
ESP 167	Energy Policy	4
Choose 10 units:		10
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ESP 168A	Methods of Environmental Policy Analysis	4
POL 105	The Legislative Process	4
POL 109	Public Policy & the Governmental Process	4
POL 122	International Law	4
POL 162	Elections & Voting Behavior	4
POL 164	Public Opinion	4
<b>Total Units</b>		<b>18</b>

## Energy Science & Technology, Minor

College of Engineering

## Energy Minor Programs

There is an urgent need to develop and commercialize technologies for the sustainable conversion and use of energy. This minor prepares students for careers that require training in energy science and technology, efficiency, and policy. Clean technologies and green technologies including energy are some of the fastest-growing markets for new investments. Well-trained individuals in all related fields are needed to provide the level of expertise required to advance technology and policy and to satisfy national and global objectives for greater energy sustainability. The minor accommodates persons of diverse backgrounds with educational interests in areas that may include engineering, science, policy, economics, planning, and management.

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements with an overall GPA in the required minor courses of 2.000 or better. Only one course overlap is allowed between major and minor.

### Minor Faculty Advisors

B. Jenkins (Department of Biological & Agricultural Engineering)

### Minor Staff Advising

The Biological & Agricultural Engineering staff advisor is available to help students create academic plans for this minor and submit minor declarations. More information can be found on the departmental website (<https://bae.ucdavis.edu/undergraduate/undergraduate-advising/>).

Code	Title	Units
ENG 105 or ECH 152B	Thermodynamics Chemical Engineering Thermodynamics	4
ENG 188	Science & Technology of Sustainable Power Generation	4
Choose 12 units:		12
EBS 161	Kinetics & Bioreactor Design	
ECH 158C	Plant Design Project	
ECH 161A	Biochemical Engineering Fundamentals	
ECH 161B	Bioseparations	
ECH 161L	Bioprocess Engineering Laboratory	
ECH 166	Catalysis	
ECI 125	Building Energy Performance	
ECI/ESP 163	Energy & Environmental Aspects of Transportation	
EME 161	Combustion & the Environment	
ARE/ESP 175	Natural Resource Economics	
FST 123	Introduction to Enzymology	
ABT/HYD 182	Environmental Analysis Using GIS	
ATM 116	Modern Climate Change	
PLS 101	Agriculture & the Environment	
ESP 167	Energy Policy	
<b>Total Units</b>		<b>20</b>

## Geographic Information Systems, Minor

College of Agricultural & Environmental Sciences

The Department of Biological & Agricultural Engineering offers a minor in Geographic Information Systems with an emphasis on spatial analysis. This minor is ideal for students interested in information processing of spatial data related to remote sensing, land information systems, marine cartography, thematic mapping, surface modeling, environmental modeling resources management, public utility planning, emergency response, geomarketing, geotechnics, precision agriculture, archaeology, military exercises, and computer-aided design. Prerequisites include MAT 016A-MAT 016B and PHY 007A-PHY 007C or PHY 009A-PHY 009B. Some electives may have additional prerequisites.

All core courses (ABT 150/LDA 150, ESM 186, and ABT 181N or ABT 182) must be taken for a letter grade. Up to one elective course may be taken P/NP.

## Minor Advisors

I. Kisekka, S.G. Vougioukas (Biological & Agricultural Engineering Department)

Code	Title	Units
ABT/LDA 150	Introduction to Geographic Information Systems	4
ESM 186	Environmental Remote Sensing	5
ABT/HYD 182 or ABT 181N	Environmental Analysis Using GIS Concepts & Methods in Geographic Information Systems	4
Choose an additional five elective units:		5
ABT 181N	Concepts & Methods in Geographic Information Systems (If not chosen above.)	
ABT 182	Environmental Analysis Using GIS (If not chosen above.)	
ESM 108	Environmental Monitoring	
ESM 185	Aerial Photo Interpretation & Remote Sensing	
ESP 168A	Methods of Environmental Policy Analysis	
ESP 168B	Methods of Environmental Policy Evaluation	
ESP 171	Urban & Regional Planning	
ESP 179	Environmental Impact Assessment	
PLS 120	Applied Statistics in Agricultural Sciences	
STA 100	Applied Statistics for Biological Sciences	
<b>Total Units</b>		<b>18</b>

## Precision Agriculture, Minor

College of Agricultural & Environmental Sciences

The Department of Biological & Agricultural Engineering (p. 96) offers the minor in Precision Agriculture, the latest farming concept that optimizes fertilizer, pesticide and water use, while minimizing environmental concerns.

This minor acquaints students with recent developments and their applications to agriculture, in Geographic Information Systems (GIS), Global Positioning Systems (GPS), Variable Rate Technologies (VRT), crop & soil sensors, and remote sensing. The minor prepares students for challenging positions in site-specific crop management as we enter the "information age" in agriculture.

All core courses (ABT 150/LDA 150 and ESM 186) must be taken for a letter grade. Up to one elective course may be taken P/NP.

## Minor Advisors

Bryan M. Jenkins, Ph.D. (Biological & Agricultural Engineering Department)

## Minor Staff Advising

The Biological & Agricultural Engineering staff advisor is available to help students create academic plans for this minor and submit minor declarations. For more information, see Undergraduate Advising (<https://bae.ucdavis.edu/undergraduate/undergraduate-advising/>).

Code	Title	Units
ABT/LDA 150	Introduction to Geographic Information Systems	4
<i>Environmental Science &amp; Management</i>		
ESM 186	Environmental Remote Sensing	5
Choose 9 or more units:		9
ABT 181N	Concepts & Methods in Geographic Information Systems	
ABT/HYD 182	Environmental Analysis Using GIS	
PLS 100A	Metabolic Processes of Cultivated Plants	
PLS 100AL	Metabolic Processes of Cultivated Plants Laboratory	
PLS 100B	Growth & Yield of Cultivated Plants	
PLS 100BL	Growth & Yield of Cultivated Plants Laboratory	
PLS 100C	Environmental Interactions of Cultivated Plants	
PLS 100CL	Environmental Interactions of Cultivated Plants Laboratory	
SSC 109	Sustainable Nutrient Management	
Choose one:		
PLS 120 or STA 100	Applied Statistics in Agricultural Sciences Applied Statistics for Biological Sciences	
Total Units		18

## Biological Sciences

College of Biological Sciences

### Advising

1023 Katherine Esau Science Hall (formerly Sciences Lab Building); 530-752-0410; Biology Academic Success Center (BASC) (<http://basc.ucdavis.edu/>); Faculty (<https://biology.ucdavis.edu/faculty/>)

- Biological Sciences, Bachelor of Arts (p. 111)
- Biological Sciences, Bachelor of Science (p. 113)
- Biological Sciences, Minor (p. 116)
- Quantitative Biology & Bioinformatics, Minor (p. 117)

## Biological Sciences, Bachelor of Arts

College of Biological Sciences

## The Biological Sciences Major

Departments of Evolution & Ecology; Microbiology & Molecular Genetics; Molecular & Cellular Biology; Neurobiology, Physiology, & Behavior; and Plant Biology

### The Program

The Biological Sciences major is broad in concept, spanning the numerous core disciplines of biology. The Bachelor of Arts (A.B.) program includes preparatory work in mathematics, general and organic chemistry, physics, and introductory level biology, as well as upper division core classes emphasizing the breadth of biological sciences. Students in the Bachelor of Arts (A.B.) program can pursue upper division coursework outside of the biological sciences. Research and internships are encouraged.

### Career Alternatives

The degree program prepares students for admission to graduate schools or professional schools, leading to either a variety of professional health careers or further study in basic and applied areas of biology. They provide suitable preparation for careers in teaching, biological and biotechnological research with various governmental agencies or private companies, government regulatory agencies, environmental consulting, biological illustration and writing, pharmaceutical sales, biological/environmental law, and biomedical engineering.

### Faculty Advisor

Lesilee Rose, Ph.D.

### Advising

Biology Academic Success Center (BASC) (<http://basc.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

### Teaching Credential Subject Representative

Associate Director of Teacher Education (School of Education); see the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

### Bodega Marine Laboratory Program

Students interested in Marine Biology should visit Marine & Coastal Science Major (p. 177) & Bodega Marine Laboratory (<http://bml.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	15
<i>Chemistry</i>		
Choose the 002 or 004 series: <sup>1</sup>		10
CHE 002A & CHE 002B	General Chemistry and General Chemistry	

CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering		<i>Animal Physiology, Behavior or Development</i>
Choose the 008 or 118 series: <sup>2</sup>	6-12	Choose one:	3-5
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	BIS 104 Cell Biology	
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	MCB 150 Developmental Biology	
<i>Mathematics</i>		NPB 100 Neurobiology	
Choose the 017 or 021 series: <sup>3</sup>	8	NPB 101 Systemic Physiology	
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	NPB 102 Animal Behavior	
MAT 021A & MAT 021B	Calculus and Calculus	NPB 107 Cell Signaling in Health & Disease	
<i>Physics</i>		NPB 141 (Discontinued)	
Choose the 001 or 007 series:	6-12	<i>Plant Physiology or Development:</i>	
PHY 001A & PHY 001B	Principles of Physics and Principles of Physics	Choose one:	3-5
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	PLB 105 Developmental Plant Anatomy	
<i>Recommended</i>		PLB 111 Plant Physiology	
<i>Chemistry</i>		PLB 112 Plant Growth & Development	
CHE 002C or CHE 004C	General Chemistry General Chemistry for the Physical Sciences & Engineering	PLB 113 Molecular & Cellular Biology of Plants	
<i>Mathematics</i>		PLB/PLS 116 Plant Morphology & Evolution	
MAT 017C or MAT 021C	Calculus for Biology & Medicine Calculus	PLB/MCB 126 Plant Biochemistry	
<i>Preparatory Subject Matter Subtotal</i>	45-57	<i>Laboratory Requirement</i>	
<i>Depth Subject Matter</i>		Choose course(s) for a minimum total of six hours/week of laboratory or field work from the list of courses below:	3-5
<i>Biological Science</i>		Choose two with three hours lab or field work/week:	
BIS 101	Genes & Gene Expression	EVE 110 Running, Swimming & Flying	
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	EVE 140 Paleobotany	
<i>Statistics</i>		EVE/ENT 180A Experimental Ecology & Evolution in the Field	
STA 100 or STA 013 or STA 013Y	Applied Statistics for Biological Sciences Elementary Statistics Elementary Statistics	EVE/ENT 180B Experimental Ecology & Evolution in the Field	
<i>Evolution</i>		MCB 185 Computer Programming for Biologists	
EVE 100	Introduction to Evolution	MIC 103L Introductory Microbiology Laboratory	
<i>Ecology</i>		NPB 100L Neurobiology Laboratory	
ESP 100 or EVE 101	General Ecology Introduction to Ecology	NPB 101L Systemic Physiology Laboratory	
<i>Microbiology</i>		NPB 121L Physiology of Reproduction Laboratory	
Choose one:	3-4	NPB 123/APC 100 Comparative Vertebrate Organology	
MIC 102	Introductory Microbiology	PLB/EVE 117 Plant Ecology	
MIC 162	General Virology	PLB/EVE 119 Population Biology of Invasive Plants & Weeds	
MIC 170	Yeast Molecular Genetics	Other courses with approval of the faculty advisor.	
		Choose one with six hours lab or field work/week; a course may fulfill both the lab and a depth topic requirement:	
		BIS 180L Genomics Laboratory	
		EVE 105 Phylogenetic Analysis of Vertebrate Structure	
		EVE 106 Mechanical Design in Organisms	
		EVE 112L Biology of Invertebrates Laboratory	
		EVE 114 Experimental Invertebrate Biology	
		EXB 106L/CHA 101L Human Gross Anatomy Laboratory	
		MIC 104L General Microbiology Laboratory	
		MIC 105L Microbial Diversity Laboratory	
		MCB 120L Molecular Biology & Biochemistry Laboratory	
		MCB 140L Cell Biology Laboratory	
		MCB 160L Principles of Genetics Laboratory	

NPB 141P	(Discontinued)
PLB/PLS 102	California Floristics
PLB 105	Developmental Plant Anatomy
PLB/EVE 108	Systematics & Evolution of Angiosperms
PLB/PLS 116	Plant Morphology & Evolution
PLB/PLP 148	Introductory Mycology
Other courses with approval of the Faculty Advisor.	
Depth Subject Matter Subtotal	31-41
<b>Total Units</b>	<b>76-98</b>

- <sup>1</sup> With BASC advisor approval, this combination also satisfies the Chemistry requirement: CHE 004A-CHE 002A (3 units w/no lab)-CHE 002B.  
<sup>2</sup> With BASC advisor approval, this combination also satisfies the Organic Chemistry requirement: CHE 118A-CHE 008B.  
<sup>3</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B; MAT 017A-MAT 021B.

## Biological Sciences, Bachelor of Science

College of Biological Sciences

### The Biological Sciences Major

Departments of Evolution & Ecology; Microbiology & Molecular Genetics; Molecular & Cellular Biology; Neurobiology, Physiology, & Behavior; and Plant Biology

#### The Program

The Biological Sciences major is broad in concept, spanning the numerous core disciplines of biology. The Bachelor of Science (B.S.) program includes preparatory work in mathematics, general and organic chemistry, physics, and introductory level biology, as well as upper division core classes emphasizing the breadth of biological sciences. Students in the B.S. degree program complete additional upper division biology coursework, for which they can choose classes from a variety of different areas such as molecular biology and genetics, animal behavior, plant growth and development, bioinformatics, marine biology, forensics, and microbiology research and internships are encouraged.

#### Career Alternatives

The degree program prepares students for admission to graduate schools or professional schools, leading to either a variety of professional health careers or further study in basic and applied areas of biology. They provide suitable preparation for careers in teaching, biological and biotechnological research with various governmental agencies or private companies, government regulatory agencies, environmental consulting, biological illustration and writing, pharmaceutical sales, biological/environmental law, and biomedical engineering.

#### Faculty Advisor

Lesilee Rose, Ph.D.

## Advising

Biology Academic Success Center (BASC) (<http://basc.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

## Teaching Credential Subject Representative

Associate Director of Teacher Education (School of Education); see the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

## Bodega Marine Laboratory Program

Students interested in Marine Biology should visit Marine & Coastal Science Major (p. 177) & Bodega Marine Laboratory (<http://bml.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	15
<i>Chemistry</i>		
Choose the 002 or 004 series: <sup>1</sup>		
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	15
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
Choose the 008 or 118 series: <sup>2</sup>		
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	6-12
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<i>Mathematics</i>		
Choose the 017 or 021 series: <sup>3</sup>		
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	8-12
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus (Recommended)	
<i>Physics</i>		
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	12
Preparatory Subject Matter Subtotal		56-66
<b>Depth Subject Matter</b>		

Section 1: Core Curriculum		
BIS 101	Genes & Gene Expression	4
BIS 104	Cell Biology	3
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6
Section 2: Depth Subject Topics		
Choose one from each topic:		21-26
Statistics		
STA 100	Applied Statistics for Biological Sciences	
Evolution		
EVE 100	Introduction to Evolution	
Ecology		
EVE 101	Introduction to Ecology	
ESP 100	General Ecology	
Microbiology		
MIC 102	Introductory Microbiology	
MIC 162	General Virology	
MIC 170	Yeast Molecular Genetics	
Plant Physiology or Development		
PLB 105	Developmental Plant Anatomy	
PLB 111	Plant Physiology	
PLB 112	Plant Growth & Development	
PLB 113	Molecular & Cellular Biology of Plants	
PLB/PLS 116	Plant Morphology & Evolution	
PLB/MCB 126	Plant Biochemistry	
Animal Physiology, Behavior or Development		
NPB 100	Neurobiology	
NPB 101	Systemic Physiology	
NPB 102	Animal Behavior	
NPB 107	Cell Signaling in Health & Disease	
NPB 141	(Discontinued)	
MCB 150	Developmental Biology	
Section 3: Laboratory Requirement		
Course(s) selected to fulfill the laboratory requirement may also satisfy restricted elective or depth subject matter units (but not both).		
Choose course(s) for a minimum total of six hours/week of laboratory or field work from the list of courses below:		
Choose two with three hours lab or field work/week:		
EVE 110	Running, Swimming & Flying	
EVE 140	Paleobotany	
EVE/ENT 180A	Experimental Ecology & Evolution in the Field	
EVE/ENT 180B	Experimental Ecology & Evolution in the Field	
MCB 185	Computer Programming for Biologists	
MIC 103L	Introductory Microbiology Laboratory	
NPB 100L	Neurobiology Laboratory	
NPB 101L	Systemic Physiology Laboratory	
NPB 121L	Physiology of Reproduction Laboratory	
NPB 123/APC 100	Comparative Vertebrate Organology	
PLB/EVE 117	Plant Ecology	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
Other courses with approval of Faculty Advisor.		
Choose one course with six hours lab or field work/week:		
BIS 180L	Genomics Laboratory	
EVE 105	Phylogenetic Analysis of Vertebrate Structure	
EVE 106	Mechanical Design in Organisms	
EVE/PLB 108	Systematics & Evolution of Angiosperms	
EVE 112L	Biology of Invertebrates Laboratory	
EVE 114	Experimental Invertebrate Biology	
EXB 106L/CHA 101L	Human Gross Anatomy Laboratory	
MIC 104L	General Microbiology Laboratory	
MIC 105L	Microbial Diversity Laboratory	
MCB 120L	Molecular Biology & Biochemistry Laboratory	
MCB 140L	Cell Biology Laboratory	
MCB 160L	Principles of Genetics Laboratory	
NPB 141P	(Discontinued)	
PLB/PLS 102	California Floristics	
PLB 105	Developmental Plant Anatomy	
PLB/EVE 108	Systematics & Evolution of Angiosperms	
PLB/PLS 116	Plant Morphology & Evolution	
PLB/PLP 148	Introductory Mycology	
Other courses with approval of the Faculty Advisor.		
Section 4: Restricted Electives		
Choose at least three or more courses for a minimum of 11 units from the list of Approved Upper Division Restrictive Electives and/or laboratory courses. No class or laboratory used to satisfy a Section 1 or a Section 2 course requirement may be used as a restricted elective.		
Students may choose any combination of approved courses that align with their academic or career objectives. Up to three of the 11 units may be fulfilled by approved seminar or research courses.		
Approved Seminar/Research Courses (p. 114)		
Approved Upper Division Restricted Electives (p. 115)		
Total Units		
98-111		
1 With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units w/no lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.		
2 With BASC advisor approval, this combination also satisfies the Organic Chemistry requirement: CHE 118A-CHE 008B.		
3 With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.		
Approved Seminar/Research Courses		
Code		
Courses numbered 189, 190/190C, 192, 194H, and 199 in ABI, ANS, BIS, BIT, ENH, ENT, ETX, EVE, MCB, MIC, MMG, NPB, PLB, PLS, VEN, WFC, as well as:		

BIS 122P	Population Biology & Ecology/Advanced Laboratory Topics	5	CHE 130B	Computational Drug Design	3	
BIS 123	Undergraduate Colloquium in Marine Science	1	CHE 150	Chemistry of Natural Products	3	
BIS 133	Collaborative Studies in Mathematical Biology	3	ECS 124	Theory & Practice of Bioinformatics	4	
EVE/ESP 111	Marine Environmental Issues or MMG 191 (PENDING APPROVAL)	1	EDU 110	Educational Psychology: General	4	
MCB 138	Undergraduate Seminar in Biochemistry	1	EDU/GEL 181	Teaching in Science & Mathematics	2	
MCB 139	Undergraduate Seminar in Biochemistry	2	EDU/GEL 183	Teaching High School Mathematics & Science	3	
MCB 148	Undergraduate Seminar in Cell Biology	2	ENH 105	Taxonomy & Ecology of Environmental Plant Families	4	
MCB 158	Undergraduate Seminar in Developmental Biology	2	ENH 150	Genetics & Plant Conservation: The Biodiversity Crisis	3	
MCB 178	Undergraduate Seminar in Molecular Genetics	1	ENT 105	Entomology (ENT)—all upper division courses. (p. 802) <sup>1</sup>		
MCB 191	Introduction to Research	1	ESP 106	Environmental Data Science	4	
MCB 193	Advanced Research	3	ESP 110	Principles of Environmental Science	4	
NPB 139	Frontiers in Physiology	3	ESP/GEL 116N	Oceanography	3	
NPB 159	Frontiers in Behavior	3	ESP 121	Population Ecology	4	
NPB 169	Frontiers in Neurobiology	3	ESP 123	Introduction to Field & Laboratory Methods in Ecology	4	
			ESP 124	Marine & Coastal Field Ecology	3	
			ESP 151	Limnology	4	
			ESP 151L	Limnology Laboratory	3	
			ESP 155	Wetland Ecology	4	
				Environmental Toxicology (ETX)—all upper division courses. (p. 817) <sup>1</sup>		
				Evolution & Ecology (EVE)—all upper division courses. (p. 825) <sup>1</sup>		
				Exercise Biology (EXB)—all upper division courses. (p. 831) <sup>1</sup>		
			FST 102A	Malting & Brewing Science	4	
			FST 104	Food Microbiology	3	
			GDB 101	Epidemiology	4	
			GDB 103	Microbiome of People, Animals, & Plants	3	
			GEL 107	Earth History: Paleobiology	3	
			GEL 107L	Earth History: Paleobiology Laboratory	2	
			GEL 108	Earth History: Paleoclimates	3	
			GEL/ESP 116N	Oceanography	3	
			GEL 141	Evolutionary History of Vertebrates	3	
			GEL 144	Historical Ecology	3	
			GEL/ESP 150A	Physical & Chemical Oceanography	4	
			GEL/ESP 150B	Geological Oceanography	3	
			GEL/ESP 150C	Biological Oceanography	4	
			HDE 100A	Infancy & Early Childhood	4	
			or HDE 100AV	Infancy & Early Childhood		
			HDE 100C	Adulthood & Aging	4	
			HDE/ENT 117	Longevity	4	
			HPH 115	Cannabis & Cannabinoids in Physiology & Medicine	3	
	Biological Sciences (BIS)—all upper division courses. (p. 569) <sup>1</sup>			Molecular & Cellular Biology (MCB)—all upper division courses. (p. 1116) <sup>1</sup>		
	BIT 150	Applied Bioinformatics	4	Microbiology (MIC)—all upper division courses. (p. 1108) <sup>1</sup>		
	BIT 160	Principles of Plant Biotechnology	3	Microbiology & Molecular Genetics (MMG)—all upper division courses. ( <a href="https://catalog.ucdavis.edu/courses-subject-code/mmgs/">https://catalog.ucdavis.edu/courses-subject-code/mmgs/</a> ) <sup>1</sup>		
	BIT 161A	Genetics & Biotechnology Laboratory	6	MMI 188A	Human Immunology	3
	BIT 161B	Plant Genetics & Biotechnology Laboratory	4	or MMI 188B	Human Immunology	
	CHE 107A	Physical Chemistry for the Life Sciences	3	NEM 100	Plant Nematology	4
	CHE 107B	Physical Chemistry for the Life Sciences	3			
	CHE 108	Molecular Biochemistry	3			
	CHE 130A	Principles of Medicinal Chemistry	3			

## Approved Upper Division Restricted Electives

Code	Title	Units			
ANG 105	Horse Genetics	3			
ANG 107	Genetics & Animal Breeding	5			
ANS 104	Principles & Applications of Domestic Animal Behavior	4			
ANS 123	Animal Growth & Development	4			
ANS 170	Ethics of Animal Use	4			
ANT 151	Primate Evolution	4			
ANT 152	Human Evolution	5			
ANT 153	Human Genetics: Mutation & Migration	5			
ANT 154A	The Evolution of Primate Behavior	5			
ANT 154B	Primate Evolutionary Ecology	5			
ANT 155	Primate Conservation Biology	4			
ANT 157	Advanced Human Genetics	2			
ANT 157L	Advanced Human Genetics Lab	4			
AVS 100	Avian Biology	3			
AVS 103	Avian Development & Genomics	3			
AVS 115	Raptor Biology	3			
BIM 140	Protein Engineering	4			
BIM 143	Biomolecular Systems Engineering: Synthetic Biology	4			
	Biological Sciences (BIS)—all upper division courses. (p. 569) <sup>1</sup>				
BIT 150	Applied Bioinformatics	4			
BIT 160	Principles of Plant Biotechnology	3			
BIT 161A	Genetics & Biotechnology Laboratory	6			
BIT 161B	Plant Genetics & Biotechnology Laboratory	4			
CHE 107A	Physical Chemistry for the Life Sciences	3			
CHE 107B	Physical Chemistry for the Life Sciences	3			
CHE 108	Molecular Biochemistry	3			
CHE 130A	Principles of Medicinal Chemistry	3			

Introduction to Nematology		2	The Biological Sciences minor provides an opportunity for students in programs outside of the College of Biological Sciences to complement their studies with a concentration in biology. Student in the minor experience the breadth of biology by taking courses in five core areas: molecular biology/biochemistry, animal biology, plant biology, microbiology and ecology/evolution.
Neurobiology, Physiology, & Behavior (NPB)—all upper division courses. (p. 1148) <sup>1</sup>		4	Departments of Evolution & Ecology; Microbiology & Molecular Genetics; Molecular & Cellular Biology; Neurobiology, Physiology, & Behavior; and Plant Biology
NUT/ETX 104	Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants	4	
PHI 108	Philosophy of the Biological Sciences	4	
Plant Biology (PLB)—all upper division courses. (p. 1231) <sup>1</sup>		3	
PLP 120	Introduction to Plant Pathology	4	
PLP 130	Fungal Biology & Disease	3	
PLS 100A	Metabolic Processes of Cultivated Plants	3	
PLS 100B	Growth & Yield of Cultivated Plants	3	
PLS 101	Agriculture & the Environment	3	
PLS/ESM 144	Trees & Forests	4	
PLS 147	California Plant Communities	3	
PLS 150	Sustainability & Agroecosystem Management	4	
PLS 152	Plant Genetics	4	
PLS 154	Introduction to Plant Breeding	4	
PLS 162	Urban Ecology	3	
PLS 172	Biology and Quality of Harvested Crops	4	
PMI 126	Fundamentals of Immunology	3	
PMI 127	Medical Bacteria & Fungi	3	
PMI 128	Biology of Animal Viruses	3	
SAS/HIS 109	Environmental Change, Disease & Public Health	4	
SAS 110	Applications of Evolution in Medicine, Human Behavior, & Agriculture	4	
SOC 163	Population Health: Social Determinants & Disparities in Health	4	
SSC 111	Soil Microbiology	4	
STA 101	Advanced Applied Statistics for the Biological Sciences	4	
STS/ANT 129	Health & Medicine in a Global Context	4	
STS/ENL 164	Writing Science	4	
UWP 111C	Specialized Topics in Journalism: Science Journalism	4	
UWP 120	Rhetorical Approaches to Scientific & Technological Issues	4	
UWP 121	History of Scientific Writing	4	
VEN 110	Grapevine Growth & Physiology	3	
VME 158	Infectious Disease in Ecology & Conservation	3	
Wildlife, Fish, & Conservation Biology (WFC)—all upper division courses. (p. 1387) <sup>1</sup>		3	

<sup>1</sup> Courses numbered 198 do not fulfill restricted elective units without advisor approval. Discussion section courses, those noted with a "D" do not fulfill restricted elective units. Only 3 units of approved seminar or research courses can be applied to the restrictive electives.

## **Biological Sciences, Minor**

College of Biological Sciences

BIS 122	Population Biology & Ecology	ECS 032A	Introduction to Programming
ESP 100	General Ecology	ECS 036A	Programming & Problem Solving
EVE 100	Introduction to Evolution	<b>OR the equivalent.</b>	
EVE 101	Introduction to Ecology	The programming requirement may be satisfied by previous experience and therefore may not entail college course credit. Please see your minor advisor for this determination and its possible impact on your unit requirements for the minor.	
EVE 105	Phylogenetic Analysis of Vertebrate Structure		
EVE 112	Biology of Invertebrates	<b>Quantitative Biology</b>	
EVE 115	Marine Ecology	BIS/MAT 107	Probability & Stochastic Processes with Applications to Biology <sup>1</sup>
EVE 131	Human Genetic Variation & Evolution	or MAT 124	Mathematical Biology
EVE 138	Ecology of Tropical Latitudes	NOTE: BIS 107 (same as MAT 107) has a prerequisite of BIS 027A/MAT 027A (preferred) or MAT 022A; MAT 124 has a prerequisite of MAT 027A & MAT 027B (preferred) or MAT 022A & MAT 022B.	
EVE 140	Paleobotany		
EVE 147	Biogeography	<b>Bioinformatics</b>	
PLB/PLS 102	California Floristics	ECS 124	Theory & Practice of Bioinformatics
PLB/EVE 108	Systematics & Evolution of Angiosperms	or ECS 129	Computational Structural Bioinformatics
PLB/EVE 117	Plant Ecology	<b>Core Courses Subtotal</b>	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	8-12	
PLB 143	Evolution of Crop Plants	<b>Quantitative &amp; Computational Preparation</b>	
PLB/PLP 148	Introductory Mycology	Choose one:	
Additional courses (if necessary) from above numbered groups to reach 18 units.		BIS/MAT 107	Probability & Stochastic Processes with Applications to Biology <sup>1</sup>
<b>Total Units</b>	<b>18</b>	BIM 105	Probability & Data Science for Biomedical Engineers

## Quantitative Biology & Bioinformatics, Minor

### College of Biological Sciences

The interdisciplinary minor in Quantitative Biology & Bioinformatics is an integrative program that introduces students to the quantitative and computational approaches that are redefining all disciplines in the biological sciences, from molecular and cell biology, through genetics and physiology, to ecology and evolutionary biology. Students in this minor will learn research tools that apply mathematical and computational methods, increase their insight into the strengths and limitations of quantitative approaches, and develop the interdisciplinary perspective that is now the foundation of modern biological research and training.

The minor in Quantitative Biology & Bioinformatics is open to all undergraduates regardless of major and is sponsored by the College of Biological Sciences.

### Faculty Advisor

Mark Goldman, Ph.D.

### Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410

Only one course used to satisfy a requirement for the minor may be applied toward a student's major.

Code	Title	Units	
<b>Core Courses</b>			
<i>Programming</i>			
Choose one:		0-4	
BIS 134	Systems Biology: From Biological Circuits to Biological Systems		
BIS 180L	Genomics Laboratory		
BIS 181	Comparative Genomics		
BIS 183	Functional Genomics		

NOTE: BIS 107 (same as MAT 107) has a prerequisite of BIS 027A/MAT 027A (preferred) or MAT 022A; MAT 124 has a prerequisite of MAT 027A & MAT 027B (preferred) or MAT 022A & MAT 022B.

**Quantitative & Computational Preparation Subtotal**

### Restricted Electives

Complete two or more from the following list to achieve a total of 5-10 18-26 units:

BIM 102	Cellular Dynamics
BIM 140	Protein Engineering
BIM 141	Cell & Tissue Mechanics
BIT 150	Applied Bioinformatics
EVE 102	Population & Quantitative Genetics
EVE 103	Phylogeny, Speciation & Macroevolution
EVE 104	Community Ecology
EVE 175	Computational Genetics
MIC 105	Microbial Diversity
MIC 117	Analysis of Molecular Genetic Circuits
MCB 123	Behavior & Analysis of Enzyme & Receptor Systems
MCB 143	Cell & Molecular Biophysics
MCB 182	Principles of Genomics
NPB 166	Math Tools for Neuroscience
NPB 167	Computational Neuroscience
ESP 121 or WFC 122	Population Ecology Population Dynamics & Estimation
Restricted Electives Subtotal	5-10
Total Units	18-26

<sup>1</sup> BIS 107 can only be used to fulfill either the Quantitative Biology Core requirement or the Quantitative & Computational Preparation requirement, not both.

## Biomedical Engineering

### College of Engineering

Steven George, Ph.D., Chairperson of the Department  
Marc Facciotti, Ph.D., Vice Chair for Education

### Department Office

2303 Genome & Biomedical Sciences Facility; 530-752-1033;  
Biomedical Engineering (<https://bme.ucdavis.edu>); Faculty (<https://bme.ucdavis.edu/faculty-research/>)

- Biomedical Engineering, Bachelor of Science (p. 118)
- Biomedical Engineering, Minor (p. 121)

## Biomedical Engineering, Bachelor of Science

### College of Engineering

## The Biomedical Engineering Undergraduate Major

The Biomedical Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Biomedical engineering is an interdisciplinary field of study that integrates knowledge of engineering principles with the biomedical sciences. It is a very diverse field with biomedical engineers working in areas ranging from medical imaging to regenerative medicine. Some major contributions of Biomedical Engineering include the left ventricular

assist device (LVAD), artificial joints, hemodialysis, bioengineered skin, coronary stents, computed tomography (CT), and flexible endoscopes.

Students who choose biomedical engineering are interested in contributing to human health and quality of life, but do not routinely interact directly with patients, as do physicians. Due to the need to complete additional coursework beyond BME degree requirements, this major is not a primary route for pre-medical studies.

The mission of the BS degree program of the Department of Biomedical Engineering is to combine exceptional teaching with state-of-the-art research for the advancement of technologies and computational techniques that meet medical and societal challenges.

The educational objectives of our program are that a B.S. degree in Biomedical Engineering should prepare students to:

- Be successfully engaged in their chosen career through engineering practice, academic or clinical research, healthcare, education, service, or related activities, or through the pursuit of graduate or professional degrees; and
- Contribute effectively to society through responsible professional practice, fostering of cross-disciplinary collaboration, generation of innovative solutions to problems, and continuous pursuit of knowledge for personal and technological advancement.

The biomedical engineering curriculum is designed to provide a solid interdisciplinary foundation in life and physical sciences, mathematics and engineering, while allowing for sufficient flexibility in the upper division requirements to encourage students to explore specializations within the field. Our instructional program is designed to impart knowledge of contemporary issues at the forefront of biomedical engineering research. Employment opportunities exist in industry, hospitals, academic research and teaching institutions, national laboratories, government regulatory agencies, consulting and finance. The major also provides excellent grounding in the skills necessary for graduate-level studies in engineering disciplines and biological sciences, as well as for professional studies in health (medicine, dentistry, optometry, prosthetics), business and law. Exclusive of General Education units, the minimum number of units required for the Biomedical Engineering degree is 158.

For information about graduate degree options, see Biomedical Engineering (Graduate Group). (<https://bmegg.ucdavis.edu/>)

### Areas of Specialization

As Biomedical engineering is a broad field, specializing in a subfield of engineering can provide more in-depth expertise in a focus area. Through the judicious selection of upper division engineering and science electives, students can create this depth in one of our suggested areas of specialization or in an area of the student's choosing. One of the strengths of the UC Davis program is the flexibility to design one's own emphasis of study. These specializations are neither required nor degree-notated.

### Biomechanics

This is a broad subfield that includes orthopedic/rehabilitation engineering and the study of mechanical forces produced by biological systems. This subfield helps us understand the fluid dynamics of blood flow and the forces acting on tissue in the artery allowing us to design better cardiovascular interventional devices. This field involves a more intensive study of mechanics, dynamics and thermodynamics.

## Cellular & Tissue

The cellular and tissue specialization applies biomedical engineering principles to control behavior at the gene, protein, cell, and tissue level. Engineers in this area work with cellular therapies, protein production, gene therapy, tissue engineering and regeneration, and biomaterials development. This subfield draws heavily from the chemical and biological sciences and can involve studying biomedical transport, natural or synthetic biomaterials, pharmacokinetics and pharmacodynamics.

## Imaging

Visualizing anatomical structure, physiological processes, metabolic activity and molecular expression in living tissues is essential for the diagnosis of disease, development of new therapeutics, evaluation of the response to therapeutics, and guidance of interventional procedures. An imaging biomedical engineer can develop instruments for imaging, create algorithms for three-dimensional reconstruction of imaging data, and generate new contrast agents to enhance image quality. Our program has a particular strength in molecular imaging, which involves detecting molecular-scale events within living systems. Depending upon your area of interest, the imaging specialization can require further study in electronics, signal processing, chemistry or computer programming.

## Medical Devices

Biomedical engineers can develop devices, instruments and implants ranging from the nano- to macro-scale that can be used in the diagnosis, treatment or prevention of disease. This involves combining technologies like pharmaceuticals, electronics and mechanical devices to develop combination medical treatments.

## Systems & Synthetic Biology

In systems and synthetic biology, students apply engineering principles to better understand, design and build biological systems at the cellular level. They integrate cellular, biochemical, genetic, electromechanical and computational approaches in their work, which can be applied to health and other applications. Systems and synthetic biology specialists can build engineered or artificial cells for fighting cancer or antibiotic resistance, improve tissue engineering and drug production approaches and study how complex and dynamic molecular systems control cellular behavior.

## Pre-Medical Student

As engineering is playing an increasing role in the practice of medicine, students can focus on the intersection of engineering and medicine for future careers as physician-scientists. Please note that to meet admission requirements for medical school, students must complete extra coursework in addition to the listed Department of Biomedical Engineering Curriculum Requirements.

## The Graduate Program in Biomedical Engineering

Doctoral and master's degrees in Biomedical Engineering are offered through the interdisciplinary Graduate Group in Biomedical Engineering; see Biomedical Engineering (<https://bme.ucdavis.edu>) & Biomedical Engineering Graduate Group. (<https://bmegg.ucdavis.edu/>)

Code	Title	Units
<b>Lower Division Required Courses</b>		
MAT 021A	Calculus	4

MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A or MAT 027A or BIS 027A	Linear Algebra Linear Algebra with Applications to Biology Linear Algebra with Applications to Biology	3-4
MAT 022B or MAT 027B or BIS 027B	Differential Equations Differential Equations with Applications to Biology Differential Equations with Applications to Biology	3-4
<b>Physics</b>		
PHY 009A or PHY 009HA	Classical Physics Honors Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
<b>Chemistry</b>		
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	15
CHE 008A or CHE 118A	Organic Chemistry: Brief Course Organic Chemistry for Health & Life Sciences	2-4
CHE 008B or CHE 118B	Organic Chemistry: Brief Course Organic Chemistry for Health & Life Sciences	4
<b>Engineering</b>		
ENG 006	Engineering Problem Solving	4
ENG 017 or ENG 017V	Circuits I Circuits I	4
<b>Biological Science</b>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
<b>Biomedical Engineering</b>		
BIM 001	Introduction to Biomedical Engineering	2
BIM 020	Fundamentals of Bioengineering	4
BIM 020L	Graphics Design for BME	2
Lower Division Composition/Writing; choose one; a grade of C- or better is required:		
COM 001	Major Works of the Ancient World	
COM 002	Major Works of the Medieval & Early Modern World	
COM 003	Major Works of the Modern World	
COM 004	Major Works of the Contemporary World	
ENL 003	Introduction to Literature	
NAS 005	Introduction to Native American Literature	
UWP 001	Introduction to Academic Literacies (Recommended)	
UWP 001V	Introduction to Academic Literacies: Online (Recommended)	
UWP 001Y	Introduction to Academic Literacies (Recommended)	
Lower Division Required Courses Subtotal		
<b>Upper Division Required Courses</b>		
<b>Engineering</b>		
ENG 100 or EEC 100	Electronic Circuits & Systems Circuits II	3-5

ENG 105	Thermodynamics	4	ENG 102	Dynamics
ENG 190	Professional Responsibilities of Engineers	3	ENG 103	Fluid Mechanics
<i>Biomedical Engineering</i>			ENG 104	Mechanics of Materials
BIM 116 or NPB 101	Physiology for Biomedical Engineers Systemic Physiology	5	ENG 104L	Mechanics of Materials Laboratory
BIM 105	Probability & Data Science for Biomedical Engineers	4	ENG 106	Engineering Economics
BIM 106	Biotransport Phenomena	4	EEC 110A	Electronic Circuits I
BIM 107	Manufacturing Processes for BME	2	EEC 110B	Electronic Circuits II
BIM 108	Biomedical Signals & Control	4	EEC 118	Digital Integrated Circuits
BIM 109	Biomaterials	4	EEC 130A	Electromagnetics I
BIM 110A	Biomedical Engineering Senior Design Experience	3	EEC 130B	Introductory Electromagnetics II
BIM 110B	Biomedical Engineering Senior Design Experience	3	EEC 140A or EEC 140AV	Principles of Device Physics I
BIM 110C	Biomedical Engineering Senior Design Experience	3	EEC 140B	Principles of Device Physics II
BIM 111	Biomedical Instrumentation Laboratory	6	EEC 151	Digital Signals & Systems
<b>Science &amp; Engineering Electives are to be selected in consultation with a staff or faculty advisor.</b>			EEC 157A or EEC 157AV	Control Systems
<i>Science Electives</i>			EEC 157B or EEC 157BY	Control Systems
To be chosen according to specialization:			EEC 160	Signal Analysis & Communications
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	7	EBS 128	Biomechanics & Ergonomics
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life		EBS 130	Modeling of Dynamic Processes in Biological Systems
ECS 032A	Introduction to Programming		EBS 165	Bioinstrumentation & Control
ECS 032B	Introduction to Data Structures		EBS 175	Rheology of Biological Materials
PHY 009D	Modern Physics		ECH 141	Fluid Mechanics for Biochemical & Chemical Engineers
BIM 102	Cellular Dynamics		ECH 144	Rheology & Polymer Processing
BIM 161A	Biomolecular Engineering		ECH 145A	Chemical Engineering Thermodynamics Laboratory
BIM 161L	Biomolecular Engineering Laboratory		ECH 145B	Chemical Engineering Transport Lab
BIM 161S	(Discontinued)		ECH 155	Chemical Engineering Kinetics & Reactor Design Laboratory
Any letter graded upper division course in the Biological Sciences, Chemistry or Physics that is designated as Science & Engineering topical breadth.			ECH 160	Fundamentals of Biomanufacturing
With the approval of the Biomedical Engineering Undergraduate Committee; 4 units:			ECH 161A	Biochemical Engineering Fundamentals
BIM 192 or BIM 199	Internship in Biomedical Engineering Special Study for Advanced Undergraduates		ECH 161B	Bioseparations
<i>Engineering Electives</i>			ECH 161L	Bioprocess Engineering Laboratory
Any letter graded upper division Biomedical Engineering course that is not required. Courses that do not count are BIM 102, BIM 161A, BIM 161L, BIM 161S (Discontinued) and select variable unit classes from BIM 099, BIM 192, BIM 189A, BIM 189B, BIM 189C, BIM 199			ECH 170	Introduction to Colloid & Surface Phenomena
With the approval of the Biomedical Engineering Undergraduate Committee; 4 units:			ECS 124	Theory & Practice of Bioinformatics
BIM 192 or BIM 199	Internship in Biomedical Engineering Special Study for Advanced Undergraduates		EMS 147/FPS 100	Principles of Polymer Materials Science
No more than 4 units allowed from lower division coursework.			EMS 160	Thermodynamics of Materials
ENG 035	Statics		EMS 162	Structure & Characterization of Engineering Materials
ENG 045 or ENG 045Y	Properties of Materials Properties of Materials		EMS 162L	Structure & Characterization of Materials Laboratory
			EMS 164	Kinetics of Materials
			EMS 172	Smart Materials
			EMS 172L	Smart Materials Laboratory
			EMS 174	Mechanical Behavior of Materials
			EMS 174L	Mechanical Behavior Laboratory
			EMS 180	Materials in Engineering Design
			EMS 181	Manufacturing of 3D & Composite Materials

EMS 182	Failure Analysis
EME 150A	Mechanical Design
EME 150B	Mechanical Design
EME 151	Statistical Methods in Design & Manufacturing
EME 152	Computer-Aided Mechanism Design
EME 154	Mechatronics
EME 165	Heat Transfer
EME 171	Analysis, Simulation & Design of Mechatronic Systems
EME 172	Automatic Control of Engineering Systems
<i>Additional Elective Policies<sup>1</sup></i>	
<i>Upper Division Composition Requirement</i>	
Choose one; grade of C- or better is required:	0-4
UWP 101	Advanced Composition
or UWP 101V	Advanced Composition
or UWP 101Y	Advanced Composition
UWP 102B	Writing in the Disciplines: Biology
UWP 102E	Writing in the Disciplines: Engineering
UWP 104A	Writing in the Professions: Business Writing
or UWP 104AY	Writing in the Professions: Business Writing
UWP 104E	Writing in the Professions: Science
UWP 104F	Writing in the Professions: Health
or UWP 104FY	Writing in the Professions: Health
UWP 104I	Writing in the Professions: Internships
UWP 104T	Writing in the Professions: Technical Writing
Passing the Upper Division Composition Exam offered by the College of Letters & Science.	
Upper Division Required Courses Subtotal	75-81
<b>Total Units</b>	<b>158-162</b>

<sup>1</sup> 2 units from CHE 118A may be applied towards Science Electives if CHE 118A is also used to satisfy lower division subject credit. 2 units from EEC 100 may be applied towards Engineering Electives if EEC 100 is taken to satisfy upper division subject credit. 1 unit from MAT 027A/BIS 027A and 1 unit from MAT 027B/BIS 027B may be applied to Science Electives.

## Biomedical Engineering, Minor

### College of Engineering

The minor in Biomedical Engineering is restricted to enrolled College of Engineering students. The intent is to build upon the existing core strengths in other engineering majors by adding expertise in biomedical applications. This additional training makes students more attractive to employers in the medical device industry, and positions students for graduate training in health related applications of engineering.

The minor requires two life sciences courses not typically required for engineering students, one at the cellular level (BIM 102) and the other at the physiological level (NPB 101 or BIM 116). The remaining 12 units are to be selected in consultation with an advisor from this list of upper

division Biomedical Engineering courses. Students will be advised to select courses that complement their existing curricula.

## Minor Advisors

Rosalind Christian, Dr. Jennifer Choi

Successful completion of the minor requires the following:

- Completing 21 units of minor coursework; all courses must be taken for a letter grade.
- Minimum overall GPA of 2.000 and no grade lower than a C- for coursework completed in the minor.
- No more than one course can be counted towards both the student's major and the minor.

Code	Title	Units
<i>Required Courses</i>		
NPB 101	Systemic Physiology	5
or BIM 116	Physiology for Biomedical Engineers	
BIM 102	Cellular Dynamics	4
<i>Elective Courses</i>		
Choose 12 units from upper division BIM courses, in consultation with the academic advisor.		12
BIM 140	Protein Engineering	
BIM 141	Cell & Tissue Mechanics	
BIM 142	Principles & Practices of Biomedical Imaging	
BIM 143	Biomolecular Systems Engineering: Synthetic Biology	
BIM 143L	Synthetic Biology Laboratory	
BIM 144	Fundamentals of Biophotonics & Bioimaging	
BIM 152	Molecular Control of Biosystems	
BIM 154	Computational Genomics	
BIM 161A	Biomolecular Engineering	
BIM 162	Introduction to the Biophysics of Molecules & Cells	
BIM 163	Bioelectricity, Biomechanics, & Signaling Systems	
BIM 171	Clinical Applications for Biomedical Device Design	
BIM 172	Introduction to Neuroengineering Lab	
BIM 173	Cell & Tissue Engineering	
BIM 189A	Topics in Biomedical Engineering: Cellular & Molecular Engineering	
BIM 189B	Topics in Biomedical Engineering: Biomedical Imaging	
BIM 189C	Topics in Biomedical Engineering: Biomedical Engineering	
<b>Total Units</b>		<b>21</b>

## Biomedical Engineering (Graduate Group)

### College of Engineering

Blaine Christiansen, Ph.D., Chairperson of the Group

## Group Office

2306B Genome & Biomedical Sciences Facility; 530-752-2611; Biomedical Engineering Graduate Group (<https://bmegg.ucdavis.edu/>); Faculty (<https://bmegg.ucdavis.edu/faculty/>)

## Graduate Study

The Biomedical Engineering Graduate Group (BMEGG) offers programs of study and research leading to M.S. and Ph.D. degrees. The programs of study prepare students for professional work in the effective integration of engineering with medical and biological sciences. Research strengths lie in the areas of: bioelectricity & neuroengineering; biomaterials & devices; biomechanics & mechanobiology; bioimaging & biophotonics; computational & synthetic biology; and molecular, cellular & tissue engineering. Each student, together with an advisor, defines a specific course of study suited to individual goals.

## Preparation

The BMEGG curriculum requires strong competence in mathematics, engineering, and biology for successful completion of study. Prior course work in these areas is emphasized in the evaluation of applications, though some undergraduate training can be acquired after admission to the BMEGG.

## Courses

See Biomedical Engineering (p. 580).

## Advising

See BMEGG Advising & Administration (<https://bmegg.ucdavis.edu/advising-administration/>).

- Biomedical Engineering, Master of Science (p. 122)
- Biomedical Engineering, Doctor of Philosophy (p. 122)

## Biomedical Engineering, Master of Science

College of Engineering

## Graduate Study

The Biomedical Engineering Graduate Group (BMEGG) offers programs of study and research leading to the M.S. and Ph.D. degrees. The programs of study prepare students for professional work in the effective integration of engineering with medical and biological sciences. Research strengths lie in the areas of: bioelectricity & neuroengineering; biomaterials & devices; biomechanics & mechanobiology; bioimaging & biophotonics; computational & synthetic biology; and molecular, cellular & tissue engineering. Each student, together with an advisor, defines a specific course of study suited to individual goals.

## Preparation

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## Courses

See Biomedical Engineering (p. 580).

## Advising

See BMEGG Advising & Administration (<https://bmegg.ucdavis.edu/advising-administration/>).

## Biomedical Engineering, Doctor of Philosophy

College of Engineering

## Graduate Study

The Biomedical Engineering Graduate Group (BMEGG) offers programs of study and research leading to M.S. and Ph.D. degrees. The programs of study prepare students for professional work in the effective integration of engineering with medical and biological sciences. Research strengths lie in the areas of: bioelectricity & neuroengineering; biomaterials & devices; biomechanics & mechanobiology; bioimaging & biophotonics; computational & synthetic biology; and molecular, cellular & tissue engineering. Each student, together with an advisor, defines a specific course of study suited to individual goals.

## Preparation

The BMEGG curriculum requires strong competence in mathematics, engineering, and biology for successful completion of study. Prior course work in these areas is emphasized in the evaluation of applications, though some undergraduate training can be acquired after admission to the BMEGG.

## Courses

See Biomedical Engineering (p. 580).

## Advising

See BMEGG Advising & Administration (<https://bmegg.ucdavis.edu/advising-administration/>).

## Biophysics (Graduate Group)

### Graduate Studies

Eleonora Grandi, Ph.D., FHRs, Co-Chairperson of the Group  
Vladimir Yarov-Yarovoy, Ph.D., Co-Chairperson of the Group

## Group Office

227B Life Sciences; 530-752-4863; Biophysics Graduate Group (<http://bph.ucdavis.edu/>); Faculty (<http://bph.ucdavis.edu/faculty/>)

- Biophysics, Doctor of Philosophy (p. 122)

## Biophysics, Doctor of Philosophy

### Graduate Studies

## Graduate Study

The Biophysics Graduate Group offers a program leading to a Ph.D. degree in biophysics. The interdisciplinary program prepares students to conduct independent research at the interface of physics, chemistry,

and biology. Students employ advanced quantitative research methods and models to explore biophysical mechanisms in living systems. Faculty members have particular research interests in physical biology of the cell, structural biology, computational biology, membrane mechanics, systems and synthetic biology, mechanisms of catalysis and energy transduction, neuroscience, and imaging. Students choose from the broad biophysics research venues a research laboratory that matches their interests and career goals.

The Master of Sciences degree is offered only en route to the Ph.D.

## **Biostatistics (Graduate Group)**

### **Graduate Studies**

### **Group Office**

4118 Mathematical Sciences Building; Biostatistics Graduate Group (<https://biostat.ucdavis.edu/>); Faculty (<https://biostatistics.ucdavis.edu/people/>); Graduate Advisors (<https://biostatistics.sf.ucdavis.edu/grad-graduate-advisers/>)

### **Faculty**

Danielle Harvey, Ph.D. (Public Health Sciences), Chairperson of the Group

### **About**

The Graduate Group in Biostatistics offers M.S. and Ph.D. programs in Biostatistics.

- Biostatistics, Master of Science (p. 123)
- Biostatistics, Doctor of Philosophy (p. 123)

## **Biostatistics, Master of Science**

### **Graduate Studies**

### **Graduate Study**

Biostatistics is a field of science that uses quantitative methods to study life sciences related problems that arise in a broad array of fields. The program provides students with, first, solid training in the biostatistical core disciplines and theory; second, with state-of-the art knowledge and skills for biostatistical data analysis; third, substantial exposure to the biological and epidemiological sciences; and fourth, with a strong background in theoretical modeling, statistical techniques and quantitative as well as computational methods. Programs of study and research are offered leading to M.S. and Ph.D. degrees. The program prepares students for interdisciplinary careers ranging from bioinformatics, environmental toxicology and stochastic modeling in biology and medicine to clinical trials, drug development, epidemiological and medical statistics. The program draws on the strengths of the Biostatistics faculty at UC Davis.

### **Preparation**

Students should have one year of calculus; a course in linear algebra or one year of biological course work; facility with a programming language; and upper division work in at least one of Mathematics, Statistics and Biology.

### **Graduate Advisor**

Lihong Qi, Ph.D. (Public Health Sciences), Daniel Tancredi, Ph.D. (School of Medicine)

## **Biostatistics, Doctor of Philosophy**

### **Graduate Studies**

### **Graduate Study**

Biostatistics is a field of science that uses quantitative methods to study life sciences related problems that arise in a broad array of fields. The program provides students with, first, solid training in the biostatistical core disciplines and theory; second, with state-of-the art knowledge and skills for biostatistical data analysis; third, substantial exposure to the biological and epidemiological sciences; and fourth, with a strong background in theoretical modeling, statistical techniques and quantitative as well as computational methods. Programs of study and research are offered leading to M.S. and Ph.D. degrees. The program prepares students for interdisciplinary careers ranging from bioinformatics, environmental toxicology and stochastic modeling in biology and medicine to clinical trials, drug development, epidemiological and medical statistics. The program draws on the strengths of the Biostatistics faculty at UC Davis.

### **Preparation**

Students should have one year of calculus; a course in linear algebra or one year of biological course work; facility with a programming language; and upper division work in at least one of Mathematics, Statistics and Biology.

### **Graduate Advisor**

Christiana Drake (Statistics)

## **Chemical Engineering**

### **College of Engineering**

Tonya Kuhl, Ph.D., Chairperson of the Department 530-752-6802

### **Department Office**

3001 Ghausi Hall; Fax 530-752-1031; Chemical Engineering (<https://che.engineering.ucdavis.edu/>); Faculty (<https://che.engineering.ucdavis.edu/people/faculty/>)

The Department of Chemical Engineering offers two undergraduate programs: Chemical Engineering (p. 126) and Biochemical Engineering (p. 124).

### **Mission Statement**

To advance through teaching and research programs, the frontiers of chemical engineering and biochemical engineering; to educate students with a sense of professionalism and community; and to serve the public of California through outreach efforts.

Our faculty forms the cornerstone of this education and research mission, preparing students for careers in fields that have tremendous impact on key areas of modern life: energy, biotechnology and nanotechnology.

- Biochemical Engineering, Bachelor of Science (p. 124)
- Chemical Engineering, Bachelor of Science (p. 126)

- Chemical Engineering, Master of Engineering (p. 127)
- Chemical Engineering, Master of Science (p. 128)
- Chemical Engineering, Doctor of Philosophy (p. 128)

## Biochemical Engineering, Bachelor of Science

### College of Engineering

The Department of Chemical Engineering offers two undergraduate programs: Chemical Engineering (p. 126) and Biochemical Engineering (p. 124).

## Biochemical Engineering Undergraduate Program

The Biochemical Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

As the biotechnology industry expands and matures, there is an increasing need for engineers who can move products from the research stage to large-scale manufacturing. As they fill this need, engineers must also understand the production, purification, and regulatory issues surrounding biopharmaceutical manufacturing.

Biochemical engineers—with their strong foundations in chemistry, biological sciences, and chemical process engineering—are in a unique position to tackle these problems. Biochemical engineers apply the principles of cell and molecular biology, biochemistry, and engineering to develop, design, scale up, optimize, and operate processes that use living cells, organisms, or biological molecules for the production and purification of products (such as monoclonal antibodies, vaccines, therapeutic proteins, antibiotics, and industrial enzymes); for health and/or environmental monitoring (such as diagnostic kits, microarrays, biosensors); or for environmental improvement (such as bioremediation). An understanding of biological processes is also becoming increasingly important in the industries that traditionally employ chemical engineers, including the industries that process materials, chemicals, foods, energy, fuels, and semiconductors.

### Objectives

We educate students in the fundamentals of chemical and biochemical engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; prepare students with a sense of community, ethical responsibility, and professionalism; prepare students for careers in industry, government, and academia; teach students the necessity for continuing education and self-learning; and foster proficiency in written and oral communications.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Exclusive of General Education units, the minimum number of units required for the Biochemical Engineering major is 161.

### Honors Program

An Honors Program is available to qualified students in the Chemical Engineering & Biochemical Engineering majors. It is a two-year program designed to challenge the most talented students in these majors.

Students are invited to participate in their sophomore year. In the upper division coursework, students will complete either an honors thesis or a project that might involve local industry. Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

Code	Title	Units
<b>Lower Division Required Courses</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3-4
or MAT 027A	Linear Algebra with Applications to Biology	
or BIS 027A	Linear Algebra with Applications to Biology	
MAT 022B	Differential Equations	3-4
or MAT 027B	Differential Equations with Applications to Biology	
or BIS 027B	Differential Equations with Applications to Biology	
<i>Physics</i>		
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
<i>Chemistry</i>		
Choose one:		5
CHE 002A	General Chemistry	
CHE 002AH	Honors General Chemistry	
CHE 004A	General Chemistry for the Physical Sciences & Engineering	
Choose one:		5
CHE 002B	General Chemistry	
CHE 002BH	Honors General Chemistry	
CHE 004B	General Chemistry for the Physical Sciences & Engineering	
Choose one:		5
CHE 002C	General Chemistry	
CHE 002CH	Honors General Chemistry	
CHE 004C	General Chemistry for the Physical Sciences & Engineering	
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
<i>Chemical Engineering &amp; Programming</i>		
ECH 005	Introduction to Analysis & Design in Chemical Engineering	3
ECH 051	Material Balances	4
ECH 060	Numerical Methods in Engineering	4
or ECS 032A	Introduction to Programming	
ECH 080	Chemical Engineering Profession	1
<i>Engineering</i>		
Choose one:		4
ENG 017	Circuits I	
or ENG 017V	Circuits I	
ENG 035	Statics	

ENG 045	Properties of Materials		1. Choose at least one laboratory course from the Laboratory Elective list.
ENG 045Y	Properties of Materials		2. Complete at least 3 units in any upper division engineering course(s) not numbered 190C and/or 198.
Lower Division Composition/Writing; choose one; a grade of C- or better is required:		4	3. Remainder of units, for a total of 8 units, may be completed in any upper division engineering and/or science course(s) <sup>1</sup> excluding courses numbered 190 and 198. <sup>2</sup>
COM 001	Major Works of the Ancient World		4. You may receive biochemical engineering elective credit up to a maximum of 4 units of an internship (192) and/or independent study (199). Research does not replace the required lab elective.
COM 002	Major Works of the Medieval & Early Modern World		a. Credit for independent studies (199s) or internships (192s) completed outside of the department must be approved by the department's Undergraduate Affairs Committee. Additionally, students applying for these credits must submit an essay of at least 4 pages and no more than 10 pages detailing the engineering and/or science aspects of their work, results or outcomes (figures and graphs may be included), and how the experience relates to their educational program and objectives. The report must be submitted in pdf format and use 1.5 line spacing, 1" margins, and 12pt Times New Roman font. No intellectual property should be contained in the report. Applications must also include a written evaluation of the students' performance by the student's supervisor or faculty advisor.
COM 003	Major Works of the Modern World		5. Courses used to satisfy other major requirements cannot be used to satisfy the technical elective requirements.
COM 004	Major Works of the Contemporary World		
ENL 003	Introduction to Literature		
NAS 005	Introduction to Native American Literature		
UWP 001	Introduction to Academic Literacies (Recommended)		
UWP 001V	Introduction to Academic Literacies: Online (Recommended)		
UWP 001Y	Introduction to Academic Literacies (Recommended)		
Lower Division Required Courses Subtotal		77-79	
<b>Upper Division Required Courses</b>			
<i>Engineering Chemical</i>			
ECH 140	Mathematical Methods in Biochemical & Chemical Engineering	4	
ECH 141	Fluid Mechanics for Biochemical & Chemical Engineers	4	
ECH 142	Heat Transfer for Biochemical & Chemical Engineers	4	
ECH 143	Mass Transfer for Biochemical & Chemical Engineers	4	
ECH 145A	Chemical Engineering Thermodynamics Laboratory	3	
ECH 145B	Chemical Engineering Transport Lab	3	
ECH 148A	Chemical Kinetics & Reaction Engineering	3	
ECH 152A	Chemical Engineering Thermodynamics	3	
ECH 152B	Chemical Engineering Thermodynamics	4	
ECH 157	Process Dynamics & Control	4	
ECH 158BN	(Pending Approval)	4	
ECH 158C	Plant Design Project	4	
ECH 161AN	(Pending Approval)	4	
ECH 161BN	(Pending Approval)	4	
ECH 161C	Biotechnology Facility Design & Regulatory Compliance	4	
ECH 161L	Bioprocess Engineering Laboratory	4	
<i>Biological Science</i>			
BIS 102	Structure & Function of Biomolecules	3	Choose one: 0-4
<i>Microbiology</i>			
MIC 102	Introductory Microbiology	3	UWP 102E Writing in the Disciplines: Engineering
MIC 103L	Introductory Microbiology Laboratory	2	UWP 102F Writing in the Disciplines: Food Science & Technology
<i>Chemistry</i>			
CHE 128A	Organic Chemistry	3	UWP 104A Writing in the Professions: Business Writing
CHE 128B	Organic Chemistry	3	or UWP 104AY Writing in the Professions: Business Writing
CHE 129A	Organic Chemistry Laboratory	2	UWP 104E Writing in the Professions: Science
<i>Biochemical Engineering Technical Electives</i>			
Choose eight units from the following:		8	UWP 104T Writing in the Professions: Technical Writing
			Passing the Upper Division Composition Exam.

Upper Division Required Courses Subtotal	84-88
<b>Total Units</b>	<b>161-167</b>

<sup>1</sup> Acceptable science courses must carry one of the following subject designations: BIS, BIT, FST, MIC, MCB, NPB, PLB, PLS, STA, and VEN.

<sup>2</sup> With the exception for ECH 198.

## Chemical Engineering, Bachelor of Science

### College of Engineering

The Department of Chemical Engineering offers two undergraduate programs: Chemical Engineering (p. 126) and Biochemical Engineering (p. 124).

## Chemical Engineering Undergraduate Program

The Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Chemical engineers apply the principles of chemistry and engineering to produce useful commodities, ranging from fuels to polymers. Chemical engineers are increasingly concerned with chemical and engineering processes related to the environment and food production. They work in diverse areas ranging from integrated circuits to integrated waste management. Preparation for a career in chemical engineering requires an understanding of both engineering and chemical principles to develop proficiency in conceiving, designing, and operating new processes.

The chemical engineering curriculum has been planned to provide a sound knowledge of engineering and chemical sciences so that you may achieve competence in addressing current and future technical problems.

### Objectives

The objectives of the program in Chemical Engineering are to educate students in the fundamentals of chemical engineering, balanced with the application of these principles to practical problems; to train them as independent, critical thinkers who can also function effectively in teams; to foster a sense of community, ethical responsibility, and professionalism; to prepare them for careers in industry, government, and academia; to illustrate the necessity for continuing education and self-learning; and to help students to learn to communicate proficiently in written and oral form.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Exclusive of General Education units, the minimum number of units required for the Chemical Engineering major is 156.

### Options for Junior & Senior Year

The focus in the junior year is on fundamentals such as thermodynamics, fluid mechanics, energy transfer, and mass transfer phenomena. In the senior year, students draw these fundamentals together and apply them in a study of kinetics, process design, and process dynamics and control. The program's requirement of eight chemical engineering elective units

allow students to strengthen specific areas in chemical engineering, explore new areas, or pursue new areas of specialization.

## Honors Program

An Honors Program is available to qualified students in the Chemical Engineering & Biochemical Engineering majors. It is a two-year program designed to challenge the most talented students in these majors. Students are invited to participate in their sophomore year. In the upper division coursework, students will complete either an honors thesis or a project that might involve local industry. Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

Code	Title	Units
<b>Lower Division Required Courses</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A or MAT 027A	Linear Algebra Linear Algebra with Applications to Biology	3-4
MAT 022B or MAT 027B	Differential Equations Differential Equations with Applications to Biology	3-4
<i>Physics</i>		
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
<i>Chemistry</i>		
Choose One:		5
CHE 002A	General Chemistry	
CHE 002AH	Honors General Chemistry	
CHE 004A	General Chemistry for the Physical Sciences & Engineering	
Choose One:		5
CHE 002B	General Chemistry	
CHE 002BH	Honors General Chemistry	
CHE 004B	General Chemistry for the Physical Sciences & Engineering	
Choose One:		5
CHE 002C	General Chemistry	
CHE 002CH	Honors General Chemistry	
CHE 004C	General Chemistry for the Physical Sciences & Engineering	
<i>Chemical Engineering &amp; Programming</i>		
ECH 005	Introduction to Analysis & Design in Chemical Engineering	3
ECH 051	Material Balances	4
ECH 060 or ECS 032A	Numerical Methods in Engineering Introduction to Programming	4
ECH 080	Chemical Engineering Profession	1
<i>Engineering</i>		
Choose one:		4
ENG 017 or ENG 017V	Circuits I Circuits I	

ENG 035	Statics	
ENG 045	Properties of Materials	
ENG 045Y	Properties of Materials	
Lower Division Composition/Writing; choose one: a grade of C- or better is required:		4
COM 001	Major Works of the Ancient World	
COM 002	Major Works of the Medieval & Early Modern World	
COM 003	Major Works of the Modern World	
COM 004	Major Works of the Contemporary World	
ENL 003	Introduction to Literature	
NAS 005	Introduction to Native American Literature	
UWP 001	Introduction to Academic Literacies (Recommended)	
UWP 001V	Introduction to Academic Literacies: Online (Recommended)	
UWP 001Y	Introduction to Academic Literacies (Recommended)	
Lower Division Required Courses Subtotal		72-74
<b>Upper Division Required Courses</b>		
<i>Chemical Engineering</i>		
ECH 140	Mathematical Methods in Biochemical & Chemical Engineering	4
ECH 141	Fluid Mechanics for Biochemical & Chemical Engineers	4
ECH 142	Heat Transfer for Biochemical & Chemical Engineers	4
ECH 143	Mass Transfer for Biochemical & Chemical Engineers	4
ECH 145A	Chemical Engineering Thermodynamics Laboratory	3
ECH 145B	Chemical Engineering Transport Lab	3
ECH 148A	Chemical Kinetics & Reaction Engineering	3
ECH 148B	Chemical Kinetics & Reaction Engineering	4
ECH 152A	Chemical Engineering Thermodynamics	3
ECH 152B	Chemical Engineering Thermodynamics	4
ECH 155	Chemical Engineering Kinetics & Reactor Design Laboratory	4
ECH 157	Process Dynamics & Control	4
ECH 158AN	(Pending Approval)	4
ECN 158BN	(Pending Approval)	4
ECH 158C	Plant Design Project	4
<i>Chemistry</i>		
CHE 128A	Organic Chemistry	3
CHE 128B	Organic Chemistry	3
CHE 129A	Organic Chemistry Laboratory	2
<i>Chemical Engineering Technical Electives</i>		
Choose 20 units:		20
1. At least 3 units must be completed in any upper division engineering course(s) not numbered 190C, 192, 198, and 199 (independent study, research, seminar, or internship courses).		
2. Remaining 17 units, for a total minimum of 20 units are subject to the following:		
a. Units must be completed in science, engineering or business courses carrying one of the following subject		

designations: ARE, ATM, BIM, BIS, BIT, CHE, EAE, EBS, ECH, ECN, ECI, ECS, EEC, EME, EMS, ENG, FPS, MAT, MCB, MGT, PHY, STA and VEN.

b. A minimum of 9 units must be completed in upper division (100-199) courses.

c. You may receive chemical engineering elective credit up to a maximum of 4 units of ECH 192, ECH 198, and ECH 199 combined (192's/198's/199's from outside the department require a petition, see below item d).

d. Credit for independent studies (199s) or internships (192s) completed outside of the department must be approved by the department's Undergraduate Affairs Committee. Additionally, students applying for these credits must submit an essay of at least 4 pages and no more than 10 pages detailing the engineering and/or science aspects of their work, results or outcomes (figures and graphs may be included), and how the experience relates to their educational program and objectives. The report must be submitted in pdf format and use 1.5 line spacing, 1" margins, and 12pt Times New Roman font. No intellectual property should be contained in the report. Applications must also include a written evaluation of the students' performance by the student's supervisor or faculty advisor.

e. Courses numbered 92, 98, and 99 may not be used to satisfy this requirement.

3. Courses used to satisfy other major requirements cannot be used to satisfy the technical elective requirements.

*Upper Division Composition Requirement; a grade of C- or better is required:*

Choose one: 0-4

UWP 102E Writing in the Disciplines: Engineering

UWP 102F Writing in the Disciplines: Food Science & Technology

UWP 104A Writing in the Professions: Business Writing

or UWP 104AY Writing in the Professions: Business Writing

UWP 104E Writing in the Professions: Science

UWP 104T Writing in the Professions: Technical Writing

Passing the Upper Division Composition Exam.

Upper Division Required Courses Subtotal

84-88

**Total Units**

**156-162**

## Chemical Engineering, Master of Engineering

**College of Engineering**

## Graduate Program in the Department of Chemical Engineering

The Department of Chemical Engineering is home to a top ranked graduate program in Chemical Engineering. We offer a unique environment for graduate studies- we are large enough to boast world-renowned faculty and state-of-the-art-research facilities, yet small enough to give every graduate student personal attention.

## The Graduate Program in Chemical Engineering

M. Engr, M.S. and Ph.D.

Chemical Engineering Graduate Program (<https://che.engineering.ucdavis.edu/graduate/>); 530-752-7952

Ph.D. designated emphases are available as specializations in biotechnology, biophysics, and nuclear science.

The Chemical Engineering Graduate Program provides students with a strong grounding in the fundamentals and explores critical applications in a wide range of process systems.

Doctoral students are typically offered competitive four-year financial offers of fellowships and research/teaching assistantships which include tuition, fees, and a stipend. Financial offers are subject to satisfactory progress towards completion of degree requirements.

Major research areas include Energy, Environment, Synthetic Biology and Biotechnology.

## Chemical Engineering, Master of Science

College of Engineering

## Graduate Program in the Department of Chemical Engineering

The Department of Chemical Engineering is home to a top ranked graduate program in Chemical Engineering. We offer a unique environment for graduate studies- we are large enough to boast world-renowned faculty and state-of-the-art research facilities, yet small enough to give every graduate student personal attention.

## The Graduate Program in Chemical Engineering

M. Engr, M.S. and Ph.D.

Ph.D. designated emphases are available as specializations in biotechnology, biophysics, and nuclear science. Chemical Engineering (<http://che.engineering.ucdavis.edu>); 530-752-7952

The Chemical Engineering Graduate Program provides students with a strong grounding in the fundamentals and explores critical applications in a wide range of process systems.

Doctoral students are typically offered competitive four-year financial offers of fellowships and research/teaching assistantships which include tuition, fees, and a stipend. Financial offers are subject to satisfactory progress towards completion of degree requirements.

Major research areas include Energy, Environment, Synthetic Biology and Biotechnology

## Chemical Engineering, Doctor of Philosophy

College of Engineering

## Graduate Program in the Department of Chemical Engineering

The Department of Chemical Engineering is home to a top ranked graduate program in Chemical Engineering. We offer a unique environment for graduate studies- we are large enough to boast world-renowned faculty and state-of-the-art research facilities, yet small enough to give every graduate student personal attention.

## The Graduate Program in Chemical Engineering

M. Engr, M.S. and Ph.D.

Chemical Engineering Graduate Program (<https://che.engineering.ucdavis.edu/graduate/>); 530-752-7952

Ph.D. designated emphases are available as specializations in biotechnology, biophysics, and nuclear science.

The Chemical Engineering Graduate Program provides students with a strong grounding in the fundamentals and explores critical applications in a wide range of process systems.

Doctoral students are typically offered competitive four-year financial offers of fellowships and research/teaching assistantships which include tuition, fees, and a stipend. Financial offers are subject to satisfactory progress towards completion of degree requirements.

Major research areas include Energy, Environment, Synthetic Biology and Biotechnology.

## Chemistry

College of Letters & Science

David Goodin, Ph.D., Chairperson of the Department; term ends June 30, 2025

## Department Administration

For a complete list of department administration, see People (<https://chemistry.ucdavis.edu/people>).

## Department Office

108 Chemistry Building; 530-752-8900; Fax 530-752-8995; Chemistry (<https://chemistry.ucdavis.edu>); Faculty (<https://chemistry.ucdavis.edu/people>)

- Applied Chemistry, Bachelor of Science (p. 129)
- Chemical Physics, Bachelor of Science (p. 133)
- Chemistry & Chemical Biology, Doctor of Philosophy (p. 133)
- Chemistry & Chemical Biology, Master of Science (p. 133)
- Chemistry, Bachelor of Arts (p. 131)
- Chemistry, Bachelor of Science (p. 132)
- Chemistry, Minor (p. 133)
- Pharmaceutical Chemistry, Bachelor of Science (p. 134)
- Pharmaceutical Chemistry, Master of Science (p. 136)

# Applied Chemistry, Bachelor of Science

College of Letters & Science

## The Major Programs

Chemistry studies the composition of matter, its structure, and the means by which it is converted from one form to another.

### The Program

The Department of Chemistry offers two Bachelor of Science degree emphases under the heading of Applied Chemistry: Environmental Chemistry and Forensic Chemistry. The B.S. emphasis in Applied Chemistry fall outside of the classical chemistry degree and instead draw on significant course material from areas relevant to their particular fields. The Environmental Chemistry program provides students with tools to understand the processes governing chemical transformations in soil, air, and water, analyze for key substances in the environment, and make meaningful predictions about the fates of these chemicals. The Forensic Chemistry program involves the identification and quantitation of scientific evidence both in the natural environment and in urban settings, including substances sometimes available in only trace amounts.

### Career Alternatives

Environmental chemistry graduates with the bachelor's degree will be able to pursue advanced degrees in areas such as atmospheric chemistry, geochemistry, toxicology, and environmental science. They will also have access to a range of scientific careers including regulatory agencies, environmental consulting firms, and industries concerned with the environmental impacts and fates of their products. Forensic chemistry graduates will be able to pursue careers in private forensic labs as well as law enforcement and regulatory agencies at many levels, including police and sheriff's departments, district attorney crime labs, and laboratories of federal agencies including the FBI, DEA, FDA, and many others.

### Major Advisor

To contact a major advisor in the Department of Chemistry, see Academic Advising (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>).

### Honors & Honors Program

The student must take CHE 194HA, CHE 194HB, & CHE 194HC, and complete a capstone research project (typically a written honors thesis). For more information, see Undergraduate Research (<https://chemistry.ucdavis.edu/undergraduate/undergraduate-research/>) on the department's website.

### Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Environmental Chemistry Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Chemistry</i>		
Choose a series:		15
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<i>Physics</i>		
Choose a series:		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
<i>Mathematics</i>		
Choose a series:		9-12
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
<i>Statistics</i>		
Choose one:		4
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
<b>Preparatory Subject Matter Subtotal</b>		45-51
<b>Depth Subject Matter</b>		
<i>Chemistry</i>		
CHE 100	Environmental Water Chemistry	32-39
CHE 105	Analytical & Physical Chemical Methods	
CHE 115	Instrumental Analysis	
CHE 124A	Inorganic Chemistry: Fundamentals	
Choose a series:		
CHE 107A & CHE 107B	Physical Chemistry for the Life Sciences and Physical Chemistry for the Life Sciences	

CHE 110A & CHE 110B & CHE 110C	Physical Chemistry: Introduction to Quantum Mechanics and Physical Chemistry: Properties of Atoms & Molecules and Physical Chemistry: Thermodynamics, Equilibria & Kinetics
Choose 118 series or 128 series, & CHE 129A & CHE 129B:	
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences
<b>OR</b>	
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry and Organic Chemistry and Organic Chemistry
<b>AND</b>	
CHE 129A & CHE 129B	Organic Chemistry Laboratory and Organic Chemistry Laboratory
<i>Environmental Science &amp; Policy</i>	4
ESP 110	Principles of Environmental Science
<i>Environmental Toxicology</i>	4
ETX 101	Principles of Environmental Toxicology
Choose at least three:	7-15
ATM 160	Introduction to Atmospheric Chemistry
ESM 120	Global Environmental Interactions
ESP 151	Limnology
Choose one:	
ETX 102A	Environmental Fate of Toxicants
ETX 102B	Quantitative Analysis of Environmental Toxicants
ETX 120	Perspectives in Aquatic Toxicology
ETX 131	Environmental Toxicology of Air Pollutants
ETX 135	Health Risk Assessment of Toxicants
ETX 146	Exposure & Dose Assessment
Choose one:	
FPS 161	Structure & Properties of Fibers
FPS 161L	Textile Chemical Analysis Laboratory
Choose one:	
GEL 146	Radiogenic Isotope Geochemistry & Cosmochemistry
GEL 148	Stable Isotopes & Geochemical Tracers
GEL/ESP 150A	Physical & Chemical Oceanography
HYD 134	Aqueous Geochemistry
Choose one:	
SSC 102	Environmental Soil Chemistry
SSC 111	Soil Microbiology
At least three additional upper division units in Chemistry (CHE) <sup>1</sup>	3
Depth Subject Matter Subtotal	50-65
<b>Total Units</b>	<b>95-116</b>

## Forensic Chemistry Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Chemistry</i>		
Choose a series:		15
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<i>Physics</i>		
Choose a series:		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
<i>Mathematics</i>		
Choose a series:		9-12
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
<i>Biological Science</i>		5
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
<i>Environmental Toxicology</i>		
ETX 020	Introduction to Forensic Science	3
<i>Statistics</i>		
Choose one:		4
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
<b>Preparatory Subject Matter Subtotal</b>		<b>48-54</b>
<b>Depth Subject Matter</b>		
<i>Chemistry</i>		
CHE 104	Forensic Applications of Analytical Chemistry	29-36
CHE 105	Analytical & Physical Chemical Methods	
CHE 115	Instrumental Analysis	
Choose a series:		
CHE 107A & CHE 107B	Physical Chemistry for the Life Sciences and Physical Chemistry for the Life Sciences	

<sup>1</sup> CHE 199 strongly encouraged.

CHE 110A & CHE 110B & CHE 110C	Physical Chemistry: Introduction to Quantum Mechanics and Physical Chemistry: Properties of Atoms & Molecules and Physical Chemistry: Thermodynamics, Equilibria & Kinetics
Choose 118 series or 128 series, & CHE 129A & CHE 129B:	
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences
<b>OR</b>	
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry and Organic Chemistry and Organic Chemistry
<b>AND</b>	
CHE 129A & CHE 129B	Organic Chemistry Laboratory and Organic Chemistry Laboratory
<i>Environmental Toxicology</i>	13
ETX 101	Principles of Environmental Toxicology
ETX 102A	Environmental Fate of Toxicants
ETX 102B	Quantitative Analysis of Environmental Toxicants
Choose at least two:	6-9
Choose one:	
ESP 110 or ESP 161	Principles of Environmental Science Environmental Law
Choose one:	
BIS 101	Genes & Gene Expression
ETX 103A	Biological Effects of Toxicants
ETX 103B	Biological Effects of Toxicants: Experimental Approaches
ETX 111	Introduction to Mass Spectrometry
ETX 135	Health Risk Assessment of Toxicants
ETX 138	Legal Aspects of Environmental Toxicology
STA 108	Applied Statistical Methods: Regression Analysis
STA 130A	Mathematical Statistics: Brief Course
At least three additional upper division units in Chemistry (CHE) <sup>1</sup>	3
Depth Subject Matter Subtotal	51-61
<b>Total Units</b>	<b>99-115</b>

<sup>1</sup> CHE 199 strongly encouraged.

## Chemistry, Bachelor of Arts

College of Letters & Science

### The Major Programs

Chemistry studies the composition of matter, its structure, and the means by which it is converted from one form to another.

### The Program

We offer several degree programs leading to the Bachelor of Arts (A.B.) and the Bachelor of Science (B.S.). To meet and discuss these programs with our staff advisors, see Academic Advising (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>).

The curriculum leading to the A.B. degree offers a substantive program in chemistry while allowing students the freedom to take more courses in other disciplines and pursue a broad liberal arts education. Students with a deeper interest in chemistry should choose one of the several programs leading to the B.S. degree.

### Career Alternatives

Chemistry graduates with bachelor's degrees are employed extensively throughout various industries in quality control, research & development, production supervision, technical marketing, and other areas. The types of industries employing these graduates include chemical, energy, pharmaceutical, genetic engineering, biotechnology, food & beverage, petroleum & petrochemical, paper & textile, electronics & computer, and environmental & regulatory agencies. The bachelor's programs also provide chemistry graduates with the rigorous preparation needed for an advanced degree in chemistry and various professional schools in the health sciences.

### Major Advisor

To contact a major advisor in the Department of Chemistry, see Academic Advising (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>).

### Honors & Honors Program

The student must take courses CHE 194HA, CHE 194HB, and CHE 194HC, and complete a capstone research project (typically a written honors thesis). For more information, see Undergraduate Research (<https://chemistry.ucdavis.edu/undergraduate/undergraduate-research/>).

### Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Chemistry</i>		
Choose a series:		15
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<i>Physics</i>		
Choose a series:		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	

PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
<b>Mathematics</b>		
Choose a series:		9-12
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
Preparatory Subject Matter Subtotal		36-42
<b>Depth Subject Matter</b>		
<i>Chemistry</i>		
CHE 105	Analytical & Physical Chemical Methods	4
CHE 110A	Physical Chemistry: Introduction to Quantum Mechanics	4
CHE 110B	Physical Chemistry: Properties of Atoms & Molecules	4
CHE 110C	Physical Chemistry: Thermodynamics, Equilibria & Kinetics	4
CHE 124A	Inorganic Chemistry: Fundamentals	3
CHE 128A	Organic Chemistry	3
CHE 128B	Organic Chemistry	3
CHE 128C	Organic Chemistry	3
CHE 129A	Organic Chemistry Laboratory	2
CHE 129B	Organic Chemistry Laboratory	2
<i>Additional Upper Division Units</i>		
At least 11 additional upper division units in Chemistry (CHE) or related areas, including one course with formal lectures; courses in related areas must be approved in advance by the major advisor. <sup>1</sup>		11
Depth Subject Matter Subtotal		43
<b>Total Units</b>	<b>79-85</b>	

<sup>1</sup> Except CHE 107A or CHE 107B

this program pursue a strong foundation in math and physics, in addition to chemistry, taking the higher-level sequences of all course options. This degree provides a strong foundation in experimental processes, instrumentation, and quantitative analysis. Students will be well-prepared to apply their chemistry knowledge to a wide array of applications, including environmental, pharmaceutical, materials, and industrial chemistry.

## Career Alternatives

Graduates will be able to successfully pursue their career objectives in advanced education in professional and/or graduate schools, a scientific career in government or industry, a teaching career in the school systems or other related career tracks.

## Major Advisor

To contact a major advisor in the Department of Chemistry, see Academic Advising (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>).

## Honors & Honors Program

The student must take courses CHE 194HA, CHE 194HB, and CHE 194HC, and complete a capstone research project (typically a written honors thesis). For more information, see Undergraduate Research (<https://chemistry.ucdavis.edu/undergraduate/undergraduate-research/>).

## Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Chemistry—American Chemical Society Accredited Program

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Chemistry</i>		
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	15
<i>Physics</i>		
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	15
PHY 009D	Modern Physics (may be taken, but not required.)	
<i>Mathematics</i>		
MAT 021A & MAT 021B & MAT 021C & MAT 021D	Calculus and Calculus and Calculus and Vector Analysis	16
Choose One:		4
MAT 022A & 022AL	Linear Algebra and Linear Algebra Computer Laboratory	
MAT/BIS 027A	Linear Algebra with Applications to Biology	

# Chemistry, Bachelor of Science

College of Letters & Science

## The Major Programs

Chemistry studies the composition of matter, its structure, and the means by which it is converted from one form to another.

### The Program

We offer several degree programs leading to the Bachelor of Arts (A.B.) and the Bachelor of Science (B.S.). To meet and discuss these programs with our staff advisors, see Academic Advising (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>).

The general B.S. degree in Chemistry is the one chemistry program offered by our department that is certified by the American Chemical Society (<http://www.acs.org/content/acs/en.html>) (ACS). Students in

Choose One:		3-4
MAT 022B	Differential Equations	
MAT/BIS 027B	Differential Equations with Applications to Biology	
Preparatory Subject Matter Subtotal		53-54
<b>Depth Subject Matter</b>		
<i>Chemistry</i>		
CHE 105	Analytical & Physical Chemical Methods	4
CHE 108	Molecular Biochemistry	3
CHE 110A	Physical Chemistry: Introduction to Quantum Mechanics	4
CHE 110B	Physical Chemistry: Properties of Atoms & Molecules	4
CHE 110C	Physical Chemistry: Thermodynamics, Equilibria & Kinetics	4
CHE 115	Instrumental Analysis	4
CHE 124A	Inorganic Chemistry: Fundamentals	3
CHE 124B or CHE 124C	Inorganic Chemistry: Main Group Elements Inorganic Chemistry: D & F Block Elements	3
CHE 124L	Laboratory Methods in Inorganic Chemistry	2
CHE 125	Advanced Methods in Physical Chemistry	4
CHE 128A	Organic Chemistry	3
CHE 128B	Organic Chemistry	3
CHE 128C	Organic Chemistry	3
CHE 129A	Organic Chemistry Laboratory	2
CHE 129B	Organic Chemistry Laboratory	2
CHE 129C	Organic Chemistry Laboratory	2
At least 4 additional upper division units in Chemistry (CHE) <sup>1</sup>		4
Depth Subject Matter Subtotal		54
<b>Recommended</b>		
CHE 194HA	Undergraduate Honors Research	
CHE 194HB	Undergraduate Honors Research	
CHE 194HC	Undergraduate Honors Research	
CHE 199	Special Study for Advanced Undergraduates	
<b>Total Units</b>		107-108

or their equivalents. Students wishing to earn a Chemistry minor should consult with a Chemistry major advisor.

Code	Title	Units
<b>Chemistry</b>		
CHE 105	Analytical & Physical Chemical Methods	4
CHE 107A	Physical Chemistry for the Life Sciences	3
CHE 107B	Physical Chemistry for the Life Sciences	3
CHE 118A	Organic Chemistry for Health & Life Sciences	4
CHE 124A	Inorganic Chemistry: Fundamentals	3
Choose at least one:		3-4
CHE 118B	Organic Chemistry for Health & Life Sciences	
CHE 124B	Inorganic Chemistry: Main Group Elements	
CHE 124C	Inorganic Chemistry: D & F Block Elements	
<b>Total Units</b>		20-21

## Chemistry & Chemical Biology, Master of Science

College of Letters & Science

### Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

The Master of Sciences degree is offered only in route to the Ph.D.

## Chemistry & Chemical Biology, Doctor of Philosophy

College of Letters & Science

### Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

The Master of Sciences degree is offered only in route to the Ph.D.

## Chemical Physics, Bachelor of Science

College of Letters & Science

### The Major Programs

Chemistry studies the composition of matter, its structure, and the means by which it is converted from one form to another.

## Chemistry, Minor

College of Letters & Science

### Major Advisor

To contact a major advisor in the Department of Chemistry; see Academic Advising. (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>)

### Prerequisites

The minor program has prerequisites of CHE 002A-CHE 002B-CHE 002C or CHE 004A-CHE 004B-CHE 004C, MAT 016A-MAT 016B-MAT 016C or MAT 017A-MAT 017B-MAT 017C or MAT 021A-MAT 021B-MAT 021C, and PHY 007A-PHY 007B-PHY 007C or PHY 009A-PHY 009B-PHY 009C

## The Program

We offer several degree programs leading to the Bachelor of Arts (A.B.) and the Bachelor of Science (B.S.). To meet and discuss these programs with our staff advisors, see Academic Advising.

The B.S. degree in Chemical Physics provides students with an in-depth understanding of the fundamentals of chemistry, focusing on areas at the interface of chemistry and physics. These include, for example, the experimental measurement and theoretical calculation of the detailed properties and behavior of atoms and molecules. An important experimental tool in chemical physics is spectroscopy, which uses conventional or laser light to probe the atomic and molecular properties of matter.

## Career Alternatives

Graduates in Chemical Physics will be prepared for employment in technology, energy, laser science, material science, solid-state chemistry and other fields requiring a strong background in both chemistry and physics. They will also be well-suited for graduate study in a range of areas including chemistry, chemical physics, computational chemistry, material science, nanomaterials and laser science.

## Major Advisor

To contact a major advisor in the Department of Chemistry, see Academic Advising.

## Honors & Honors Program

The student must take courses CHE 194HA, CHE 194HB, and CHE 194HC, and complete a capstone research project (typically a written honors thesis). For more information, see Undergraduate Research (<https://chemistry.ucdavis.edu/undergraduate/undergraduate-research/>).

## Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Chemistry</i>		
CHE 004A	General Chemistry for the Physical Sciences & Engineering	5
CHE 004B	General Chemistry for the Physical Sciences & Engineering	5
CHE 004C	General Chemistry for the Physical Sciences & Engineering	5
<i>Physics</i>		
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
PHY 009D	Modern Physics	4
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4

Choose One:		4
MAT 022A & 022AL	Linear Algebra and Linear Algebra Computer Laboratory	
MAT/BIS 027A	Linear Algebra with Applications to Biology	
Choose One:		3-4
MAT 022B	Differential Equations	
MAT/BIS 027B	Differential Equations with Applications to Biology	
Preparatory Subject Matter Subtotal		57-58
<b>Depth Subject Matter</b>		
<i>Chemistry</i>		
CHE 105	Analytical & Physical Chemical Methods	4
CHE 110A	Physical Chemistry: Introduction to Quantum Mechanics	4
CHE 110B	Physical Chemistry: Properties of Atoms & Molecules	4
CHE 110C	Physical Chemistry: Thermodynamics, Equilibria & Kinetics	4
CHE 115	Instrumental Analysis	4
CHE 124A	Inorganic Chemistry: Fundamentals	3
CHE 125	Advanced Methods in Physical Chemistry	4
CHE 128A	Organic Chemistry	3
CHE 128B	Organic Chemistry	3
CHE 129A	Organic Chemistry Laboratory	2
<i>Physics</i>		
PHY 104A	Introduction to Mathematical Methods in Physics	4
PHY 105A	Classical Mechanics	4
PHY 110A	Electricity & Magnetism	4
Choose at least one:		4
PHY 105B	Analytical Mechanics	
PHY 110B	Electricity & Magnetism	
PHY 112	Thermodynamics & Statistical Mechanics	
PHY 115A	Foundation of Quantum Mechanics	
PHY 140A	Introduction to Solid State Physics	
At least 2 additional upper division units in Chemistry (CHE) <sup>1</sup>		2
Depth Subject Matter Subtotal		53
<b>Total Units</b>		<b>110-111</b>

<sup>1</sup> Except CHE 107A, CHE 107B.

## Pharmaceutical Chemistry, Bachelor of Science

College of Letters & Science

## The Major Programs

Chemistry studies the composition of matter, its structure, and the means by which it is converted from one form to another.

## The Program

We offer several degree programs leading to the Bachelor of Arts (A.B.) and the Bachelor of Science (B.S.). To meet and discuss these

programs with our staff advisors, see Academic Advising (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>).

The B.S. in Pharmaceutical Chemistry is strongly focused on basic science while providing students with a greater understanding of the experimental and computational processes and societal issues that surround the synthesis, discovery and design of modern pharmaceuticals. Important relevant topics include potential drug targets, physical principles of drug action, drug synthesis & screening, computational drug design, drug delivery and ethical concerns. The demand for pharmaceutical chemists is high and anticipated to grow, as modern chemistry allows a wide range of choices for drug synthesis and our growing knowledge of biological processes presents challenging targets for novel therapeutics.

## Career Alternatives

Graduates in Pharmaceutical Chemistry will be able to successfully pursue their career objectives in advanced education in professional and/or graduate schools and in a range of scientific careers in academia, government or industry including the pharmaceutical, medicinal & biological sciences, medicine, pharmacy, pharmacology and biotechnology.

## Major Advisor

To contact a major advisor in the Department of Chemistry, see Academic Advising (<https://chemistry.ucdavis.edu/undergraduate/academic-advising/>).

## Honors & Honors Program

The student must take courses CHE 194HA, CHE 194HB, and CHE 194HC, and complete a capstone research project (typically a written honors thesis). For more information, see Undergraduate Research (<https://chemistry.ucdavis.edu/undergraduate/undergraduate-research/>) on the department's website.

## Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry; see also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Chemistry</i>		
Choose a series:		
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	15
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	12-15
<i>Physics</i>		
Choose a series:		
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	12-15

PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
<b>Mathematics</b>		
Choose a series:		9-12
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
or BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
<i>Statistics</i>		
Choose one:		4
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
Preparatory Subject Matter Subtotal		50-56
<b>Depth Subject Matter</b>		
<i>Chemistry</i>		
CHE 124A	Inorganic Chemistry: Fundamentals	3
CHE 130A	Principles of Medicinal Chemistry	3
CHE 130B	Computational Drug Design	3
CHE 135	Drug Development Laboratory	3
Choose a series:		6-12
CHE 107A & CHE 107B	Physical Chemistry for the Life Sciences and Physical Chemistry for the Life Sciences	
CHE 110A & CHE 110B & CHE 110C	Physical Chemistry: Introduction to Quantum Mechanics and Physical Chemistry: Properties of Atoms & Molecules and Physical Chemistry: Thermodynamics, Equilibria & Kinetics	
Choose 118 series or 128 & 129 series:		12-15
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<i>or</i>		
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry and Organic Chemistry and Organic Chemistry	

CHE 129A & CHE 129B & CHE 129C	Organic Chemistry Laboratory and Organic Chemistry Laboratory and Organic Chemistry Laboratory	
Choose two:		6
BIS 102	Structure & Function of Biomolecules	
CHE 131	Modern Methods of Organic Synthesis	
CHE 150	Chemistry of Natural Products	
Choose at least four; not used to satisfy the above requirements:		11-16
ANS 170	Ethics of Animal Use	
BIS 102	Structure & Function of Biomolecules	
BIS 103	Bioenergetics & Metabolism	
BIT 171	Professionalism & Ethics in Genomics & Biotechnology	
CHE 131	Modern Methods of Organic Synthesis	
CHE 150	Chemistry of Natural Products	
CHE 199	Special Study for Advanced Undergraduates (For a minimum 3 units.)	
or CHE 194HA	Undergraduate Honors Research	
ETX 103A	Biological Effects of Toxicants	
MCB 123	Behavior & Analysis of Enzyme & Receptor Systems	
MCB 124	Macromolecular Structure & Function	
MCB/PLB 126	Plant Biochemistry	
MIC 102	Introductory Microbiology	
NPB 100	Neurobiology	
NPB 101	Systemic Physiology	
NPB 168	Neurobiology of Addictive Drugs	
PLB/MCB 126	Plant Biochemistry	
VMB 101Y	Principles of Pharmacology & Toxicology (For a minimum 3 units.)	
or VMB 101V	Principles of Pharmacology & Toxicology	
Depth Subject Matter Subtotal		47-61
Total Units		97-117

## Pharmaceutical Chemistry, Master of Science

College of Letters & Science

### Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Chicana/Chicano Studies

College of Letters & Science

Sergio De La Mora, Ph.D., Interim Chairperson of the Department; term ends June 30, 2025

## Department Office

2102 Hart Hall; 530-752-2421; Fax 530-752-8814; Chicana/Chicano Studies (<http://chi.ucdavis.edu>); Faculty (<https://chi.ucdavis.edu/people/faculty/>)

- Chicana/Chicano Studies, Bachelor of Arts (p. 136)
- Chicana/Chicano Studies, Minor (p. 138)

## Chicana/Chicano Studies, Bachelor of Arts

College of Letters & Science

### The Major Program

The Department of Chicana/Chicano Studies offers an interdisciplinary curriculum focusing on the Chicana/Chicano/Chicanx experience through an analysis of class, race, ethnicity, gender and sexuality, and cultural expression. The department offers a major leading to the Bachelor of Arts degree and a minor that can satisfy breadth requirements for the College of Letters and Science. Both the major and minor frame an analysis within the historical and contemporary experiences of Chicanx in the Americas.

### The Program

At the lower division level, the major curriculum provides an interdisciplinary overview of various topics. Students are advised to take courses that serve as prerequisites for certain upper division courses. At the upper division level, majors pursue advanced interdisciplinary course work in both the humanities/arts and the social sciences. At this level, students will find courses in Chicana/Chicano history, theory, health and several courses taught from a variety of disciplinary perspectives.

### Career Alternatives

A degree in Chicana/o Studies provides broad intellectual foundations which are useful to the graduate for the development of careers in a variety of areas, including work in cross-cultural education, cultural/art centers, community development, public policy and social welfare. The interdisciplinary structure of the Bachelor of Arts degree in Chicana/o Studies also provides excellent preparation for graduate study in a variety of fields.

### Major Advisor

Alma Martinez, M.A.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
CHI 050	Chicana & Chicano Culture	4
CHI 010	Introduction to Chicana/o Studies	4
Choose two:		8
CHI 021	Chicana/o & Latina/o Health Care Issues	
CHI 023	Qualitative Research Methods	
CHI 030	United States Political Institutions & Chicanas/os	
CHI 040	Comparative Health: Top Leading Causes of Death	
CHI 060	Chicana & Chicano Representation in Cinema	
CHI 065	New Latin American Cinema	

CHI 070	Survey of Chicana/o Art	<i>Group C</i>
CHI 073	Chicana/o Art Expression Through Silk Screen	CHI 154      The Chicana/o Novel
Preparatory Subject Matter Subtotal	16	CHI 155      Chicana/o Theater
<b>Depth Subject Matter</b>		CHI 156      Chicana/o Poetry
32 upper division units; from Core Group A, B, and C, a minimum of 12 units must be taken in one area and 8 units taken in the other two areas; a minimum of 4 units must be completed in Core Group D.	32	CHI 157      Chicana & Chicano Narrative
Please note that while some courses are listed in multiple groups, a given course can only fulfill one group requirement.		CHI 160      Mexican Film & Greater Mexican Identity
<i>Group A</i>		CHI 161      Queer Latinidad
CHI 100	Chicana/o Theoretical Perspective	CHI 165      Chicanas, Latinas & Mexicanas in Commercial Media
CHI 102A	Chicana/o Feminist Theoretical Understandings of K-20 Educational Disparities	CHI 170      Contemporary Issues in Chicano Art
CHI 102B	Grassroots Community Activism & Mobilization Efforts Challenging Educational Inequity	CHI/ART 171      Mexican & Chicano Mural Workshop
CHI 102C	Policy & Law Challenging Segregation & Educational Inequity	CHI 172      Chicana/o Voice/Poster Silk Screen Workshop
CHI 110	Sociology of the Chicana/o Experience	<i>Group D</i>
CHI 111	Chicanas/Mexicanas in Contemporary Society	CHI 102A      Chicana/o Feminist Theoretical Understandings of K-20 Educational Disparities
CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities	CHI 102B      Grassroots Community Activism & Mobilization Efforts Challenging Educational Inequity
CHI 113	Latin American Women's Engagement in Social Movements	CHI 102C      Policy & Law Challenging Segregation & Educational Inequity
CHI 130	United States-Mexican Border Relations	CHI 125S      Latino Families in the Age of Globalization: Migration & Transculturation
CHI 131	Chicanas in Politics & Public Policy	CHI 135S      Transnational Latina/o Political Economy
CHI 132	Political Economy of Chicana/o Communities	CHI 140A      Quantitative Methods: Chicano/Latino Health Research
CHI 148	Decolonizing Spirit	CHI 141      Community-Based Participatory Research & Chicana/o & Latina/o Health
CHI 150	The Chicana & Chicano Movement	CHI 145S      Bi-National Health
CHI 181	Chicanas & Latinas in the U.S.: Historical Perspectives	CHI 146S      Public Health in Latin America
CHI 184	Latino Youth Gangs in Global Perspective	CHI 147S      Indigenous Healing & Biodiversity in Latin America
<i>Group B</i>		CHI 180      Grant Writing in the Chicana/o/Latina/o Community
CHI 110	Sociology of the Chicana/o Experience	CHI 192      Internship in the Chicana/Chicano/Latina/ Latino Community
CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities	Choose one:
CHI 113	Latin American Women's Engagement in Social Movements	CHI 194HA      Senior Honors Research Project
CHI 120	Chicana/o Psychology	or CHI 194HB      Senior Honors Research Project
CHI 121	Chicana/o Community Mental Health	or CHI 194HC      Senior Honors Research Project
CHI 122	Psychology Perspectives Chicana/o & Latina/o Family	CHI 198      Directed Group Study
CHI 123	Psychological perspectives on Chicana/o & Latina/o Children & Adolescents	CHI 199      Special Study for Advanced Undergraduates
CHI 141	Community-Based Participatory Research & Chicana/o & Latina/o Health	Any upper division letter-graded coursework taken abroad.
CHI 145S	Bi-National Health	<i>Comparative Ethnicity/Gender</i>
CHI 147S	Indigenous Healing & Biodiversity in Latin America	Choose two upper division courses from any of the following areas:
CHI 148	Decolonizing Spirit	African American & African Studies (AAS) (p. 476)
		Asian American Studies (ASA) (p. 554)
		Native American Studies (NAS) (p. 1138)
		Gender, Sexuality & Women's Studies (GSW) (p. 860)
		<b>Depth Subject Matter Subtotal</b>
		40
		<b>Total Units</b>
		56

# Chicana/Chicano Studies, Minor

## College of Letters & Science

This minor provides a broad overview of the historical, social, political, economic, ideological and cultural forces that shape the Chicana/o and Latina/o experience. The minor is open to all students with or without course work in Spanish. Students should contact the academic advisor for a plan approval and verification of the minor.

## Minor Advisor

Alma Martinez, M.A.

Code	Title	Units
Choose one:		4
CHI 010	Introduction to Chicana/o Studies	
CHI 050	Chicana & Chicano Culture	
Choose one:		4
CHI 150	The Chicana & Chicano Movement	
CHI 181	Chicanas & Latinas in the U.S.: Historical Perspectives	
HIS 169A	Mexican-American History	
HIS 169B	Mexican-American History	
Choose four:		16
CHI 110	Sociology of the Chicana/o Experience	
CHI 111	Chicanas/Mexicanas in Contemporary Society	
CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities	
CHI 120	Chicana/o Psychology	
CHI 121	Chicana/o Community Mental Health	
CHI 122	Psychology Perspectives Chicana/o & Latina/o Family	
CHI 123	Psychological perspectives on Chicana/o & Latina/o Children & Adolescents	
CHI 130	United States-Mexican Border Relations	
CHI 131	Chicanas in Politics & Public Policy	
CHI 132	Political Economy of Chicana/o Communities	
CHI 154	The Chicana/o Novel	
CHI 155	Chicana/o Theater	
CHI 156	Chicana/o Poetry	
CHI 160	Mexican Film & Greater Mexican Identity	
CHI 165	Chicanas, Latinas & Mexicanas in Commercial Media	
CHI/ART 171	Mexican & Chicano Mural Workshop	
CHI 172	Chicana/o Voice/Poster Silk Screen Workshop	
Total Units		24

## Child Development (Graduate Group)

### College of Agricultural & Environmental Sciences

## Group Office

1315 Hart Hall; 530-754-4109; Human Development Graduate Group (<http://humandevelopment.ucdavis.edu/>); Faculty (<https://humandevelopment.ucdavis.edu/people/>)

- Child Development, Master of Science (p. 138)

## Child Development, Master of Science

### College of Agricultural & Environmental Sciences

## Graduate Study

The Graduate Group in Child Development offers a multidisciplinary program leading to an M.S. degree. The program provides students with an opportunity to pursue a coordinated course of graduate study in the field of child development, which cuts across departmental boundaries. Students may complete a practicum working with children and families in the community, as well as the University's Center for Child & Family Studies. Recipients of the degree gain sufficient background to engage in professions that directly (e.g., preschool, 4-H) or indirectly (e.g., social policy) involve children and families, obtain positions in teaching or research settings, or pursue further study leading to a doctorate in child development, human development, clinical psychology, or related fields.

Applicants seeking admissions and fellowships consideration must submit all materials by our priority December 15 deadline. The final admissions deadline is March 1. For more details, see Human Development Graduate Group (<http://humandevelopment.ucdavis.edu/>).

## Graduate Advisor

Contact Group office.

## Cinema & Digital Media

### College of Letters & Science

Timothy Lenoir, Ph.D., Chairperson of the Department

## Department Office

101 Art Building; 530-752-0105; Cinema & Digital Media (<http://arts.ucdavis.edu/cinema-and-digital-media/>); Faculty (<http://arts.ucdavis.edu/cinema-digital-media-program-faculty/>)

- Cinema & Digital Media, Bachelor of Arts (p. 138)
- Film Studies, Minor (p. 140)

## Cinema & Digital Media, Bachelor of Arts

### College of Letters & Science

## The Cinema & Digital Media Major Program

The Cinema & Digital Media (CDM) program combines the study of audio-visual and digital media, theories about such media, and the relevant modes of artistic practice and production. CDM integrates the analysis of audio-visual and digital texts with their theoretical underpinnings and

their methods of production. The program also addresses the particular impact that technology has on culture in its many forms and fields.

CDM faculty teach and research on various histories, theories, and practices of media. Current fields for teaching and research in cinema and digital media include the history and analysis of film and video, film and video production, electronic music, digital content creation and design, the digital arts, community media and activism, computer graphics, animation, and gaming—as well as the theories and politics of these various areas.

## The Program

Preparatory course work involves a solid introduction to the history, ideas and current trends in cinema and digital media. For depth subject matter, students in the major select a combination of critical studies and creative production courses. Two courses will be selected from the production/programming distribution, two from the theory/history distribution and four will be elected by the student, allowing them to take up to six production courses or six studies/theory classes, should they so choose.

## Major Advisor

Information on the current Academic Advisors can be obtained at the Arts Group Advising Center (<http://arts.ucdavis.edu/arts-group-undergraduate-advising/>) at 530-752-0616.

## Career Alternatives

Cinema & Digital Media is designed to prepare graduates to be highly adaptable analytical thinkers, collaborative, multi-skilled and current with the latest developments in media and technology. Perhaps most importantly is self-motivation: students do best when fueled by their own passions and plot their own directions, while held to very high standards. We feel this is the best education for living and working in a complex, rapidly changing world. Final research papers and creative production portfolios will provide graduate school admissions committees, employers or clients with tangible evidence of Cinema & Digital Media graduates' track records and talents.

## Course Changes

Cinema & Digital Media is working on updating all of the existing FMS, TCS, and CTS courses to the CDM course subject code. If you have any questions regarding the course subject code changes and equivalent major requirements, please contact the Arts Group Advising Center (<http://arts.ucdavis.edu/arts-group-undergraduate-advising/>) at 530-752-0616.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose two:		8
CDM 001	Introduction to Film Studies	
CDM 002	Introduction to Technocultural Studies	
CDM 003	Media Archaeology	
Choose two:		8-9
CDM/ECS 012	Introduction to Media Computation	
CDM 020 or CDM 020V	Filmmaking Foundations	
CDM/ENL 072	Introduction to Games	
Choose two:		8
CDM 040A	(Pending Approval)	

CDM 040B	(Pending Approval)	
CDM 041A	History of Cinema from 1895-1945	
CDM 041B or CDM 041BV	History of Cinema from 1945-Present	
CTS/STS 040A	Media History 1, Guttenberg to Oppenheimer	
CTS/STS 040B	Media History 2 1945-Present	
<b>Preparatory Subject Matter Subtotal</b>		24-25
<b>Depth Subject Matter</b>		
Choose one:		4-5
CDM 150	(Pending Approval)	
CDM/STS 151	Media Theory	
CTS 150	(Discontinued)	
FMS 127	Film Theory	
Choose two or more for a total of 8 units:		8
ART 114A	Intermediate Video: Animation	
ART 114B	Intermediate Video: Experimental Documentary	
ART 114C	Intermediate Video: Performance Strategies	
ART 117	Advanced Video & Electronic Arts	
CDM 100	Experimental Digital Cinema I	
CDM 101	Experimental Digital Cinema II	
CDM 103	Interactivity & Animation	
CDM 104	Documentary Production	
CDM 105/ WMS 165	Feminist Media Production	
CDM 107/DRA 174	Acting for Camera	
CDM 108	(Pending Approval)	
CDM 111	Community Media Production	
CDM 112	(Pending Approval)	
CDM 113	Community Networks & Social Media	
CDM 116	(Pending Approval)	
CDM 117	(Pending Approval)	
CDM 121 or CDM 121V	Introduction to Sonic Arts	
CDM 122 or CDM 122V	Intermediate Sonic Arts	
CDM 123	Sound & Soundtrack	
CDM 125	Advanced Sound: Performance & Improvisation	
CDM 130	Fundamentals of Computer Graphics	
CDM 131	Character Animation	
CDM 135	Object-Oriented Programming for Artists	
CDM 136	Electronics for Artists	
CDM 137	Topics in Virtuality	
CDM/STS/ENL 172	Video Games & Culture	
CDM 174	Special Topics in Analog Game Design	
CDM 175	Introduction to Digital Game Development	
CDM 173	Introduction to Analog Game Design	
CDM 177	Introduction to Game Programming	
CDM 178	Special Topics in Game Programming	

CDM 192	Internship		STS 151/	Media Theory	
CDM 198	Directed Group Study		CTS 150 (DISCONTINUED)		
CDM 199	Special Study for Advanced Undergraduates		TCS 155	Introduction to Documentary Studies	
CTS/DRA 116	Design on Screen		TCS 159	Media Subcultures	
CTS/DRA 124E	Costume Design for Film		Choose four additional courses, chosen from the lists above, for a total of at least 16 units. Some courses are identified as fulfilling more than one requirement; a given course can only fulfill one such requirement.		
TCS 112	New Radio Features & Documentary				
TCS/DRA 175	Small Scale Film Production				
Choose two for a total of 8 units:		8			
CDM 151	Media Theory		Depth Subject Matter Subtotal		
CDM 156	Epic Television: The Golden Age of TV? Sopranos, Wire, Girls, Walking Dead		36-37		
CDM 155	(Pending Approval)				
CDM/AMS 158	Technology & the Modern American Body				
CDM 159	(Pending Approval)				
CDM 160	(Pending Approval)				
CDM 162	(Pending Approval)				
CDM 163	Art & Cinema: Between the White Cube & the Black Box				
or CDM 163V	Art & Cinema: Between the White Cube & the Black Box				
CDM 165A	(Pending Approval)				
CDM 165AS	(Pending Approval)				
CDM 165B	(Pending Approval)				
CDM 165C	(Pending Approval)				
CDM 165D	(Pending Approval)				
CDM/GER 165E	Nazi & Fascist Cinema: Film & other Visual Media				
CDM 165F	(Pending Approval)				
CDM 165G	(Pending Approval)				
CDM 165H	(Pending Approval)				
CDM 165I	(Pending Approval)				
CDM 165K	(Pending Approval)				
CDM 165O	(Pending Approval)				
CDM 165P	(Pending Approval)				
CDM 166	Topics in U.S. Film History				
CDM 167	Topics in Film Genres				
CDM 171	(Pending Approval)				
CDM 172	Video Games & Culture				
CDM 189	Special Topics in Cinema & Digital Media				
CDM 190	Research Methods in Cinema & Digital Media (Pending Approval)				
CDM 198	Directed Group Study				
CHN 101	Chinese Film				
CTS 146A/ MSA 131A	Modern Iranian Cinema				
FMS 120	Italian-American Cinema				
FMS/ITA 121	New Italian Cinema				
FMS/ITA 121S	New Italian Cinema				
FMS 127	Film Theory				
FMS/RUS 129	Russian Film				
FMS/GER 142	New German Cinema				
FMS/GER 176A	Classic Weimar Cinema				
AAS 170	African-American Film & Video				
AAS 171	Black African & Black European Film & Video				
FMS 120	Italian-American Cinema				
JST 120	Cinema & the American Jewish Experience				
WMS 160	Women, "Race" & Sexuality in Postcolonial Cinema				

## **Film Studies, Minor**

College of Letters & Science

# **Minor Advisor**

Information on the current Academic Advisors can be obtained at Arts Group Advising Center (<http://arts.ucdavis.edu/arts-group-undergraduate-advising/>) at 530-752-0616.

Code	Title	Units
<b>Film Studies</b>		
CDM 001	Introduction to Film Studies	4
Choose no more than two from any one category.		20
No more than two courses from a single department or program may be offered in satisfaction of the minor requirements.		
<i>(a) Problems &amp; Themes in Cinema</i>		
ANT 136	Ethnographic Film	
CLA 102	Film & the Classical World	
DRA 115	Advanced Study of Major Film Makers	
ENL 160	Film as Narrative	
ENL 162	Film Theory & Criticism	
CDM 166	Topics in U.S. Film History	
CDM 167	Topics in Film Genres	
WMS 162	Feminist Film Theory & Criticism	
<i>(b) Cinema, Nation &amp; Nationality</i>		
GER 119	From German Fiction to German Film	
GER/FMS 142	New German Cinema	
FMS/GER 176A	Classic Weimar Cinema	
FMS 176B	Postwar German Cinema	
ITA 150	Studies in Italian Cinema	
JPN 106	Japanese Culture Through Film	
FRE 122	French & Francophone Film	
RUS/FMS 129	Russian Film	
SPA 148	Cinema in the Spanish-Speaking World in Translation	
<i>(c) Film &amp; Social Identities</i>		
AAS 170	African-American Film & Video	
AAS 171	Black African & Black European Film & Video	
FMS 120	Italian-American Cinema	
JST 120	Cinema & the American Jewish Experience	
WMS 160	Women, "Race" & Sexuality in Postcolonial Cinema	

WMS 164	Topics in Gender & Cinematic Representation
<i>(d) Film/Video Production</i>	
ART 117	Advanced Video & Electronic Arts
ART 150	Theory & Criticism of Electronic Media
<i>(e) Popular &amp; Visual Culture</i>	
AMS 130	American Popular Culture
AMS/GSW 139	Feminist Cultural Studies
ART 150	Theory & Criticism of Electronic Media
CMN 140	Introduction to Mass Communication
POL 165	Mass Media & Politics
<b>Total Units</b>	<b>24</b>

## Areas of Specialization

### Environmental Engineering

Environmental Engineering focuses on understanding and management of physical, chemical, and biological processes in natural and engineered systems. Areas of emphasis include improvement of air, land, and water quality in the face of increasing population, expanding industrialization, and global climate change. Examples of environmental engineering include innovative analysis and design of air, water, wastewater, and solid waste treatment systems; mathematical modeling of natural and engineered systems; life cycle analysis; sampling, analysis, transport and transformation of natural and anthropogenic pollutants; and modeling of air pollutant emissions.

### Suggested Advisors

H.N. Bischel, C.E. Bronner, C. D. Cappa, R. Corsi, A. Kendall, M.J. Kleeman, F.J. Loge, J. Pena, S.G. Schladow, T.M. Young

### Geotechnical Engineering

Geotechnical Engineering encompasses civil infrastructure and environmental problems that require characterization and utilization of geologic materials (soils and rocks) to develop, design, analyze and model engineered solutions. This includes, but is not limited to, foundations for buildings and bridges retaining structures, earthwork (e.g. dams, tunnels, highways), pavements, effects of earthquakes and other natural hazards (e.g. ground motions, liquefaction, soil-structure interaction, landslides, tsunamis), ground improvement methods (e.g. compaction, cement mixing), and geo-environmental problems (e.g. groundwater flow, subsurface contaminant transport and remediation).

### Suggested Advisors

J.T. DeJong, J.T. Harvey, B. Jeremic, A. Martinez, K. Ziotopoulou

### Structural Engineering & Structural Mechanics

Structural Engineering addresses the conception, design, analysis, construction, retrofit and modeling of all types of civil infrastructure, including buildings and bridges, dams, ports, highways, and industrial facilities subject to loadings ranging from gravity and earthquakes, to extreme environmental events, with consideration of safe, serviceable, and sustainable outcomes over the entire life-cycle. Structural Mechanics encompasses theories for solids and structures, and the associated methods of analysis, computation and materials characterization used in the practice of Structural Engineering. For both disciplines, materials of particular interest include steel, concrete, timber, advanced composites and particulate media.

### Suggested Advisors

M. Barbato, J.E. Bolander, Y.H. Chai, L. Cheng, J.T. Harvey, B. Jeremic, A.M. Kanvinde, S.K. Kunnath, S.A. Miller, M.M. Rashid, N. Sukumar

### Transportation Planning & Engineering

Transportation Engineering deals with the movement of people and goods in a manner consistent with society's environmental and socio-economic goals. Transportation engineering applies engineering, physical and mathematical sciences, economics, and behavioral social science principles to plan, analyze, design, and operate resilient and sustainable transportation systems, such as highways, transit, airfields and ports. Transportation planning involves the formulation and analysis of transportation policy, program, and project alternatives. Societal goals, budgetary constraints, socio-economic (such as safety, equity and mobility) and environmental (such as air and water quality, climate change, and clean energy) objectives, and technological feasibilities

## Civil & Environmental Engineering

### College of Engineering

Christopher Cappa; Chairperson of the Department; term July 1, 2020-June 30, 2025

### Department Office

2001 Ghausi Hall; 530-752-0586; Civil & Environmental Engineering (<http://cee.engr.ucdavis.edu>); Faculty (<http://cee.engr.ucdavis.edu/people/faculty-directory/>)

- Civil Engineering, Bachelor of Science (p. 141)
- Civil & Environmental Engineering, Master of Science (p. 143)
- Civil & Environmental Engineering, Doctor of Philosophy (p. 144)
- Construction Engineering & Management, Minor (p. 144)
- Environmental Engineering, Bachelor of Science (p. 145)
- Sustainability in the Built Environment, Minor (p. 146)

## Civil Engineering, Bachelor of Science

### College of Engineering

The civil engineering profession is responsible for designing, building, operating and maintaining the physical infrastructure and protecting the natural environment that together support human society in an economically and environmentally sustainable manner. The need to predict and mitigate the impact of complex human- and nature-induced stresses on large-scale, geographically-distributed systems has never been more evident than now. These challenges and inevitable societal changes result in a need to develop and adopt new technologies and improved efficiency into the infrastructure.

The Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. Exclusive of General Education units, the minimum number of units required for the Civil Engineering major is 154.

(such as vehicle, infrastructure, and information technologies) are considered.

### Suggested Advisors

Y. Fan, J.T. Harvey, M.A. Jaller, A. Kendall, S. Nassiri, D. Sperling, K.E. Watkins, H.M. Zhang

## Water Resources Engineering

Water Resources Engineering includes hydrology, hydraulics, fluid mechanics, and water resources systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including the relationships between precipitation, runoff, groundwater, and surface water. Water quality and contaminant transport issues are linked to hydrologic conditions. Hydraulics and fluid mechanics deal with flows in pipes, open-channel water-distribution systems, and natural systems, such as lakes and estuaries. Water resources systems planning and design deals with the comprehensive development of water resources to meet the multiple needs of industry, agriculture, municipalities, recreation, and other activities.

### Suggested Advisors

F.A. Bombardelli, A.L. Forrest, J.D. Herman, M.L. Kavvas, V.L. Morales, H.J. Oldroyd, S.G. Schladow, B.A. Younis

Additional information on areas of specialization and potential faculty advisors can be obtained from the departmental website.

Code	Title	Units
<b>Lower Division Required Courses</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3
MAT 022B	Differential Equations	3
<i>Physics</i>		
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
Choose one BIS 002A or GEL 050 & GEL 050L:		5
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
or GEL 050 & 050L	Physical Geology and Physical Geology Laboratory	
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
or CHE 002AH	Honors General Chemistry	
CHE 002B	General Chemistry	5
or CHE 002BH	Honors General Chemistry	
<i>Civil Engineering</i>		
Choose 2-6 units:		2-6
ECI 003	Civil & Environmental Infrastructure & Society <sup>1</sup>	
ECI 016	Spatial Data Analysis	
<i>Engineering</i>		
ENG 035	Statics	4
ENG 006	Engineering Problem Solving	4

or ECS 032A	Introduction to Programming	
ENG 003	Introduction to Engineering Design	4
or ENG 003Y	Introduction to Engineering Design	
Lower Division Composition/Writing; choose one; a grade of C- or better is required:		
COM 001	Major Works of the Ancient World	
COM 002	Major Works of the Medieval & Early Modern World	
COM 003	Major Works of the Modern World	
COM 004	Major Works of the Contemporary World	
ENL 003	Introduction to Literature	
NAS 005	Introduction to Native American Literature	
UWP 001	Introduction to Academic Literacies (Recommended)	
UWP 001V	Introduction to Academic Literacies: Online (Recommended)	
UWP 001Y	Introduction to Academic Literacies (Recommended)	
Lower Division Required Courses Subtotal		70-74
<b>Upper Division Requirements</b>		
<i>Engineering</i>		
ENG 103	Fluid Mechanics	4
or ECI 100	Introduction to Fluid Mechanics for Civil & Environmental Engineers	
ENG 104	Mechanics of Materials	4
ENG 104L	Mechanics of Materials Laboratory	1
ENG 106	Engineering Economics	4
ENG 102	Dynamics	4
or ENG 105	Thermodynamics	
<i>Civil Engineering</i>		
ECI 114	Probabilistic Systems Analysis for Civil & Environmental Engineers	4
ECI 193A	Civil & Environmental Engineering Senior Design	4
ECI 193B	Civil & Environmental Engineering Senior Design	4
Choose one:		4
ECI 115	Computer Methods in Civil & Environmental Engineering	
ECI 153	Deterministic Optimization & Design	
MAT 118A	Partial Differential Equations: Elementary Methods	
<i>Civil &amp; Environmental Engineering Breadth</i>		
Choose one course from four of the following group options; to satisfy Geotechnical & Water Resources breadth area groups, both lecture and lab courses must be completed:		15-17
<i>Environment</i>		
Choose one:		
ECI 140A	Environmental Analysis of Aqueous Systems	
ECI 140B	Chemical Principles for Environmental Engineers	
ECI 148A	(Discontinued)	
ECI/ATM 149	Air Pollution	

<b>Geotechnical</b>		Choose one: a grade of C- or better is required:	0-4
ECI 171	Soil Mechanics	UWP 101	Advanced Composition
ECI 171L	Soil Mechanics Laboratory	or UWP 101V	Advanced Composition
<i>Structures</i>		or UWP 101Y	Advanced Composition
ECI 130	Structural Analysis	UWP 102E	Writing in the Disciplines: Engineering
<i>Transportation</i>		UWP 102G	Writing in the Disciplines: Environmental Writing
<b>Choose one:</b>		UWP 104A	Writing in the Professions: Business Writing
ECI 161	Transportation System Operations	or UWP 104AY	Writing in the Professions: Business Writing
ECI/ESP 163	Energy & Environmental Aspects of Transportation	UWP 104E	Writing in the Professions: Science
ECI 165	Transportation Policy	UWP 104T	Writing in the Professions: Technical Writing
<i>Water Resources</i>		Passing the Upper Division Composition Exam.	
ECI 141	Engineering Hydraulics		
ECI 141L	Engineering Hydraulics Laboratory	Upper Division Requirements Subtotal	
<i>Civil &amp; Environmental Engineering Depth</i>		80-90	
Choose two courses from two of the following group options selected from Civil & Environmental Engineering Breadth:	16	<b>Total Units</b>	
<i>Environment</i>		<b>150-164</b>	
ECI 140B	Chemical Principles for Environmental Engineers		
ECI 140C	Biological Principles for Environmental Engineering		
ECI 140D	Water & Wastewater Treatment System Design (Discontinued)		
ECI/ATM 149	Air Pollution		
<i>Geotechnical</i>			
ECI 173	Foundation Design		
ECI 175	Geotechnical Earthquake Engineering		
ECI 179	Pavement Engineering		
<i>Structures</i>			
ECI 131	Matrix Structural Analysis		
ECI 132	Structural Design: Metallic Elements		
ECI 133	Structure & Properties of Civil Engineering Materials		
ECI 134	Structural Loads: Calculation & Modeling		
ECI 135	Structural Design: Concrete Elements		
ECI 136	Building Design		
ECI 138	Earthquake Loads on Structures		
<i>Transportation</i>			
ECI 153	Deterministic Optimization & Design		
ECI 161	Transportation System Operations		
ECI 179	Pavement Engineering		
<i>Water Resources</i>			
ECI 142	Engineering Hydrology		
ECI 144	Groundwater Systems Design		
ECI 145	Hydraulic Structure Design		
ECI 146	Water Resources Simulation		
ECI 155	Water Resources Engineering Planning		
<i>Civil &amp; Engineering Electives</i>			
Civil & Environmental Engineering electives may include any upper division, letter-graded Civil & Environmental Engineering courses (i.e. not already used towards the ECI breadth, ECI depth and math analysis requirements) <sup>3,4</sup>	16-20		
<i>Upper Division Composition Requirement</i>			

<sup>1</sup> ECI 003 is designed for lower division students and is not open to upper division students; students who do not take this course will substitute 4 units of additional letter graded upper division Civil & Environmental Engineering (ECI) coursework; see Civil & Environmental Engineering Electives.

<sup>2</sup> May include ENG 102 or ENG 105. If both ENG 102 and ENG 105 are completed, 4 units will be considered towards the ECI electives. Also can include, but not exceed, a combination of 6 units from ECI 198 and ECI 199. A maximum of 4 units of upper-division coursework outside of Civil & Environmental Engineering may be considered on a petition basis. Please consult with the undergraduate staff advisor.

<sup>3</sup> If ECI 003 was not completed in the Lower Division requirements, 20 units of electives are required.

## Civil & Environmental Engineering, Master of Science

### College of Engineering

M.S.

Civil & Environmental Engineering (<https://cee.engineering.ucdavis.edu/graduate/>)

With over forty faculty members, over \$20 million in annual research expenditures and over 200 graduate students, the Department of Civil & Environmental Engineering integrates research, education and professional service in areas related to civil infrastructure and the environment. Graduate students benefit from close working relationships with professors who are the leading international experts in their field. Students pursuing their M.S. degrees have the opportunity to follow a more coursework-focused track or research-focused track. Graduate students pursuing their M.S. will specialize in one of five core areas: environmental, geotechnical, structural/structural mechanics, transportation or water resources engineering. Our graduates go on to serve the profession and academia by advancing the leading edge of fundamental knowledge, as well as engineering practice.

Financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid. Over 80% of the

graduate students in our program are either fully or partially supported through one or more of these paths.

## Research Area Highlights

- Alternative fuel transportation infrastructure
- Earthquake engineering
- Environmental engineering
- Environmental planning and management
- Geotechnical engineering
- Hydraulics and fluid mechanics
- Hydrology
- Structural engineering
- Structural health monitoring
- Structural mechanics
- Systems planning and design
- Transportation engineering
- Transportation planning and design
- Water resources engineering

## Research Facilities & Partnerships

- Air Quality Research Center
- Center for Bio-mediated & Bio-inspired Geotechnics
- Center for Geotechnical Modeling
- Center for Watershed Sciences
- Center for Water-Energy Efficiency
- Institute of Transportation Studies
- J. Amorocho Hydraulics Laboratory (JAHL)
- John Muir Institute of the Environment
- Pavement Research Center & Advanced Transportation Infrastructure Research Center
- Tahoe Environmental Research Center
- Western Cooling Efficiency Center

Complete Information is on our website.

## Civil & Environmental Engineering, Doctor of Philosophy

### College of Engineering

Ph.D.; Designated Ph.D. emphasis available in Biotechnology

Civil & Environmental Engineering (<https://cee.engineering.ucdavis.edu/graduate/>)

With over forty faculty members, over \$20 million in annual research expenditures and over 200 graduate students, the Department of Civil & Environmental Engineering integrates research, education and professional service in areas related to civil infrastructure and the environment. Graduate students benefit from close working relationships with professors who are the leading international experts in their field. They are supported in their study and research by robust funding, and they have access to state-of-the-art research facilities within the program and in interdisciplinary CEE faculty-led centers across campus. Our graduates go on to serve the profession and academia by advancing the leading edge of fundamental knowledge, as well as engineering practice.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid. Nearly all Ph.D. students are fully supported through one or more of these paths, or through external fellowships.

## Research Area Highlights

- Alternative fuel transportation infrastructure
- Earthquake engineering
- Environmental engineering
- Environmental planning and management
- Geotechnical engineering
- Hydraulics and fluid mechanics
- Hydrology
- Structural engineering
- Structural health monitoring
- Structural mechanics
- Systems planning and design
- Transportation engineering
- Transportation planning and design
- Water resources engineering

## Research Facilities & Partnerships

- Air Quality Research Center
- Center for Bio-mediated & Bio-inspired Geotechnics
- Center for Geotechnical Modeling
- Center for Watershed Sciences
- Center for Water-Energy Efficiency
- Institute of Transportation Studies
- J. Amorocho Hydraulics Laboratory (JAHL)
- John Muir Institute of the Environment
- Pavement Research Center & Advanced Transportation Infrastructure Research Center
- Tahoe Environmental Research Center
- Western Cooling Efficiency Center

Complete Information is on our website.

## Construction Engineering & Management, Minor

### College of Engineering

California's construction industry continues to experience high growth as it continues to accommodate an increasing population and as it faces renewal of much of the infrastructure built by previous generations. At the same time, the construction industry faces challenges of scarce materials, a need for decreased environmental impact in terms of the construction process itself and operation of the completed project, and a more complex operational, regulatory and social context in which it must do its work.

The purpose of this minor is to better prepare professional civil and environmental engineers to thrive in this challenging industry and to improve the efficiency of delivery and sustainability of the civil infrastructure in the state through their future efforts.

It is expected that engineering students will enroll in this minor program, including Civil, Mechanical, Chemical, and Materials Science majors. Students from other colleges can also complete this minor, but it is recommended that they review the requirements with one of the advisors before enrolling. Students who are interested in the construction of infrastructure in their discipline can make use of the skills that will be learned through the completion of this minor.

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements, with an overall GPA of 2.000 or better. All prerequisites for courses must have been taken for a letter grade; no grade lower than a C- will be accepted in any prerequisite course. Students must complete ENG 106 with a C- or better.

## Course Overlap

Please refer to your college's policies regarding overlap rules.

The online Minor Declaration form is available via the Online Advising Student Information System (OASIS) (<https://students.ucdavis.edu/>). For more information, contact the undergraduate advisors ([civiladvising@ucdavis.edu](mailto:civiladvising@ucdavis.edu)) in the Department of Civil & Environmental Engineering.

Transcript notation must be requested no later than the quarter preceding graduation, and will appear as a minor in Construction Engineering & Management.

## Minor Advisors

J.T. Harvey, J.E. Bolander, S.A. Miller, S. Nassiri

Code	Title	Units
May include one from:		
ARE 018	Business Law	
MGT 011A	Elementary Accounting	
<i>Civil &amp; Environmental Engineering</i>		
ECI 137	Construction Principles & Project Management	4
ECI 123	Urban Systems & Sustainability	4
ECI 153	Deterministic Optimization & Design	4
Choose 12 units:		12
ECI 179	Pavement Engineering	
ARE 112	Fundamentals of Organization Management	
ARE 155	Operations Research & Management Science	
ARE 157	Analysis for Operations & Production Management	
ECN 134	Financial Economics	
ECN 162	International Economic Relations	
ESP 161	Environmental Law	
<b>Total Units</b>		<b>24</b>

Environmental engineers are responsible for designing processes and infrastructure to ensure society has access to safe water, clean air, and healthy ecosystems. Environmental engineers apply knowledge from physics, chemistry, biology and the social sciences to problems in a variety of areas including water & wastewater treatment and ecosystem remediation, analysis of chemical fate and transport in the natural environment, and modeling of hydrologic & atmospheric flows. As climate change creates new challenges, such as in the form of droughts and intense weather events, the field of environmental engineering evolves to meet society's needs. As an environmental engineering student at UC Davis, you will gain skills that enable you to design sustainable solutions for society.

The Environmental Engineering major started in 2017 and was accredited by the Engineering Accreditation Commission of ABET (<https://www.abet.org/>) in 2022.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. Exclusive of General Education units, the minimum number of units required for the Environmental Engineering major is 142 (75-80 units in lower division and 63-71 units in upper division).

Code	Title	Units
<b>Lower Division Required Courses</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3
MAT 022B	Differential Equations	3
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
CHE 008A	Organic Chemistry: Brief Course	2
<i>Physics</i>		
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
Choose GEL 050 & GEO 050L or ATM 060:		4-5
GEL 050 & 050L	Physical Geology and Physical Geology Laboratory	
or ATM 060	Introduction to Atmospheric Science	
ENG 006 or ECS 032A	Engineering Problem Solving Introduction to Programming	4
<i>Biological Sciences</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
<i>Engineering</i>		
ENG 003 or ENG 003Y	Introduction to Engineering Design Introduction to Engineering Design	4
ENG 035	Statics	4
<i>Civil &amp; Environmental Engineering</i>		
Choose 6-10 units:		6-10
ECI 003	Civil & Environmental Infrastructure & Society <sup>1</sup>	

## Environmental Engineering, Bachelor of Science

College of Engineering

ECI 016	Spatial Data Analysis		ECI 189A	Selected Topics in Civil Engineering: Environmental Engineering
ECI 040	Introduction to Environmental Engineering		ECI 189B	Selected Topics in Civil Engineering: Hydraulics & Hydrologic Engineering
Lower Division Composition/Writing; choose one; a grade of a C- or better is required		4	ECI 189I	Selected Topics in Civil Engineering: Water Resources Engineering
COM 001	Major Works of the Ancient World		ECI 189J	Selected Topics in Civil Engineering: Water Resources Planning
COM 002	Major Works of the Medieval & Early Modern World		ECI 198	Directed Group Study <sup>3</sup>
COM 003	Major Works of the Modern World		ECI 199	Special Study for Advanced Undergraduates <sup>3</sup>
COM 004	Major Works of the Contemporary World		<i>Civil &amp; Environmental Engineering (ECI) Electives</i>	
ENL 003	Introduction to Literature		4 units of Upper Division ECI electives are required. <sup>2</sup>	
NAS 005	Introduction to Native American Literature		0-4	
UWP 001	Introduction to Academic Literacies (Recommended)		<i>Upper Division Composition Requirement</i>	
UWP 001V	Introduction to Academic Literacies: Online (Recommended)		Choose one; a grade of C- or better is required:	
UWP 001Y	Introduction to Academic Literacies (Recommended)		UWP 101	Advanced Composition
Lower Division Required Courses Subtotal		75-80	or UWP 101V	Advanced Composition
<b>Upper Division Required Courses</b>			or UWP 101Y	Advanced Composition
<i>Microbiology</i>			UWP 102E	Writing in the Disciplines: Engineering
MIC 102	Introductory Microbiology	3	UWP 102G	Writing in the Disciplines: Environmental Writing
<i>Engineering</i>			UWP 104A	Writing in the Professions: Business Writing
ENG 106	Engineering Economics	4	UWP 104E	Writing in the Professions: Science
<i>Civil &amp; Environmental Engineering</i>			or UWP 104AY	Writing in the Professions: Business Writing
ECI 100	Introduction to Fluid Mechanics for Civil & Environmental Engineers	4	UWP 104T	Writing in the Professions: Technical Writing
ECI 114	Probabilistic Systems Analysis for Civil & Environmental Engineers	4	Passing the Upper Division Composition Exam.	
ECI 115	Computer Methods in Civil & Environmental Engineering	4	Upper Division Required Courses Subtotal	
ECI 123	Urban Systems & Sustainability	4	63-71	
ECI 140A	Environmental Analysis of Aqueous Systems	4	<b>Total Units</b>	
ECI 140B	Chemical Principles for Environmental Engineers	4	<b>142-146</b>	
ECI 140D	Water & Wastewater Treatment System Design (Discontinued)	4		
ECI 141	Engineering Hydraulics	3		
ECI 141L	Engineering Hydraulics Laboratory	1		
ECI 144	Groundwater Systems Design	4		
ECI/ATM 149	Air Pollution	4		
ECI 193A	Civil & Environmental Engineering Senior Design	4		
ECI 193B	Civil & Environmental Engineering Senior Design	4		
Choose one:		4		
ECI 153	Deterministic Optimization & Design			
ECI 155	Water Resources Engineering Planning			
Choose one:		4		
ECI 142	Engineering Hydrology			
ECI 145	Hydraulic Structure Design			
ECI 146	Water Resources Simulation			
ECI 153	Deterministic Optimization & Design			
ECI 155	Water Resources Engineering Planning			

## Sustainability in the Built Environment, Minor

### College of Engineering

The built environment plays an integral role in meeting society's most basic needs of shelter, security, mobility, community, and water & waste treatment, but it also contributes significantly to the sustainability challenges of climate change, pollution, resource consumption, and land use. As society and government policy increase pressure to reduce the environmental impacts of our everyday activities, individuals must increasingly understand how the built environment they design and maintain fits into the complex environmental and human system in which we live. The minor provides a guiding framework for educating individuals who will design and maintain our future built environment in the challenges and potential solutions for improved sustainability.

<sup>1</sup> ECI 003 is designed for lower division students and is not open to upper division students; students who do not take this course will substitute 4 units of additional letter graded upper division Civil & Environmental Engineering (ECI) coursework; see Civil & Environmental Engineering.

<sup>2</sup> If ECI 003 was not completed in the Lower Division requirements.

<sup>3</sup> Up to 4 units.

The minor is designed to develop students' awareness in the three core themes of sustainability: Engineering & Science, Social Context, and Policy & Economics. The aim is both to foster the social context of engineering and to attract students from a range of departments and programs across campus to grow trans-disciplinary interactions. Students are required to take ECI 123, as well as electives as specified in the three core themes.

The minor is designed to attract students from a range of departments and programs across campus, including, Environmental Science & Policy, Plant Sciences, Landscape Architecture, Design, Engineering, Community & Regional Development, Anthropology, Agriculture & Resource Economics, Atmospheric Science, Environmental Toxicology, Applied Biological Systems Technology, Geology, Hydrology and all disciplines of Engineering. Students enrolled in the minor will acquire fundamental skills and knowledge of the elements and integrated processes necessary for a sustainable built environment.

To complete this minor a student is required to:

1. Take ECI 123 (4 units); and
2. Take one additional course, of at least 3 units each, in each of three core thematic areas of the minor: Engineering & Science, Social Context, and Policy & Economics; and
3. Take at least one additional course in any of the three core thematic areas of the minor (can be any number of units); and
4. Complete at least 14 units of coursework from the core thematic areas of the minor. May include 1-3 units of ECI 198 sustainable design project, by approval of advisor.

Successful completion of the minor requires both a minimum overall UC GPA of 2.000 and a minimum 2.000 GPA for the coursework completed for the minor, with no grade lower than a C- for any course used for the minor. All courses must be taken for a letter grade. Up to 4 units can be lower division, all other units must be upper division. Substitute courses in the thematic areas may be proposed by students for the minor and are considered on a case-by-case basis.

Please refer to your college's policies regarding course overlap rules.

The Minor Declaration form is available via the Online Advising Student Information System (OASIS) (<https://students.ucdavis.edu/>). For more information, please email the undergraduate advisors ([civiladvising@ucdavis.edu](mailto:civiladvising@ucdavis.edu)) in the Department of Civil & Environmental Engineering.

Transcript notation must be requested no later than the quarter preceding graduation and will appear as a minor in Sustainability in the Built Environment.

## Minor Advisors

H.N. Bischel, C.E. Bronner, A.L. Forrest, F.J. Loge, A. Kendall, S.A. Miller

Code	Title	Units
ECI 123	Urban Systems & Sustainability	4
Complete at least 14 units of coursework from the three core thematic areas, below. <sup>1</sup>		14

### Engineering & Science

Choose at least one, 3 or 4 unit course:

ATM 116	Modern Climate Change
DES 127A	Sustainable Design

DES 127B	Studio Practice in Sustainable Design
DES 156	Graphitecture: Architecture in the Age of New Media
ECI 040	Introduction to Environmental Engineering
ECI 140A	Environmental Analysis of Aqueous Systems
ECI/ATM 149	Air Pollution
ECI 155	Water Resources Engineering Planning
ECI/ESP 163	Energy & Environmental Aspects of Transportation
ECI 165	Transportation Policy
ENG 188	Science & Technology of Sustainable Power Generation
ETX 101	Principles of Environmental Toxicology
GEL 130	Non-Renewable Natural Resources
LDA 140	Green Building, Design, & Materials
<i>Social Context</i>	
Choose at least one, 3 or 4 unit course:	
ANT/ESP 101	Ecology, Nature, & Society
ANT 104N	Cultural Politics of the Environment
CRD 142	Rural Change in the Industrialized World
CRD 149	Community Development Perspectives on Environmental Justice
CRD 154	Social Theory & Community Change
CRD 158	Community Governance
CRD 172	Social Inequality: Issues & Innovations
LDA 003	Sustainable Development: Theory & Practice
PLS 162	Urban Ecology
<i>Policy &amp; Economics</i>	
Choose at least one, 4 unit course:	
ARE/ESP 175	Natural Resource Economics
ARE 176	Environmental Economics
ESP 161	Environmental Law
ESP 162	Environmental Policy
ESP 171	Urban & Regional Planning
PLS 150	Sustainability & Agroecosystem Management
ESP 173	Land Use & Growth Controls

**Total Units** 18

<sup>1</sup> May include 1-3 units of ECI 198, by approval of advisor.

## Classics

College of Letters & Science

### Department Chair

Anna Uhlig, Ph.D.

### Department Office

Classics Program; 211 Sproul Hall; 530-752-4999; Classics (<http://classics.ucdavis.edu>); Faculty (<https://classics.ucdavis.edu/faculty/>)

The Classics department offers a Classical Civilization A.B. (p. 148) and minors in Classical Civilization (p. 151), Greek (p. 151), and Latin (p. 151).

- Classical Civilization, Bachelor of Arts (p. 148)
- Classical Civilization, Minor (p. 151)
- Greek, Minor (p. 151)
- Latin, Minor (p. 151)

## Classical Civilization, Bachelor of Arts

College of Letters & Science

### The Major Program

Classical Civilization is an interdisciplinary major that examines the ancient Mediterranean cultures of Greece, Rome and the Near East, with courses offered on the languages, history, literature, religions, myths, art and archaeology of these societies, their achievements in rhetoric and philosophy, and their political and social institutions. Minor programs in Classical Civilization, Greek, and Latin, and many General Education courses are also offered.

### The Program

The major has two tracks: (1) Classical & Mediterranean Civilizations, and (2) Classical Languages & Literatures. The core of both major tracks consists of two years of Latin or Greek, the introductory sequence on the ancient Mediterranean world (CLA 001, CLA 002, CLA 003 or CLA 004), the advanced seminar (CLA 190), and a number of electives. The Classical & Mediterranean Civilization track allows students to choose their electives from a broadly balanced program in history, art and archaeology, literature, philosophy and rhetoric. The Classical Languages & Literatures track focuses more intensively on language and literature, requiring the study of two languages and allowing fewer electives. Students planning to go on to graduate work in Classics should take Track 2 and study as much Latin and Greek as possible. They should make a point of talking to an advisor early in their undergraduate program. They are also advised to acquire a reading knowledge of French or German.

### Career Opportunities

A degree in Classical Civilization represents a solid liberal arts education that provides an excellent foundation for a wide variety of careers. In the last twenty-five years, many majors have applied to law or medical schools and nearly all have been accepted. Additional career options include library and museum work, teaching, journalism, and graduate study in Classics, art, archaeology, history, literature, philosophy, and religion.

### Major Advisors

Consult the department office.

### Honors Program

Candidates for high or highest honors in Classical Civilization must write a senior honors thesis under the direction of a faculty member in Classics. Potential candidates for the honors program must enroll in Classics CLA 194HA and CLA 194HB, normally during the first two quarters of the senior year. Enrollment is limited to upper division students with a minimum of 135 units, and a 3.500 grade point average in courses in the Classical Civilization major. For further information, students should consult with the major advisor or program director.

The requirements for the honors program are in addition to the regular requirements for the major in Classical Civilization.

### Graduate Study

The Department offers a master's degree in Classics with emphasis on either Greek or Latin; however, admission into the graduate program has been suspended.

### Prerequisite Credit

Credit will not normally be given for a lower division course in Latin or Greek if it is the prerequisite of a course already successfully completed. Exceptions can be made by the Program Director only.

## Classical & Mediterranean Civilizations Track

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Latin or Greek</i>		15
Choose a series:		
LAT 001 & LAT 002 & LAT 003	Elementary Latin and Elementary Latin and Intermediate Latin	
GRK 001 & GRK 002 & GRK 003	Elementary Greek and Elementary Greek and Intermediate Greek	
Choose two: <sup>1</sup>		8
CLA 001	Ancient Near East & Early Greece: 3000-500 B.C.E.	
CLA 002	Ancient Greece & the Near East: 500-146 B.C.E.	
CLA 003	Rome & the Mediterranean: 800 B.C.E.-500 C.E.	
CLA 004	Late Antiquity	
Choose one: <sup>1</sup>		3-4
AHI 001A	Ancient Mediterranean Art	
CLA 001	Ancient Near East & Early Greece: 3000-500 B.C.E.	
CLA 002	Ancient Greece & the Near East: 500-146 B.C.E.	
CLA 003	Rome & the Mediterranean: 800 B.C.E.-500 C.E.	
CLA 004	Late Antiquity	
CLA 010 or CLA 010Y	Greek, Roman, & Near Eastern Mythology Greek, Roman, & Near Eastern Mythology—Hybrid	
CLA 015	Women & Gender in Classical Antiquity	
CLA 020	Pompeii AD 79	
CLA 025	The Classical Heritage in America	
CLA 030	Greek & Latin Elements in English Vocabulary	
CLA 030F	Greek & Latin Elements in English Vocabulary	
CLA 031	Greek & Latin Elements in Technical Vocabulary	
CLA 040	Life & Economy in the Ancient Mediterranean World	
CLA/STS 050	Ancient Science	

COM 001	Major Works of the Ancient World	GRK 114	Lyric Poetry
PHI 021	Philosophical Classics of the Ancient Era	GRK 115	Aeschylus
RST 021	The Bible & Its Interpreters	GRK 116	Herodotus
RST 040	New Testament	GRK 121	Greek Prose Composition
Preparatory Subject Matter Subtotal	26-27	GRK 130	Readings in Later Greek
<b>Depth Subject Matter</b>		GRK 131	Readings in Ancient Greek Philosophy & Science
Upper Division courses in Latin or Greek.	12	LAT 100	Readings in Latin Prose
CLA 190 Senior Seminar	4	LAT 101	Livy
<i>Six Additional Upper Division Courses Chosen from the Following Groups:</i>		LAT 102	Roman Comedy
Of these 24 units at least 12 must be in LAT, GRK, or CLA.		LAT 103	Vergil: Aeneid
(a) Upper division courses: <sup>2</sup>	12	LAT 104	Sallust
CLA 101A Topics in Ancient Mediterranean Civilizations		LAT 105	Catullus
CLA 101B Topics in Greek Civilization		LAT 106	Horace: Odes & Epodes
CLA 101C Topics in Roman Civilization		LAT 108	Horace: Satires & Epistles
CLA 101D Topics in Classical Receptions		LAT 109	Roman Elegy
CLA 101E Topics in Ancient Science		LAT 110	Ovid
CLA 102 Film & the Classical World		LAT 112	Cicero
CLA 103 Love & Beauty in the Ancient World		LAT 115	Lucretius
CLA 105 Theory & Practice of Greek & Roman Mythology		LAT 116	Vergil: Eclogues & Georgics
CLA 110 Origins of Rhetoric		LAT 118	Roman Historians
CLA 111 Forms of Knowledge in the Ancient World		LAT 119	Readings in Republican Latin Literature
CLA 120 Greek & Roman Historiography		LAT 120	Readings in Imperial Latin Literature
CLA 125 Roman Political Thought		LAT 121	Latin Prose Composition
CLA 140 Homer & Ancient Epic		LAT 122	Early Christian Writers
CLA 141 Greek & Roman Comedy		LAT 125	Medieval Latin
CLA 142 Greek & Roman Novel		LAT 130	Readings in Late Latin
CLA 143 Greek Tragedy		LAT 135	Themes in Latin Literature
CLA 150 Socrates & Classical Athens		(b) Relevant courses in other departments such as:	
CLA 170 Cultural Interactions in the Ancient Mediterranean World		HIS 102A	Undergraduate Proseminar in History: Ancient
CLA 171 Mediterranean Bronze Age Archaeology		HIS 111A	Ancient History
CLA/AHI 172A Early Greek Art & Architecture		HIS 111B	Ancient History
CLA/AHI 172B Later Greek Art & Architecture		HIS 111C	Ancient History
CLA/AHI 173 Roman Art & Architecture		RST 102	Christian Origins
CLA 174 Greek Religion & Society		RST 125	Dead Sea Scrolls, Apocrypha, & Pseudepigrapha
CLA/AHI 175 Architecture & Urbanism in Mediterranean Antiquity		RST 141A	New Testament Literature: Synoptic Gospels
CLA 176 Roman Religions		RST 141B	New Testament Literature: John
GRK 100 Readings in Greek Prose		RST 141C	New Testament Literature: Paul
GRK 101 Plato		PHI 143	Hellenistic Philosophy
GRK 102 Euripides		PHI 160	Pre-Socratics
GRK 103A Homer: Iliad		PHI 161	Plato
GRK 103B Homer: Odyssey		PHI 162	Aristotle
GRK 104 Menander		POL 118A	History of Political Theory: Ancient
GRK 105 Attic Orators		<b>Depth Subject Matter Subtotal</b>	
GRK 106 Greek Hexameter Poetry		<b>Total Units</b>	
GRK 110 Readings in the Greek Novel		<b>40</b>	
GRK 111 Sophocles		<b>66-67</b>	
GRK 112 Aristophanes			
GRK 113 Thucydides			

<sup>1</sup> Please note that CLA 001, CLA 002, CLA 003, & CLA 004 can only be used one time (in either Area 1 OR Area 2) for the Classical Civilization major requirements.

<sup>2</sup> In LAT or GRK (100 & above), or CLA 101A, CLA 101B, CLA 101C, CLA 101D, CLA 101E, and above, except CLA 194HA, CLA 194HB; no more than 4 units from CLA 197TC.

CLA/AHI 172A	Early Greek Art & Architecture
CLA/AHI 172B	Later Greek Art & Architecture
CLA/AHI 173	Roman Art & Architecture
CLA 174	Greek Religion & Society
CLA/AHI 175	Architecture & Urbanism in Mediterranean Antiquity

## Classical Languages & Literatures Track

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>Latin</i>			
LAT 001	Elementary Latin	5	GRK 100
LAT 002	Elementary Latin	5	GRK 101
LAT 003	Intermediate Latin	5	GRK 102
<i>Greek</i>			
GRK 001	Elementary Greek	5	GRK 103A
GRK 002	Elementary Greek	5	GRK 103B
GRK 003	Intermediate Greek	5	GRK 104
<i>Classics</i>			
Choose one:		4	GRK 105
CLA 001	Ancient Near East & Early Greece: 3000-500 B.C.E.		GRK 106
CLA 002	Ancient Greece & the Near East: 500-146 B.C.E.		GRK 110
CLA 003	Rome & the Mediterranean: 800 B.C.E.-500 C.E.		GRK 111
CLA 004	Late Antiquity		GRK 112
Preparatory Subject Matter Subtotal		34	GRK 113
<b>Depth Subject Matter</b>			
Six upper division courses in the two chosen languages, with at least two courses in each language		24	GRK 114
CLA 190	Senior Seminar	4	GRK 115
Choose two from either of the following groups:		8	GRK 116
(a) Additional upper division courses: <sup>1</sup>			GRK 121
Additional upper division courses in Latin or Greek.			GRK 130
CLA 101A	Topics in Ancient Mediterranean Civilizations		GRK 131
CLA 101B	Topics in Greek Civilization		LAT 100
CLA 101C	Topics in Roman Civilization		LAT 101
CLA 101D	Topics in Classical Receptions		LAT 102
CLA 101E	Topics in Ancient Science		LAT 103
CLA 102	Film & the Classical World		LAT 104
CLA 103	Love & Beauty in the Ancient World		LAT 105
CLA 105	Theory & Practice of Greek & Roman Mythology		LAT 106
CLA 110	Origins of Rhetoric		LAT 108
CLA 111	Forms of Knowledge in the Ancient World		LAT 109
CLA 120	Greek & Roman Historiography		LAT 110
CLA 125	Roman Political Thought		LAT 112
CLA 140	Homer & Ancient Epic		LAT 115
CLA 141	Greek & Roman Comedy		LAT 116
CLA 142	Greek & Roman Novel		LAT 118
CLA 143	Greek Tragedy		LAT 119
CLA 150	Socrates & Classical Athens		LAT 120
CLA 171	Mediterranean Bronze Age Archaeology		LAT 121
			LAT 122
			LAT 125
			LAT 130
			LAT 135
			(b) Relevant courses in other departments such as:
			HIS 102A
			Undergraduate Proseminar in History: Ancient
			HIS 111A
			Ancient History
			HIS 111B
			Ancient History
			HIS 111C
			Ancient History

RST 102	Christian Origins	
RST 125	Dead Sea Scrolls, Apocrypha, & Pseudepigrapha	
RST 141A	New Testament Literature: Synoptic Gospels	
RST 141B	New Testament Literature: John	
RST 141C	New Testament Literature: Paul	
PHI 143	Hellenistic Philosophy	
PHI 160	Pre-Socratics	
PHI 161	Plato	
PHI 162	Aristotle	
POL 118A	History of Political Theory: Ancient	
Depth Subject Matter Subtotal		36
<b>Total Units</b>		<b>70</b>

<sup>1</sup> In LAT or GRK (100 & above), or CLA 101A, CLA 101B, CLA 101C, CLA 101D, CLA 101E, and above, except CLA 194HA, CLA 194HB; no more than 4 units from CLA 197TC.

## Classical Civilization, Minor

### College of Letters & Science

The Department offers minors in Classical Civilization, Greek (p. 151) and Latin (p. 151) for those wishing to follow a shorter but formally recognized program of study in Classics.

Code	Title	Units
Choose one:		4
CLA 001	Ancient Near East & Early Greece: 3000-500 B.C.E.	
CLA 002	Ancient Greece & the Near East: 500-146 B.C.E.	
CLA 003	Rome & the Mediterranean: 800 B.C.E.-500 C.E.	
CLA 004	Late Antiquity	
Choose one upper division course in:		4
Latin (LAT) (p. 975)		
OR		
Greek (GRK) (p. 891)		
Choose two additional upper division courses in:		8
Classics (CLA) (p. 655)		
OR		
Greek (GRK) (p. 891)		
OR		
Latin (LAT) (p. 975)		
Choose one additional upper division course selected from either group (a) or (b) in the Classical Civilization major in either track.		4
Classical Civilization (p. 148)		
<b>Total Units</b>		<b>20</b>

## Greek, Minor

### College of Letters & Science

The Department offers minors in Classical Civilization (p. 151), Greek and Latin (p. 151) for those wishing to follow a shorter but formally recognized program of study in Classics.	
<b>Code</b>	<b>Title</b>
Choose one:	
CLA 001	Ancient Near East & Early Greece: 3000-500 B.C.E.
or CLA 002	Ancient Greece & the Near East: 500-146 B.C.E.
Three upper division courses in Greek.	12
Greek (GRK) (p. 891)	
One additional upper division course in Classics, Greek, or Latin.	4
Classics (CLA) (p. 655)	
Greek (GRK) (p. 891)	
Latin (LAT) (p. 975)	
<b>Total Units</b>	<b>20</b>

## Latin, Minor

### College of Letters & Science

The Department offers minors in Classical Civilization (p. 151), Greek (p. 151) and Latin for those wishing to follow a shorter but formally recognized program of study in Classics.

Code	Title	Units
Classics; choose one:		4
CLA 003	Rome & the Mediterranean: 800 B.C.E.-500 C.E.	
or CLA 004	Late Antiquity	
Choose three upper division courses in Latin.		12
Latin (LAT) (p. 975)		
Choose one additional upper division course in Classics, Latin, or Greek.		4
Classics (CLA) (p. 655)		
Latin (LAT) (p. 975)		
Greek (GRK) (p. 891)		
<b>Total Units</b>		<b>20</b>

## Clinical Research (Graduate Group)

### School of Medicine

Stephen Henry, M.D., M.Sc., Chairperson of the Group

## Group Office

CTSC, 2921 Stockton Blvd., Sacramento, CA 95817; 916-703-9110;  
Faculty (<https://health.ucdavis.edu/clinicalresearch/faculty.html>)

- Clinical Research, Master of Advanced Studies (p. 151)

## Clinical Research, Master of Advanced Studies

### School of Medicine

## Graduate Study

The Graduate Group in Clinical Research (GGCR) is an interdisciplinary graduate group in clinical and translational research offering a Master of Advanced Study degree in Clinical Research. The GGCR provides a solid clinical/translational, patient-oriented research foundation for junior faculty, clinical and post-doctoral fellows, medical students, and other health professionals interested in clinical research. The program centers around three core elements: didactic instruction, mentored research, and the capstone project.

The M.A.S. degree requirements include a core intensive curriculum and depends on a cohesive cohort model that provides access to collaborate with researchers across multiple disciplines. Students graduate with the skills necessary to design, conduct, and analyze translational research studies, and to interpret, apply and disseminate research findings. Instruction begins with two summer courses which are followed by a one- or two-year core curriculum plan. Electives can be tailored to best meet each scholar's career development needs.

## Degree Offered

M.A.S. Plan II; Degree Requirements (<https://health.ucdavis.edu/clinicalresearch/curriculum.html>)

## Cognitive Science

### College of Letters & Science

David Corina, Ph.D., Program Director

## Program Office

101 Young Hall; Cognitive Science (<http://cogsci.ucdavis.edu/>); Committee in Charge (<https://cogsci.ucdavis.edu/people/faculty/>)

## Advising

Staff advisors are located in Young Hall; [cogsciadvising@ucdavis.edu](mailto:cogsciadvising@ucdavis.edu). For more information on how to make an appointment or join Drop-In Advising hours, see Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

- Cognitive Science, Bachelor of Arts (p. 152)
- Cognitive Science, Bachelor of Science (p. 153)

## Cognitive Science, Bachelor of Arts

### College of Letters & Science

## The Major Programs

The Cognitive Science major is designed to provide a broad interdisciplinary approach to the study of mind that includes courses from different departments and attracts students with a variety of interests. It emphasizes a multifaceted approach to the study of the mind integrating concepts and techniques from psychology, artificial intelligence, linguistics, neurology, philosophy and other relevant fields.

For students interested in the liberal arts the Cognitive Science major can be pursued as a Bachelor of Arts (A.B.) program. Alternatively, it can be pursued as a Bachelor of Science (B.S.) program for students with a stronger interest in the mathematical, neurological and computational foundations of the discipline. The main objective of both programs is to give the student a broad grounding in the integrated sciences of the mind

and to connect approaches from different fields. Students must complete a number of core courses for the degree, as well as a number of specialty courses on such wide-ranging topics as logic for artificial intelligence, computational linguistics, cognitive neuroscience, animal cognition and the psychology of music.

## Career Alternatives

A degree in Cognitive Science provides broad intellectual foundations useful for careers in a variety of areas, including teaching, business, social work/counseling and the information technology industry.

Undergraduate education in cognitive science also prepares the student for graduate study in appropriate subfields of psychology, linguistics, philosophy and informatics. It is also suitable training for pre-medicine, pre-law, and pre-management students.

## Major Advisors

Staff advisors are located in Young Hall; [cogsciadvising@ucdavis.edu](mailto:cogsciadvising@ucdavis.edu); 530 752 5104. For more information on how to make an appointment or join Drop-In Advising hours, see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Cognitive Science</i>		
CGS 001/PHI 010	Introduction to Cognitive Science	4
<i>Linguistics</i>		
LIN 001 or LIN 001Y	Introduction to Linguistics Introduction to Linguistics	4
<i>Philosophy</i>		
PHI 012	Introduction to Symbolic Logic	4
PHI 013G	Minds, Brains, & Computers with Discussion	4
<i>Psychology</i>		
PSC 001 or PSC 001Y	General Psychology General Psychology	4
<i>Statistics</i>		
STA 013 or STA 013Y or STA 100	Elementary Statistics Elementary Statistics Applied Statistics for Biological Sciences	4
<i>Research Methods</i>		
PSC 041	Research Methods in Psychology (recommended to take Statistics before Research Methods)	4
<b>Preparatory Subject Matter Subtotal</b>		28
<b>Depth Subject Matter</b>		
<i>Group A: Core</i>		
All courses from Group A:		12
PSC 100 or PSC 100Y	Introduction to Cognitive Psychology Introduction to Cognitive Psychology	
PHI 112	Intermediate Symbolic Logic	
CGS Topical Course: one upper division CGS course <sup>1</sup>		
<i>Group B: Computation</i>		
One course from Group B:		4
LIN 177	Computational Linguistics	
PHI 133	Logic, Probability, & Artificial Intelligence	
CMN 150V	Computational Social Science	

CMN 151	Simulating Communication Processes		PHI 112	Intermediate Symbolic Logic
<i>Concentration Areas: 16 units from your choice of two groups from Groups B-F</i>		16	PHI 125	Theory of Action
<i>CGS Electives: 12 additional units from Groups B-G</i>		12	PHI 128	Rationality
<i>Group C: Neuroscience</i>			PHI 137A	Philosophy of Language: Theory of Reference
CGS/ECN 107/	Neuroeconomics/Reinforcement Learning		PHI 137B	Philosophy of Language: Truth & Meaning
PSC 133	& Decision Making		PHI 137C	Philosophy of Language: Semantics & Pragmatics
PSC 121	Physiological Psychology		PSC 113	Developmental Psychobiology
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind		PSC/NPB 124	Comparative Neuroanatomy
PSC 139	Advanced Cognitive Neuroscience		PSC 142	Social & Personality Development or HDE 102
PSC 145	Developmental Cognitive Neuroscience		PSC 148	Social & Personality Development Developmental Disorders
<i>Group D: Linguistics</i>			PSC 152	Social Cognition
LIN 103A	Linguistic Analysis I: Phonetics, Phonology, Morphology		STA 106	Applied Statistical Methods: Analysis of Variance
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics		STA 108	Applied Statistical Methods: Regression Analysis
LIN 131	Introduction to Syntactic Theory		<b>Depth Subject Matter Subtotal</b>	44
LIN 141	Semantics		<b>Total Units</b>	72
LIN 171	Introduction to Psycholinguistics			
LIN/EDU 173	Language Development			
<i>Group E: Philosophy</i>				
PHI 103	Philosophy on Mind			
PHI 104	The Evolution of Mind			
PHI 129	Knowledge & the A Priori			
PHI 136	Formal Epistemology			
<i>Group F: Psychology</i>				
PSC 101	Introduction to Biological Psychology			
PSC 130	Human Learning & Memory			
PSC 131	Perception			
PSC 132	Language & Cognition			
PSC 136	Psychology of Music			
PSC 137	Neurobiology of Learning & Memory			
PSC 140	Developmental Psychology			
or PSC 140Y	Developmental Psychology			
PSC 141	Cognitive Development			
or HDE 101	Cognitive Development			
<i>Group G: Other</i>				
CMN 101	Communication Theories			
CMN 101Y	Communication Theories			
CMN 121	Language Use in Conversation			
EDU 110	Educational Psychology: General			
EDU/LIN 173	Language Development			
HDE 100C	Adulthood & Aging			
HDE 161	Technology Use, Health, & Aging			
HDE 163	Cognitive Neuropsychology in Adulthood & Aging			
LIN 112	Phonetics			
LIN 121	Morphology			
LIN 150	Languages of the World			
LIN 152	Language Universals & Typology			
LIN 182	Multilingualism			
PHI 102	Theory of Knowledge			

<sup>1</sup> For a list of approved CGS Topical Courses, please see the major worksheet (<https://yellowcluster.ucdavis.edu/cognitivescience/>).

## Cognitive Science, Bachelor of Science

College of Letters & Science

### The Major Programs

The Cognitive Science major is designed to provide a broad interdisciplinary approach to the study of mind that includes courses from different departments and attracts students with a variety of interests. It emphasizes a multifaceted approach to the study of mind that integrates concepts and techniques from psychology, artificial intelligence, linguistics, neurology, philosophy and other relevant fields.

For students interested in the liberal arts the Cognitive Science major can be pursued as a Bachelor of Arts (A.B.) program. Alternatively, it can be pursued as a Bachelor of Science (B.S.) program for students with a stronger interest in the mathematical, neurological and computational foundations of the discipline. The main objective of both programs is to give the student a broad grounding in the integrated sciences of the mind and to connect approaches from different fields. Students must complete a number of core courses for the degree, as well as a number of specialty courses on such wide-ranging topics as logic for artificial intelligence, computational linguistics, cognitive neuroscience, animal cognition and the psychology of music.

### Career Alternatives

A degree in Cognitive Science provides broad intellectual foundations useful for careers in a variety of areas, including teaching, business, social work/counseling and the information technology industry. Undergraduate education in cognitive science also prepares the student for graduate study in appropriate subfields of psychology, linguistics,

philosophy and informatics. It is also suitable training for pre-medicine, pre-law, and premanagement students.

Bachelor of Science (B.S.) program students select to pursue either the Computational Emphasis (Emphasis 1) or the Neuroscience Emphasis (Emphasis 2).

## Major Advisors

Staff advisors are located in Young Hall; cogsciadvising@ucdavis.edu; 530 752 5104. For more information on how to make an appointment or join Drop-In Advising, see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

## Computational Emphasis

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>Cognitive Science:</i>			
CGS 001/PHI 010	Introduction to Cognitive Science	4	
<i>Computer Science Engineering</i>			
ECS 020	Discrete Mathematics For Computer Science	4	
Choose a series:		12	
ECS 032A & ECS 032B & ECS 034	Introduction to Programming and Introduction to Data Structures and Software Development in UNIX & C++ (pre-req is ECS 032C)		
ECS 036A & ECS 036B & ECS 036C	Programming & Problem Solving and Software Development & Object-Oriented Programming in C++ and Data Structures, Algorithms, & Programming		
<i>Linguistics</i>			
LIN 001 or LIN 001Y	Introduction to Linguistics	4	
<i>Mathematics</i>			
Choose a series:		12	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine		
<b>OR</b>			
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus		
MAT 022A & 022AL or MAT/BIS 027A	Linear Algebra and Linear Algebra Computer Laboratory Linear Algebra with Applications to Biology	4	
<i>Philosophy</i>			
PHI 012	Introduction to Symbolic Logic	4	
PHI 013G	Minds, Brains, & Computers with Discussion	4	
<i>Psychology</i>			
PSC 001 or PSC 001Y	General Psychology	4	
<i>Research Methods</i>			
PSC 041	Research Methods in Psychology	4	
<i>Statistics</i>			
STA 013 or STA 013Y or STA 100	Elementary Statistics Elementary Statistics Applied Statistics for Biological Sciences		4
<b>Preparatory Subject Matter Subtotal</b>			60
<b>Depth Subject Matter</b>			
<i>Group A: Core</i>			
All courses from Group A:		12	
PSC 100 or PSC 100Y	Introduction to Cognitive Psychology Introduction to Cognitive Psychology		
PHI 112	Intermediate Symbolic Logic		
CGS Topical Course: one upper division CGS course (p. 664) 1			
<i>Group B: Computation</i>			
Choose three from Group B:		12	
ECS 120	Theory of Computation		
ECS 170	Introduction to Artificial Intelligence		
ECS 171	Machine Learning		
LIN 177	Computational Linguistics		
PHI 133	Logic, Probability, & Artificial Intelligence		
<i>Group C: Neuroscience</i>			
Choose one from Group C:		4	
CGS 107/ PSC 133/ECN 107	Neuroeconomics/Reinforcement Learning & Decision Making		
LIN 175	Biological Basis of Language		
PSC 101	Introduction to Biological Psychology <sup>2</sup>		
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind <sup>2</sup>		
PSC 139	Advanced Cognitive Neuroscience		
PSC 145	Developmental Cognitive Neuroscience		
Choose one from Group D or E:		4	
<i>Group D: Philosophy</i>			
PHI 103	Philosophy on Mind		
PHI 104	The Evolution of Mind		
PHI 129	Knowledge & the A Priori		
PHI 136	Formal Epistemology		
<i>Group E: Linguistics</i>			
LIN 103A	Linguistic Analysis I: Phonetics, Phonology, Morphology		
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics		
LIN 150	Languages of the World		
LIN 182	Multilingualism		
<i>Group F: Psychology</i>			
Choose four from Group F (which do not overlap with the Group C course):		15-18	
PSC 101	Introduction to Biological Psychology <sup>2</sup>		
PSC 103A	Statistical Analysis of Psychological Data		
PSC 103B	Statistical Analysis of Psychological Data		
PSC 113	Developmental Psychobiology		
PSC 121	Physiological Psychology		
PSC/NPB 124	Comparative Neuroanatomy		
PSC 130	Human Learning & Memory		
PSC 131	Perception		

PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind <sup>2</sup>	<i>Research Methods</i>
PSC 136	Psychology of Music	PSC 041 Research Methods in Psychology 4
PSC 137	Neurobiology of Learning & Memory	<i>Statistics</i>
PSC 140 or PSC 140Y	Developmental Psychology Developmental Psychology	STA 013 Elementary Statistics 4 or STA 013Y Elementary Statistics or STA 100 Applied Statistics for Biological Sciences
PSC 141	Cognitive Development	Preparatory Subject Matter Subtotal 63-66
Depth Subject Matter Subtotal	47-50	<b>Depth Subject Matter</b>
<b>Total Units</b>	<b>107-110</b>	

- <sup>1</sup> For a list of approved CGS *Topical Courses*, please see the major worksheet (<https://ucdavis.app.box.com/file/458212968122/?s=iu3cby5n5aimx4xvh5vn26scb1bcqq4>).
- <sup>2</sup> PSC 101 and PSC 135 can be used for either Group C or Group F, but not both.

## Neuroscience Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Cognitive Science</i>		
CGS 001/PHI 010	Introduction to Cognitive Science	4
<i>Biological Science</i>		
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
BIS 002A	Introduction to Biology: Essentials of Life on Earth (recommended to take after BIS 002B and BIS 002C)	5
<i>Linguistics</i>		
LIN 001 or LIN 001Y	Introduction to Linguistics Introduction to Linguistics	4
<i>Mathematics</i>		
Choose a series:		12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
<i>Philosophy</i>		
PHI 013G	Minds, Brains, & Computers with Discussion	4
<i>Physics</i>		
Choose a series:		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
<i>Psychology</i>		
PSC 001 or PSC 001Y	General Psychology General Psychology	4
<i>Research Methods</i>		
PSC 041	Research Methods in Psychology	4
<i>Statistics</i>		
STA 013	Elementary Statistics 4	
or STA 013Y	Elementary Statistics	
or STA 100	Applied Statistics for Biological Sciences	
<b>Preparatory Subject Matter Subtotal</b>		
		63-66
<b>Depth Subject Matter</b>		
<i>Group A: Core</i>		
All courses from Group A:		13
NPB 100	Neurobiology	
PSC 103A	Statistical Analysis of Psychological Data	
CGS Topical Course: one upper division CGS course (p. 664) 1		
<i>Group B: Computation</i>		
Choose one from Group B:		4-5
LIN 177	Computational Linguistics	
NPB 167	Computational Neuroscience (offered very irregularly)	
<i>Group C: Neuroscience</i>		
Choose 12-13 units from Group C:		12-13
CGS 107/	Neuroeconomics/Reinforcement Learning	
PSC 133/ECN 107	& Decision Making	
LIN 175	Biological Basis of Language	
NPB 161	Developmental Neurobiology (3 units)	
NPB 162	Neural Mechanisms of Behavior (3 units)	
NPB 163	Systems Neuroscience	
NPB 164	Mammalian Vision	
NPB 165	Neurobiology of Speech Perception (3 units)	
PSC 101	Introduction to Biological Psychology <sup>2</sup>	
PSC 121	Physiological Psychology <sup>2</sup>	
PSC 123/NPB 152	Hormones & Behavior (3 units)	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind <sup>2</sup>	
NPB 139	Advanced Cognitive Neuroscience	
NPB 145	Developmental Cognitive Neuroscience	
Choose two from Groups D or E:		8
<i>Group D: Philosophy</i>		
PHI 103	Philosophy on Mind	
PHI 104	The Evolution of Mind	
PHI 129	Knowledge & the A Priori	
PHI 136	Formal Epistemology	
<i>Group E: Linguistics</i>		
LIN 103A	Linguistic Analysis I: Phonetics, Phonology, Morphology	
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics	
LIN 150	Languages of the World	
LIN 182	Multilingualism	
<i>Group F: Psychology</i>		
Choose two from Group F (which do not overlap with courses selected for Group C):		7

PSC 100 or PSC 100Y	Introduction to Cognitive Psychology Introduction to Cognitive Psychology <sup>2</sup>
PSC 101	Introduction to Biological Psychology <sup>2</sup>
PSC 113	Developmental Psychobiology
PSC 121	Physiological Psychology <sup>2</sup>
PSC/NPB 124	Comparative Neuroanatomy
PSC 130	Human Learning & Memory
PSC 131	Perception
PSC 132	Language & Cognition
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind <sup>2</sup>
PSC 136	Psychology of Music
PSC 137	Neurobiology of Learning & Memory
PSC 140	Developmental Psychology
PSC 141	Cognitive Development

Depth Subject Matter Subtotal	44-46
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Total Units	107-112
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<sup>1</sup> For a list of approved CGS *Topical Courses*, please see the major worksheet (<https://ucdavis.app.box.com/file/458205152398/?s=7ielx1z8rp4i3qq5ajzxe5hzbmw2wyz3>).

<sup>2</sup> PSC 101, PSC 121, and PSC 135 can be used for either Group C or Group F, but not both.

## Communication

### College of Letters & Science

Laramie D. Taylor, Chairperson of the Department

### Department Office

469 Kerr Hall; 530-752-0966; Communication (<http://communication.ucdavis.edu/>); Faculty (<http://communication.ucdavis.edu/directory-of-people/>)

- Communication, Bachelor of Arts (p. 156)
- Communication, Minor (p. 157)
- Communication, Master of Arts (p. 157)
- Communication, Doctor of Philosophy (p. 157)

## Communication, Bachelor of Arts

### College of Letters & Science

### The Major Program

The program of study in communication examines communication processes at several different levels of analysis. Courses dealing with communication at the individual, interpersonal, organizational and societal levels of analysis are offered. The emphasis in the program reflects the changing focus in the discipline and society toward computer-mediated communication, quantitative behavioral science and cognitive science. Classes addressing such topics as communication and cognition, message systems, interpersonal communication, nonverbal communication, persuasion, organizational communication, mass media effects, computer-mediated communication and public

communication campaigns explore communication at these levels of analysis. Related social science courses are also part of the major.

### Major Advisors

Contact department.

### Career Alternatives

Communication graduates have found careers in such fields as broadcast and print journalism, administration, sales, management, politics and government, education, social work, social media, and public relations. A communication degree is also excellent preparation for law school or other graduate programs.

### Grading Recommendation

Although not required, it is recommended that all courses offered in satisfaction of the major, except variable-unit courses, be taken for a letter grade.

### Graduate Study

The Department of Communication offers programs of study and research leading to M.A. and Ph.D. degrees in Communication. Detailed information may be obtained from the Graduate Advisor, Department of Communication.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
ANT 004 or LIN 001 or LIN 001Y	Introduction to Anthropological Linguistics Introduction to Linguistics Introduction to Linguistics	4
CMN 010Y or CMN 010V	Introduction to Communication Introduction to Communication	4
Choose one:		4
CMN 001 CMN 003 or CMN 003Y or CMN 003V	Introduction to Public Speaking Interpersonal Communication Competence Interpersonal Communication Competence Interpersonal Communication Competence	
CMN/LIN 005	Global English & Communication	
ECS 015 or PHI 012	(Discontinued) Introduction to Symbolic Logic	4
PSC 001 or PSC 001Y	General Psychology General Psychology	4
SOC 001	Introduction to Sociology	5
STA 013 or STA 013 or SOC 056 or SOC 056Y	Elementary Statistics Elementary Statistics Introduction to Social Statistics Introduction to Social Statistics	4-5
<b>Preparatory Subject Matter Subtotal:</b>		
<b>Depth Subject Matter</b>		
CMN 101 or CMN 101Y	Communication Theories Communication Theories	4
CMN 102	Empirical Methods in Communication	4
CMN 120	Interpersonal Communication	4
CMN 140	Introduction to Mass Communication	4
Choose one:		4
CMN 170 or CMN 170V	Digital Technology & Social Change Digital Technology & Social Change	

CMN 172	Interpersonal Technologies	SOC 126	Social Interaction	
Choose five:		20-22	STA 106	Applied Statistical Methods: Analysis of Variance
CMN 110	Communication Networks	STA 108	Applied Statistical Methods: Regression Analysis	
CMN 111	Gender Differences in Communication	Depth Subject Matter Subtotal:	40-42	
CMN 112	Theories of Persuasion	Total Units	69-72	
CMN 114	Communication & Cognition	Note: Many of the upper division courses offered by other College of Letters & Science departments have their own prerequisites not accounted for by lower division Communication courses. To the degree that students elect to take those courses having "hidden prerequisites," the number of units necessary to complete the major increases above the stated minimum.		
CMN 121	Language Use in Conversation	<b>Communication, Minor</b>		
CMN 122	Nonverbal Communication	<b>College of Letters &amp; Science</b>		
CMN 123	Intercultural Communication	<b>Career Alternatives</b>		
CMN 124	Family Communication	Communication graduates have found careers in such fields as broadcast and print journalism, administration, sales, management, politics and government, education, social work, and public relations. A communication degree is also excellent preparation for law school or other graduate programs.		
CMN 130	Group Communication			
CMN 131	Strategic Communication in Public Relations			
CMN 132	Social Media for Public Relations			
CMN 136	Organizational Communication			
CMN 139	Advanced Organizational Communication			
CMN 141	Media Effects: Theory & Research			
CMN 142	Newsmaking			
CMN 143	Analysis of Media Messages			
CMN 144	Media Entertainment			
CMN 145	Political Communication			
CMN 146	Communication Campaigns			
CMN 147	Children, Adolescents, & the Media			
CMN 148	Contemporary Trends In Media			
CMN 150V	Computational Social Science			
CMN 151	Simulating Communication Processes			
CMN 161	Health Communication			
CMN 165	Media & Health			
CMN 170	Digital Technology & Social Change			
or CMN 170V	Digital Technology & Social Change			
CMN 172	Interpersonal Technologies			
CMN 174	Social Media			
CMN 176	Video Games Theory & Research			
or CMN 176V	Video Games Theory & Research			
CMN 178	Persuasive Technologies			
CMN 180	Current Topics in Communication			
CMN 189A	Proseminar in Social Interaction			
CMN 189B	Proseminar in Mass Communication			
CMN 189C	Proseminar in Health Communication			
CMN 189D	Proseminar in Organizational Communication			
ANT 120	Language & Culture			
ECN 122	Theory of Games & Strategic Behavior			
LIN 171	Introduction to Psycholinguistics			
LIN 177	Computational Linguistics			
LIN 182	Multilingualism			
POL 165	Mass Media & Politics			
PSC 100	Introduction to Cognitive Psychology			
or PSC 100Y	Introduction to Cognitive Psychology			
PSC 107	Questionnaire & Survey Research Methods			
PSC 152	Social Cognition			
PSC 154	Psychology of Emotion			

## Graduate Study

The Department of Communication offers programs of study and research leading to M.A. and Ph.D. degrees in Communication. Detailed information may be obtained from the Graduate Advisor, Department of Communication.

## Graduate Advisor

Contact the Department of Communication (<http://communication.ucdavis.edu/>).

## Comparative Literature

### College of Letters & Science

Cheryl Ross, Ph.D., Chairperson

## Department Office

215 Sproul Hall; 530-752-1219; Comparative Literature (<http://complit.ucdavis.edu>); Faculty (<https://complit.ucdavis.edu/people/>)

- Comparative Literature, Bachelor of Arts (p. 158)
- Comparative Literature, Minor (p. 159)
- Comparative Literature, Master of Arts (p. 159)
- Comparative Literature, Doctor of Philosophy (p. 160)

## Comparative Literature, Bachelor of Arts

### College of Letters & Science

## The Major Program

Comparative Literature is a dynamic major whose own self-definition is constantly shifting. Once mostly limited to the study of western European literature and its Greco-Roman classical past, today Comparative Literature has become a global interdisciplinary study of literature in original languages and other media (including cinema, television, fine arts, and opera, for example). Thus, we can define Comparative Literature as the study of literature and culture across national boundaries and throughout historical time.

## The Program

Both the major and the minor programs in Comparative Literature allow students to combine courses in one or more national literature departments with courses in Comparative Literature. The introductory course sequence (COM 001-COM 004) provides both an overview of ancient to contemporary literature and film and offers intensive practice in analytical thought. In addition, any one of the courses in the sequence satisfies the university composition requirement. All readings in undergraduate Comparative Literature courses are in English, but majors take upper division courses in at least one foreign literature in the original language.

Students majoring in Comparative Literature choose a first and second literature of concentration, one of which may be English. After the introductory sequence, each student's major course work is divided between courses in the two literatures of concentration and Comparative Literature courses. These Comparative Literature courses encourage students to take a broad view of a historical period, a theme, a genre, or a literary movement. The wide variety of options in the program permits

great flexibility and encourages interdisciplinary connections among literature and philosophy, psychology, history, and the arts. Each student's plan of study must be approved by the major advisor at the beginning and end of each calendar year.

## Advising

All Comparative Literature majors and minors must consult with their advisor, individually, at least once at the beginning and once at the end of each academic year.

## Major Advisor

Consult the Department office.

## Career Alternatives

A Comparative Literature major offers an excellent enhancement to pre-professional training, preparing students for graduate study in medicine, dentistry, veterinary medicine, and other science fields as well as law and business, besides of course journalism and publishing, teaching, or graduate study in literature.

## Honors & Honors Program

Students, who meet the grade point requirement for graduation with honors and complete the requirements established by the College of Letters and Science, may be recommended by the department for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major and in the honors project in particular. Entrance into the honors program requires that a student have completed at least 135 units with a minimum grade point average of 3.500 in courses counted toward the major.

Candidates must write a senior thesis under the direction of a faculty member approved by the major advisor. For this purpose, in addition to fulfilling all other major requirements, honors candidates must enroll in 6 units of COM 194H during the first two quarters of the senior year.

## Teaching Credential Subject Representative

See the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

## Education Abroad Options

The department of Comparative Literature encourages students to study abroad, in the Summer Abroad program, the Quarter Abroad Program, or the Education Abroad Program. With the approval of a major advisor, applicable courses taken abroad may be accepted in the major or minor programs.

## Graduate Study

The Comparative Literature Program offers the Ph.D. degree with a strong emphasis on individual research under the supervision of a faculty member. Candidates for the Ph.D., in addition to research of a comparative nature, study three literatures (one of which may be English and/or American) in the original languages, acquiring an extensive knowledge of the overall development of one. Students may choose to focus on a special topic instead of on a third literary tradition.

Within this framework, each student's program will be tailored to individual interests, and may center on a major historical period, such as the Renaissance or the modern age; a genre, such as lyric poetry, epic, drama, or the novel; or any other special emphasis approved by the Graduate Advisor.

## Preparation

For admission to the Ph.D. Program candidates should have an undergraduate major in literature and reading ability in three foreign languages. The Group requires three letters of recommendation and a sample of recent written work, and it is recommended that students submit their GRE scores.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
COM 001 or COM 002	Major Works of the Ancient World Major Works of the Medieval & Early Modern World	4
COM 003 or COM 004	Major Works of the Modern World Major Works of the Contemporary World	4
Two other lower division courses in Comparative Literature; selected from COM 001-COM 053C excluding the COM 010 series; cannot include the two required courses in the COM 001- COM 004 series:		8
COM 005	Fairy Tales, Fables, & Parables	
COM 006	Myths & Legends	
COM 007	Literature of Fantasy & the Supernatural	
COM 008	Utopias & Their Transformations	
COM 009	The Short Story & Novella	
COM/GER 011	Travel & the Modern World	
COM 012	Introduction to Women Writers	
COM 013	Dramatic Literature	
COM 014	Introduction to Poetry	
COM 020	Humans & the Natural World	
COM 024	Animals in Literature	
COM 025	Ethnic Minority Writers in World Literature	
COM 053A	Literature of East Asia	
COM 053B	Literature of South Asia	
COM 053C	Literatures of the Islamic World	
It is recommended that students who do not use a European language toward the major take one of the remaining required lower division courses in the COM 053 series, preferably the COM 053 course that relates to the region of the language the student is using to satisfy the upper division language requirement in the major.		
<i>Foreign Language</i>		
Sufficient preparation to ensure satisfactory performance at the upper division level.		0-30
See Major Requirements. ( <a href="https://complit.ucdavis.edu/major/">https://complit.ucdavis.edu/major/</a> )		
<b>Preparatory Subject Matter Subtotal</b>		
<b>Depth Subject Matter</b>		
Choose five upper division Comparative Literature courses including at least one course in a major period (such as COM 164A, COM 164B, COM 164C, COM 164D), movement (such as COM 168A, COM 168B, COM 169) or genre (such as COM 160A, COM 160B, COM 161A, COM 161B, COM 163, COM 166A, COM 166B) and including the following required courses:		20
COM 141/CRI 101	Introduction to Critical Theoretical Approaches to Literature & Culture (recommended for the junior year.)	

COM 195	Senior Seminar in Comparative Literature (to be taken in the spring quarter before graduation.)	
Three upper division literature courses in a language other than English.		12
Two additional upper division literature courses in Comparative Literature or in any other program including English or literature in translation.		8
Depth Subject Matter Subtotal		40
<b>Total Units</b>		<b>56-86</b>

## Comparative Literature, Minor

### College of Letters & Science

The minor in Comparative Literature allows students to combine courses in Comparative Literature with courses in a national literature, including English or foreign literature in translation. There is no foreign language requirement for the minor.

### Minor Advisor

Consult the Department office.

### Advising

All Comparative Literature majors and minors must consult with their advisor, individually, at least once at the beginning and once at the end of each academic year.

Code	Title	Units
Choose one:		4
COM 001	Major Works of the Ancient World	
COM 002	Major Works of the Medieval & Early Modern World	
COM 003	Major Works of the Modern World	
COM 004	Major Works of the Contemporary World	
Choose at least five upper division literature courses, at least four of which are in Comparative Literature (COM) <sup>1</sup> . Courses should be chosen in consultation with the approval of the advisor.		20
Subtotal		24
<b>Total Units</b>		<b>24</b>

<sup>1</sup> COM 141 & COM 195 recommended

## Comparative Literature, Master of Arts

### College of Letters & Science

### Graduate Study

#### Thesis-Based MA Program in Comparative Literature

The thesis-based M.A. program in Comparative Literature prepares students for doctoral research or professional employment. Our graduate students are supported by a large group of core and affiliated faculty in Comparative Literature. Our faculty hold cross-appointments with the departments of East Asian Languages & Cultures, English, French & Italian, German & Russian, Middle East/South Asian Languages, and Religious Studies. We welcome applications from students with a

strong humanities background who wish to strengthen their expertise in comparative literature and criticism.

The program combines core courses on the theory and practice of comparison with broad opportunities for work in specific languages and literatures. Students will write a Masters thesis with the support of a thesis committee and a collaborative thesis-writing group.

## Preparation

Consideration for program admission requires evidence of the following:

- A strong undergraduate record in any humanities major.
- Fluent reading, writing, and speaking knowledge in one language that is not the student's native language.
- A clear commitment to the study of a second language that is not the student's native language.

Please see Comparative Literature Graduate Admissions (<https://complit.ucdavis.edu/graduate-admissions/>) for deadlines and application requirements.

## Graduate Advisor

Consult the graduate advising office.

# Comparative Literature, Doctor of Philosophy

College of Letters & Science

## Graduate Study

The Comparative Literature Program offers the Ph.D. degree with a strong emphasis on individual research under the supervision of a faculty member. Candidates for the Ph.D., in addition to research of a comparative nature, study three literatures (one of which may be English and/or American) in the original languages, acquiring an extensive knowledge of the overall development of one. Students may choose to focus on a special topic instead of on a third literary tradition.

Within this framework, each student's program is tailored to individual interests, and may center on a major historical period, such as the Renaissance or the modern age; a genre, such as lyric poetry, epic, drama, or the novel; or any other special emphasis approved by the Graduate Advisor.

## Preparation

For admission to the Ph.D. Program candidates should have an undergraduate major in literature and reading ability in three foreign languages. The Group requires three letters of recommendation and a sample of recent written work. GRE scores are not required.

## Graduate Advisor

Consult the graduate advising office.

# Computer Science

College of Engineering

Dipak Ghosal, Ph.D., Chairperson of the Department; term ends June 30, 2025

## Department Office

2063 Kemper Hall; 530-752-7004; Computer Science (<http://www.cs.ucdavis.edu>); Faculty (<http://www.cs.ucdavis.edu/people/faculty/>)

# The Computer Science & Engineering Program

The Department of Computer Science administers two curricula: Computer Science & Engineering and Computer Science. It also administers two minors: Computer Science and Computational Biology. For information on the Computer Science curriculum and minor; see Computer Science.

## Mission

The University of California, Davis, is, first and foremost, an institution of learning and teaching, committed to serving the needs of society. The Department of Computer Science contributes to the mission in three ways. First, its undergraduate and graduate education programs seek to educate students in the fundamental principles of computer science and the skills needed to solve the complex technological problems of modern society. The breadth of coursework provides a framework for life-long learning and an appreciation for multidisciplinary activities. Second, through its research programs, the department contributes to the development and progress of computer science, and software and information technology, to provide innovative, creative solutions for societal needs. Finally, the department disseminates its research to enhance collaborations with the public sector, further interdisciplinary interests that benefit society, and educate the public through publications, public service, and professional activities.

## Department Objectives

**Teaching**—We seek to provide undergraduate students with a thorough understanding of the key principles and practices of computing, which include a strong theoretical background in mathematics, basic sciences, and engineering fundamentals and an ability to apply this knowledge to practical problems. We endeavor to provide students with sufficient breadth to work creatively and productively in multidisciplinary work teams; this breadth, in its broadest context, will form the basis for an appreciation and interest in life-long learning. We provide students with the opportunities to design and conduct experiments, and to collect and analyze data in core, as well as more specialized, areas of computer science. We provide students with breadth in the humanities and social sciences so they learn to communicate effectively, understand professional and ethical issues in society, and appreciate the interrelatedness between computing and society. We educate graduate students to be our next generation of teachers or leaders in industry, or to pursue meaningful, creative research in industry, government, or academia.

**Research**—We develop and maintain research programs that produce fundamental scientific advances, as well as useful technological innovations, while simultaneously training the next generation of researchers and leaders in the field of computer science.

## Objectives

We train graduates to practice computer science and engineering in a broad range of industries; we prepare interested graduates for graduate education or other professional degrees; we give students an understanding of computer software and hardware systems, and both

theoretical and experimental approaches to problem-solving; we ready graduates for lifelong learning; and we encourage graduates to contribute to their profession and society.

- Computational Biology, Minor (p. 161)
- Computer Science & Engineering, Bachelor of Science (p. 161)
- Computer Science, Bachelor of Science (p. 163)
- Computer Science, Minor (p. 164)

## Computational Biology, Minor

### College of Engineering

The minor in Computational Biology will provide to students with engineering, physical science or biological science majors the foundations necessary to build efficient computational models and algorithms, use state-of-the-art techniques for scientific analysis and create scalable infrastructure environments for biological and biotechnological applications.

### Minor Advisors

Faculty Advisors: V. Filkov, D. Gusfield, P. Koehl, I. Tagkopoulos  
Academic Advisors: A. Abrahamson, K. Gage, J. Sison

Students must take a total of 19-24 upper division units, with two required courses and 11-12 units of upper division electives, as specified below. A minimum GPA of 2.000 is required for coursework in the minor. Students should note that most of the courses listed below have lower division prerequisites. In particular, required course ECS 122A has a prerequisite chain of ECS 020, ECS 036A, ECS 036B, and ECS 036C. No more than one course of upper division work will be permitted for overlap between any major and the minor.

Code	Title	Units
<b>Required Courses</b>		
ECS 122A	Algorithm Design & Analysis	4
ECS 124	Theory & Practice of Bioinformatics	4
<b>Electives</b>		
Choose 12-15 units:		12-15
Choose at least one biology course; 4 units minimum:		
MCB 121	Advanced Molecular Biology	
MCB 124	Macromolecular Structure & Function	
MCB 182	Principles of Genomics	
EVE 100	Introduction to Evolution	
EVE 101	Introduction to Ecology	
EVE 102	Population & Quantitative Genetics	
EVE 103	Phylogeny, Speciation & Macroevolution	
EVE 131	Human Genetic Variation & Evolution	
BIS 101	Genes & Gene Expression	
BIS 104	Cell Biology	
BIS 122	Population Biology & Ecology	
Choose at least one computational or statistics course:		
ECS 130	Scientific Computation	
ECS 132	Probability & Statistical Modeling for Computer Science	
ECS 140A	Programming Languages	
ECS 145	Scripting Languages & Their Applications	

ECS 158	Programming on Parallel Architectures
ECS 160	Software Engineering
ECS 165A	Database Systems
ECS 170	Introduction to Artificial Intelligence
ECS 171	Machine Learning
ECS 177	Scientific Visualization
STA 130A	Mathematical Statistics: Brief Course
STA 141A	Fundamentals of Statistical Data Science
STA 141B	Data & Web Technologies for Data Analysis
STA 141C	Big Data & High Performance Statistical Computing
BIT 150	Applied Bioinformatics
BIS 132	(Discontinued)
Choose at least one computational biology and bioinformatics course:	
ECS 129	Computational Structural Bioinformatics
BIS 132	(Discontinued)
BIM 117	Modeling Strategies for Biomedical Engineering
BIT 150	Applied Bioinformatics

**Total Units** 20-23

## Computer Science & Engineering, Bachelor of Science

### College of Engineering

The Computer Science Engineering major prepares students to do further work in hardware, software, theory, or electronics, either in industry or in postgraduate study.

The primary differences between the Computer Science Engineering and the Computer Science majors are the extent of course work covering hardware and the flexibility of the curriculum. The Computer Science Engineering major develops a solid understanding of the entire machine, including hands-on experience with its hardware components. The Computer Science major has some course work on hardware, at the digital-design level, on simulators. The Computer Science Engineering major has fewer free electives. The CS major's more generous electives make it easier to complete a minor or double major.

A key theme of the Computer Science Engineering curriculum is the hardware/software interaction, a theme reflected in the courses required and the orientation of the courses themselves.

The Computer Science & Engineering major provides students with a solid background in mathematics, physics, chemistry, and electronic circuits and systems, all supporting the computer hardware and computer software courses that constitute the focus of the curriculum.

## Computer Science & Engineering Undergraduate Program

The Computer Science & Engineering program is accredited by the Engineering Accreditation Commission and the Computing Accreditation Commission of ABET (<http://www.abet.org>).

Exclusive of General Education units, the minimum number of units for the Computer Science & Engineering major is 144.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

## Major Advisors

A. Abrahamson, K. Gage, J. Sison

For information on how to speak to an advisor, see CS Undergraduate Advising (<https://cs.ucdavis.edu/advising/>).

Before declaring a major in Computer Science & Engineering, students must complete specific course requirements and meet GPA minimums. For a full list of requirements to declare the major, see CS Advising (<https://cs.ucdavis.edu/undergraduate/changing-majors-double-majors/>).

Code	Title	Units
<b>Lower Division Required Courses</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
Choose one:		3-4
MAT 022A	Linear Algebra	
MAT/BIS 027A	Linear Algebra with Applications to Biology	
MAT 067	Modern Linear Algebra	
MAT 022B or MAT 027B	Differential Equations Differential Equations with Applications to Biology	3-4
or BIS 027B	Differential Equations with Applications to Biology	
<i>Physics</i>		
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
PHY 009D	Modern Physics	4
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
<i>Computer Science Engineering</i>		
ECS 020	Discrete Mathematics For Computer Science	4
ECS 050	Computer Organization & Machine-Dependent Programming	4
Choose a series option (must complete one full series in entirety; mixing of courses between series is not allowed):	12-16	
(a)		
ECS 036A	Programming & Problem Solving	
ECS 036B	Software Development & Object-Oriented Programming in C++	
ECS 036C	Data Structures, Algorithms, & Programming	
(b)		
ECS 032A or ECS 036A	Introduction to Programming Programming & Problem Solving	
ECS 032B	Introduction to Data Structures	

ECS 032C	Implementation of Data Structures in C	
ECS 034	Software Development in UNIX & C++	
<i>Engineering</i>		
ENG 017 or ENG 017V	Circuits I Circuits I	4
<i>Communications</i>		
CMN 001	Introduction to Public Speaking	4
Lower Division Composition/Writing; choose one; a grade of C- or better is required:		4
COM 001	Major Works of the Ancient World	
COM 002	Major Works of the Medieval & Early Modern World	
COM 003	Major Works of the Modern World	
COM 004	Major Works of the Contemporary World	
ENL 003	Introduction to Literature	
NAS 005	Introduction to Native American Literature	
UWP 001	Introduction to Academic Literacies (Recommended)	
UWP 001V	Introduction to Academic Literacies: Online (Recommended)	
UWP 001Y	Introduction to Academic Literacies (Recommended)	
<b>Lower Division Required Courses Subtotal</b>		78-84
<b>Upper Division Required Courses</b>		
<i>Computer Science Engineering</i>		
ECS 132	Probability & Statistical Modeling for Computer Science	4
ECS 140A	Programming Languages	4
ECS 150	Operating Systems & System Programming	4
ECS 152A/EEC 173A	Computer Networks	4
ECS 154A	Computer Architecture	4
ECS 154B	Computer Architecture	4
ECS 160	Software Engineering	4
ECS 188	Ethics in an Age of Technology	4
ECS 193A	Capstone Project	3
ECS 193B	Capstone Project	3
ECS 120 or ECS 122A	Theory of Computation Algorithm Design & Analysis	4
<i>Electrical &amp; Computer Engineering</i>		
EEC 100	Circuits II	5
EEC 172	Embedded Systems	4
<i>Computer Science Electives</i>		
Choose a minimum of four courses and a minimum of 15 units <sup>1</sup>		15
<i>Upper Division Composition Requirement</i>		
Choose one:		0-4
UWP 101 or UWP 101V or UWP 101Y	Advanced Composition (Grade of C- or better required.) Advanced Composition Advanced Composition	
Passing the Upper Division Composition Exam administered by the College of Letters & Science.		
<b>Upper Division Required Courses Subtotal</b>		66-70
<b>Total Units</b>		<b>144-154</b>

<sup>1</sup> Chosen from ECS courses numbered 120 to 189 inclusive; one approved course of 3-5 units from ECS 192 or ECS 199; EEC 171, EEC 180A Discontinued, EEC 180B Discontinued; one course may be taken from the following restricted elective list: ECN 122; LIN 127, LIN 177; MAT 135A, MAT 135B; PSC 120; STA 131A, STA 131B. No course can count as both a required course and a computer science and engineering elective.

## Computer Science, Bachelor of Science

College of Letters & Science

### The Major Program

The Department of Computer Science administers two majors: Computer Science & Engineering (CSE) and Computer Science (CS). It also administers two minors: Computer Science (p. 164) and Computational Biology (p. 161). For information on the Computer Science & Engineering curriculum and the minor in Computational Biology, see Computer Science Engineering (<https://www.ucdavis.edu/majors/computer-science-and-engineering/>).

The primary differences between the CSE and CS majors are the extent of hardware coverage and curricular flexibility. The CSE major develops a solid understanding of the entire machine, including hands-on experience with its hardware components. The CS major teaches some hardware, at the digital-design level, on simulators. The CSE major has fewer free electives. The CS major's more generous electives make it easier to complete a minor or double major.

Students in the CS major receive a solid grounding in the fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstractions underpinning computer science. Students are prepared for both industry and postgraduate study.

### Major Advisors

A. Abrahamson, K. Gage, J. Sison; For information on how to speak to an advisor, see CS Undergraduate Advising (<https://cs.ucdavis.edu/advising/>).

### Graduate Study

See Graduate Studies (<http://gradstudies.ucdavis.edu/>).

Before declaring a major in Computer Science, students must complete specific course requirements and meet GPA minimums. Visit the CS Advising webpage (<https://cs.ucdavis.edu/undergraduate/changing-majors-double-majors/>) for a full list of requirements to declare the major.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
Choose one:		3-4
MAT 022A	Linear Algebra	
MAT/BIS 027A	Linear Algebra with Applications to Biology	

MAT 067	Modern Linear Algebra	
Computer Science Engineering		20
ECS 020	Discrete Mathematics For Computer Science	
ECS 036A	Programming & Problem Solving	
ECS 036B	Software Development & Object-Oriented Programming in C++	
ECS 036C	Data Structures, Algorithms, & Programming	
ECS 050	Computer Organization & Machine-Dependent Programming	
Choose three:		15
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
CHE 002A	General Chemistry	
CHE 002B	General Chemistry	
CHE 002C	General Chemistry	
CHE 004A	General Chemistry for the Physical Sciences & Engineering	
CHE 004B	General Chemistry for the Physical Sciences & Engineering	
CHE 004C	General Chemistry for the Physical Sciences & Engineering	
PHY 009A	Classical Physics	
PHY 009B	Classical Physics	
PHY 009C	Classical Physics	
Preparatory Subject Matter Subtotal		50-51
<b>Depth Subject Matter</b>		
<i>Computer Science Engineering</i>		
ECS 122A	Algorithm Design & Analysis	4
ECS 120 or ECS 122B	Theory of Computation Algorithm Design & Analysis	4
ECS 140A	Programming Languages	4
ECS 150	Operating Systems & System Programming	4
ECS 154A	Computer Architecture	4
Choose one:		4
ECS 132	Probability & Statistical Modeling for Computer Science	
MAT 135A	Probability	
STA 131A	Introduction to Probability Theory	
<i>Computer Science Electives</i>		
Choose a minimum of seven courses, including at least one Mathematics (MAT) or Statistics (STA) course. A minimum of four electives must be (ECS) courses: <sup>1</sup>		26-31
<b>No course can count as both a required course and a Computer Science elective.</b>		
Depth Subject Matter Subtotal		50-55
<b>Total Units</b>		<b>100-106</b>

<sup>1</sup> ECS 120-ECS 189 inclusive; ECS 193AB Discontinued (counts as one); one approved 3-5 unit course from ECS 192 or ECS 199; ECN 122;

EEC 100, EEC 171, EEC 172, EEC 180A Discontinued, EEC 180B Discontinued; LIN 127, 177; MAT 100 Discontinued-MAT 189, excluding MAT 111; STA 131A, STA 131B, STA 141B, STA 141C STS 115; PSC 120.

## Computer Science, Minor

College of Letters & Science

### The Major Program

The Department of Computer Science administers two majors: Computer Science & Engineering (CSE), in the College of Engineering, and Computer Science (CS), in the College of Letters & Science. It also administers two minors: Computer Science, in the College of Letters & Science, and Computational Biology, in the College of Engineering. For information on the Computer Science & Engineering curriculum and the minor in Computational Biology, see Computer Science Engineering (p. 161).

The primary differences between the CSE and CS majors are the extent of hardware coverage and curricular flexibility. The CSE major develops a solid understanding of the entire machine, including hands-on experience with its hardware components. The CS major teaches some hardware, at the digital-design level, on simulators. The CSE major has fewer free electives. The CS major's more generous electives make it easier to complete a minor or double major.

Students in the CS major receive a solid grounding in the fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstractions underpinning computer science. Students are prepared for both industry and postgraduate study.

Code	Title	Units
Choose any three upper division Computer Science Engineering (ECS) courses <sup>1</sup>		11-12
Choose any two upper division ECS courses or any upper division course in MAT: <sup>2</sup>		8-10
EEC 100	Circuits II	
EEC 171	Parallel Computer Architecture	
EEC 172	Embedded Systems	
EEC 180	Digital Systems II	
ECN 122	Theory of Games & Strategic Behavior	
STA 131A	Introduction to Probability Theory	
STA 131B	Introduction to Mathematical Statistics	
STA 141B	Data & Web Technologies for Data Analysis	
STA 141C	Big Data & High Performance Statistical Computing	
PSC 120	Agent-Based Modeling	
LIN 127	Text Processing & Corpus Linguistics	
LIN 177	Computational Linguistics	
<b>Total Units</b>		<b>19-22</b>

<sup>1</sup> A single approved course of 3-5 units from ECS 192 or ECS 199 is allowed.

<sup>2</sup> Excluding MAT 111.

Dipak Ghosal, Ph.D., Chairperson of the Group

### Group Office

2063 Kemper Hall (Department of Computer Science); 530-752-7004; Advising ([csgradadvising@ucdavis.edu](mailto:csgradadvising@ucdavis.edu)); Computer Science Graduate Group (<http://www.cs.ucdavis.edu>); Faculty (<https://cs.ucdavis.edu/> directory/)

- Computer Science, Master of Science (p. 164)
- Computer Science, Doctor of Philosophy (p. 164)

## Computer Science, Master of Science

College of Engineering

### Graduate Study

The Graduate Group in Computer Science offers programs of study leading to M.S. and Ph.D. degrees in Computer Science. The diverse expertise of the faculty brings a wide variety of research interests to the program. Research strengths lie in algorithms, artificial intelligence, computational biology, computer architecture, computer graphics and visualization, computer vision, computer science education, computer security and cryptography, computer networks, data science, database systems, machine learning, molecular computing, nanotechnology, natural language processing, network science, parallel and distributed systems, program specifications and verification, programming languages and compilers, quantum computing, scientific computation, social and ethical issues of computing, and software engineering. Interdisciplinary research in computer science is encouraged.

### Preparation

Normal preparation for the program is a bachelor's degree in either computer science or in a closely related field (such as electrical engineering or mathematics, with substantial course work in computer science). Applications are also considered from students with outstanding records in other disciplines. Ph.D. students must pass a qualifying oral examination and complete a dissertation demonstrating original research in an area approved by the Graduate Group.

### Graduate Advisors

M. Franklin, Z. Bai, M. Farrens, C. Rubio Gonzalez

## Computer Science, Doctor of Philosophy

College of Engineering

### Graduate Study

The Graduate Group in Computer Science offers programs of study leading to M.S. and Ph.D. degrees in Computer Science. The diverse expertise of the faculty brings a wide variety of research interests to the program. Research strengths lie in algorithms, artificial intelligence, computational biology, computer architecture, computer graphics and visualization, computer vision, computer science education, computer security and cryptography, computer networks, data science, database systems, machine learning, molecular computing, nanotechnology, natural language processing, network science, parallel and distributed systems, program specifications and verification, programming languages and compilers, quantum computing, scientific computation,

## Computer Science (Graduate Group)

College of Engineering

social and ethical issues of computing, and software engineering. Interdisciplinary research in computer science is encouraged.

## **Preparation**

Normal preparation for the program is a bachelor's degree in either computer science or in a closely related field (such as electrical engineering or mathematics, with substantial course work in computer science). Applications are also considered from students with outstanding records in other disciplines. Ph.D. students must pass a qualifying oral examination and complete a dissertation demonstrating original research in an area approved by the Graduate Group.

## **Graduate Advisors**

M. Franklin, Z. Bai, M. Farrens, C. Rubio Gonzalez

# **Cultural Studies (Graduate Group)**

**College of Letters & Science**

Rana Jaleel, Graduate Group Chair

## **Group Office**

3129 Hart Hall; 530-754-9765; Cultural Studies Graduate Group (<https://culturalstudies.ucdavis.edu/>); Faculty (<https://culturalstudies.ucdavis.edu/people/?first=&last=&title=&unit=>)

- Cultural Studies, Master of Arts (p. 165)
- Cultural Studies, Doctor of Philosophy (p. 165)

# **Cultural Studies, Master of Arts**

**College of Letters & Science**

## **Graduate Study**

The Graduate Group in Cultural Studies at UC Davis offers an interdisciplinary approach to the study of culture and society that highlights how sexuality, race, ability, citizenship, gender, nationality, class, and language organize embodied identities, social relations, and cultural objects. With the close guidance and supervision of a faculty committee, students in the program pursue interdisciplinary research in areas including studies of comparative and critical race, ecocriticism, fashion, queer theory, media and popular cultural representation, science and technology, Marxist theory, travel, and tourism, food, physical and cognitive abilities, cultural geography, transnational culture and politics, globalization, religion, rhetoric, performance, and critical theory. Although both the Ph.D. and M.A. are offered, applications are only accepted for the Ph.D. program, and the M.A. is available as a terminal degree in route to the Ph.D.

## **Preparation**

Normal preparation for the program is a bachelor's degree in a related field. Terminal M.A. students must pass an examination. Ph.D. students must pass a qualifying examination, a comprehensive examination, and complete a dissertation demonstrating original research in an area approved by the Graduate Group. In addition to the standard UC Davis graduate application (which requires a statement of purpose), we also require three letters of recommendation, transcripts, GRE scores, writing sample (ten-page minimum, not exceeding twenty pages), and a fellowship application.

## **Graduate Advisors**

Rana Jaleel (Gender, Sexuality, & Women's Studies), Kris Fallon (Cinema & Digital Media, Science & Technology Studies), Wendy Ho (Gender, Sexuality, & Women's Studies, Asian American Studies), Mark Jerng (English), Richard Kim (Asian American Studies)

# **Cultural Studies, Doctor of Philosophy**

**College of Letters & Science**

## **Graduate Study**

The Graduate Group in Cultural Studies at UC Davis offers an interdisciplinary approach to the study of culture and society that highlights how sexuality, race, ability, citizenship, gender, nationality, class and language organize embodied identities, social relations and cultural objects. With the close guidance and supervision of a faculty committee, students in the program pursue interdisciplinary research in areas including studies of comparative and critical race, ecocriticism, fashion, queer theory, media and popular cultural representation, science and technology, Marxist theory, travel and tourism, food, physical and cognitive abilities, cultural geography, transnational culture and politics, globalization, religion, rhetoric, performance, and critical theory. Although both the Ph.D. and M.A. are offered, applications are only accepted for the Ph.D. program, and the M.A. is available as a terminal degree in route to the Ph.D.

## **Preparation**

Normal preparation for the program is a bachelor's degree in a related field. Terminal M.A. students must pass an examination. Ph.D. students must pass a qualifying examination, a comprehensive examination, and complete a dissertation demonstrating original research in an area approved by the Graduate Group. In addition to the standard UC Davis graduate application (which requires a statement of purpose), we also require three letters of recommendation, transcripts, GRE scores, writing sample (ten-page minimum, not exceeding twenty pages), and a fellowship application.

## **Graduate Advisors**

Rana Jaleel (Gender, Sexuality, & Women's Studies), Kris Fallon (Cinema & Digital Media, Science & Technology Studies), Wendy Ho (Gender, Sexuality, & Women's Studies, Asian American Studies), Mark Jerng (English), Richard Kim (Asian American Studies)

## **Design**

**College of Letters & Science**

# **Department Office**

101 Art Building; 530-752-0890; Design (<https://arts.ucdavis.edu/design/>); Faculty (<http://arts.ucdavis.edu/design-people-0/>)

- Design, Bachelor of Arts (p. 165)
- Design, Master of Fine Arts (p. 168)

# **Design, Bachelor of Arts**

**College of Letters & Science**

## The Major Program

The Department of Design offers a creative, challenging, and flexible approach to the study of design with emphasis on socially responsible, human centered, and sustainable practice.

### The Program

Foundation courses: Introduction to Design; Design Drawing or Drafting and Perspective, Form & Color, and Graphic Design & Computer Technology; and one class in Design History/Theory/Criticism from the DES 040 series; are required of all design majors. Additional coursework in the student's area of interest is required for the Preparatory Subject Matter. Depth Subject Matter courses provide: (1) further exploration of design principles and conceptual, formal and technical issues; (2) conceptual and critical development through a series of history and theory classes; (3) in-depth studio experience with projects that demonstrate a research-based, iterative design process. Optional capstone class. A more detailed explanation is available through the Design Advising office in 101 Art Building; 530-752-0890.

### Portfolios

Portfolios are not required for admission to the major. However, it is highly recommended that design students maintain an updated portfolio of work for faculty and professional evaluation and consideration for enrollment in specialized courses, including independent study, group study and internship.

### Internships, Careers, & Study Abroad

Design students are encouraged to supplement their coursework with internships in design firms, museums, and design-related businesses. Design graduates go directly from this program into further graduate study, or professional work including exhibition, fashion, information, interior architecture & product (lighting & furniture), textiles, visual communications (digital, environmental & print), and sustainable design. In addition, students have become entrepreneurs through freelance and commissioned work in many related areas. The Department of Design encourages students to experience design education abroad through a variety of sponsored programs.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Design</i>		
DES 001	Introduction to Design (Fall Only)	4
DES 014 or DES 021	Design Drawing Drafting & Perspective	4
DES 015	Form & Color	4
DES 016	Graphic Design & Computer Technology	4
<i>University Writing Program</i>		
Choose one:		4
UWP 011	Popular Science & Technology Writing	
UWP 012	Writing & Visual Rhetoric (Preferred)	
UWP 048	Style in the Essay	
UWP 049	Writing Research Papers	
Choose one:		4
DES 040A/ SAS 043	Energy, Materials, & Design Over Time	
DES 040B	Ideologies of Design	
DES 040C	Design for Aesthetics & Experience	

DES 040D	Designed Geographies: Environment, Containment, Sanctuary	4
Choose one:		
DES 021	Drafting & Perspective (Can only be used for this requirement if not counted above.)	
DES 040A/ SAS 043	Energy, Materials, & Design Over Time (Can only be used for this requirement if not counted above.)	
DES 040B	Ideologies of Design (Can only be used for this requirement if not counted above.)	
DES 040C	Design for Aesthetics & Experience (Can only be used for this requirement if not counted above.)	
DES 040D	Designed Geographies: Environment, Containment, Sanctuary (Can only be used for this requirement if not counted above.)	
DES 050	Introduction to Three-Dimensional Design	
DES 051	Computer-Assisted Drawing for Designers	
DES 070	Introduction to Textile Design Structures	
DES 077	Introduction to Structural Design for Fashion	
ART 012	Beginning Video	
<b>Preparatory Subject Matter Subtotal</b>		28
<b>Depth Subject Matter</b>		
<i>List A:</i>		
Choose three from list A:		12
AHI 100	Methods of Art History	
AHI 101	Understanding Museum Practices	
AHI 102	Exhibition Practicum	
AHI 110	Cultural History of Museums	
AHI 120A	Art, Architecture, & Human Rights	
AHI 122	Sex & Space	
AHI 121	Politics of Public Art	
AHI 123	The Museum in the Age of Spectacle	
AHI 130	Landscape, Nature, & Art	
AHI 148	Theory & Criticism: Painting & Sculpture	
AHI 150	Arts of Subsaharan Africa	
AHI 151	Arts of the Ancient New World	
AHI 152	Arts of Oceania & Prehistoric Europe	
AHI 153	Hindu Gods & Hindu Symbols	
AHI 154	The Hindu Temple	
AHI 155	The Islamic City	
AHI 156	Arts of the Islamic Book	
AHI 157	Buddhist Art	
AHI 158	Popular Religious Art in India	
AHI 163A	Early Chinese Art	
AHI 163B	Chinese Painting	
AHI 163C	Early Modern Chinese Painting	
AHI 163D	Art from China 1900 to the Present	
AHI 164	The Arts of Japan	
AHI 168	Great Cities	
AHI 172A	Early Greek Art & Architecture	
AHI 172B	Later Greek Art & Architecture	
AHI 173	Roman Art & Architecture	

AHI 175	Architecture & Urbanism in Mediterranean Antiquity	Choose five from lists B & C; one may be a non-Design (DES) course:	20
AHI 184	20th-Century Architecture	<i>List B:</i>	
AHI 173	Roman Art & Architecture	DES 107 Advanced Structural Design for Fashion	
AHI 175	Architecture & Urbanism in Mediterranean Antiquity	DES 111 Coding for Designers	
AHI 176A	Art of the Middle Ages: Early Christian & Byzantine Art	DES 112 UI/UX Design: Principles & Practices	
AHI 176B	Art of the Middle Ages: Early Medieval & Romanesque Art	DES 113 Photography & Digital Imaging	
AHI 176C	Art of the Middle Ages: Gothic	DES 115 Letterforms & Typography	
AHI 177	Northern Renaissance Art	DES 116 Visual Communication: Graphic Design Studio	
AHI 178B	Early Italian Renaissance Art & Architecture	DES 117 Interactive Media I	
AHI 178C	High & Late Italian Renaissance Art & Architecture	DES 126 Design Ethnography	
AHI 179B	Baroque Art	DES 127B Studio Practice in Sustainable Design	
AHI 180	Arts of the Rococo	DES 128B Biodesign Experimentation & Prototyping: Biodesign Challenge Part II	
AHI 181	Latin American Art & Architecture	DES 131 Global Fashion & Product Design	
AHI 182	British Art & Culture (1750-1900)	DES 132A Textile Design: Woven Structures	
AHI 183A	Art in the Age of Revolution, 1750-1850	DES 132B Loom-Constructed Textile Design	
AHI 183B	Impressionism & Post-Impressionism: Manet to 1900	DES 134A Introduction to Interior Design—Residential	
AHI 183C	Modernism in France, 1880-1940	DES 134B Introduction to Interior Design—Commercial & Technical Spaces	
AHI 184	20th-Century Architecture	DES 135A Furniture Design & Detailing	
AHI 185	Avant-Gardism & its Aftermath, 1917-1960	DES 135B Furniture Design & Prototyping	
AHI 186	Contemporary Art 1960-Present	DES 136A Lighting Technology & Design	
AHI 187	Contemporary Architecture	DES 136B Designing with Light—Industrial Design	
AHI 188A	The American Home	DES 137A Daylighting & Interior Design	
AHI 188B	Architecture of the United States	DES 137B Daylighting Design Studio	
AHI 188C	American Art to 1910	DES 150 Computer-Assisted Presentations for Interior Architecture	
AHI 189	Photography in History	DES 151 Type in Motion	
DES 127A	Sustainable Design	DES 155A Pattern, Form & Surface	
DES 128A	Biodesign Theory & Practice: Biodesign Challenge Part I	DES 156 Graphitecture: Architecture in the Age of New Media	
DES 138	Materials & Methods in Interior Design	DES 157A Interactive Media II	
DES 141	Cultural Studies of Fashion	DES 158 Data & Large-Scale Installation	
DES 142A	World Textiles: Eastern Hemisphere	DES 160 Textile Surface Design: Patterns & Resists	
DES 142B	World Textiles: Western Hemisphere	DES 161 Textile Surface Design: Screen & Digital Printing	
DES 143	History of Fashion	DES 165 Studio Practices in Industrial Design	
DES 144	History of Interior Architecture	DES 166 Human Centered Design	
DES 145	History of Visual Communication	DES 167 Prototyping: From Objects to Systems	
DES 146	Mobilities	DES 168 Interactive Objects	
DES 148	Trend Research & Forecasting in Design	DES 169 Advanced Explorations in Textile Design	
DES 149	Information Design: Principles & Practice	DES 170 Experimental Fashion & Textile Design	
DRA 114	Theatre on Film	DES 171 Fashion Drawing: Technical & Illustration	
DRA/CTS 116	Design on Screen	DES 175 Functional Apparel Design	
DRA 150	American Theatre & Drama	DES 177 Computer-Assisted Fashion Design	
DRA 155	Representing Race in Performance	DES 178 Design & Wearable Technology	
CDM 155	(Pending Approval)	DES 180A Advanced Interior Design: Institutional Spaces	
CDM 159	(Pending Approval)	DES 185 Exhibition Design	
TCS 155	Introduction to Documentary Studies	DES 186 Environmental Graphic Design	
TCS 159	Media Subcultures	DES 191A Workshops in Design	

DES 191B	Workshops in Design
DES 191C	Workshops in Design
DES 191D	Workshops in Design

One from the following approved list may count:

ART 110A	Intermediate Photography: Black & White Analog
ART 110B	Intermediate Photography: Digital Imaging
ART 113	Interdisciplinary Art
ART 114A	Intermediate Video: Animation
CDM 100	Experimental Digital Cinema I
CDM 104	Documentary Production
CDM 125	Advanced Sound: Performance & Improvisation
CDM 130	Fundamentals of Computer Graphics
CDM 131	Character Animation
CHI 172	Chicana/o Voice/Poster Silk Screen Workshop
DRA 124A	Principles of Theatrical Design: Scenery
DRA 124B	Principles of Theatrical Design: Scenery
DRA 124C	Principles of Theatrical Design: Lighting
DRA 124D	Principles of Theatrical Design: Costume
DRA/CTS 124E	Costume Design for Film
DRA 128	Principles of Theatre Sound
DRA 130	Approaches to Theatrical Design: Practice & Theory
DRA 170	Media Theatre
LDA 141	Community Participation & Design

*List C:*

Capstone Course Option; these courses are the most advanced in the major and prerequisites are strictly enforced:

DES 154	Visual Communication: Message Campaign Design
DES 159	Design for Understanding
DES 157B	Interactive Media III
DES 179	Fashion Design: Signature Collection
DES 180B	Advanced Interior Architecture
DES 187	Narrative Environments

Choose two from list A, B, or C that have not been previously counted.

Note: Substitutions for the listed courses may be allowed under certain circumstances with prior departmental approval.

Depth Subject Matter Subtotal	40
Total Units	68

## Design, Master of Fine Arts

### College of Letters & Science

The M.F.A. in Design at UC Davis is a two-year program that encourages interdisciplinary approaches through research and practice aligning with social and environmental responsibility. We offer graduate students a unique opportunity to work with faculty in the Department of Design and across departments in one of the nation's top public research universities. Design faculty expertise includes design theory, exhibition, fashion, history, information, interactivity, interior architecture, immersion, lighting, product, textiles, time-based, visual communication, wearables,

and more. Students are encouraged to build connections across campus to expand perspectives and deepen understandings. Students' progress through core courses alongside their cohort members while advancing their individual research. Core courses are augmented by graduate-level independent and group studies and upper-division undergraduate level electives. The M.F.A. program culminates in a written- and project-based thesis publicized in a major graduate exhibition. The program is committed to equity, diversity, inclusion and public engagement.

For more information, see MFA in Design (<http://arts.ucdavis.edu/design-graduate-program/>).

## Program Contact

Rachelle Agundes ([ragundes@ucdavis.edu](mailto:ragundes@ucdavis.edu)), Graduate Program Coordinator (Art History, Art Studio, Design, & Dramatic Art); 530-752-8710.

## Designated Emphasis, Ph.D

### Graduate Studies

This is a partial list. For more information, see Designated Emphases (<https://grad.ucdavis.edu/designated-emphases/>).

- Biotechnology, Designated Emphasis (p. 168)
- Computational Social Science, Designated Emphasis (p. 168)
- Critical Theory, Designated Emphasis (p. 169)
- Feminist Theory & Research, Designated Emphasis (p. 169)
- Global Nutrition, Designated Emphasis (p. 169)

## Biotechnology, Designated Emphasis

### College of Agricultural & Environmental Sciences

(Office of Research)

Abhaya Dandekar, Ph.D., Chairperson

### Department Office

302 Green Hall; 530-752-1048; Designated Emphasis in Biotechnology (<https://deb.ucdavis.edu/>); Faculty (<https://deb.ucdavis.edu/current-deb-faculty/>)

8 The Designated Emphasis in Biotechnology (DEB) is an inter-graduate group program that allows Ph.D. students to receive and be credited for training in the area of biotechnology. Currently, there are 29 STEM graduate programs affiliated with the DEB. Coursework and program activities provide a basic understanding of the "business of biotech" and common platform technologies, develop transferable professional skills informed by interactions with industry partners, and prepare students for a diverse range of biotech-related careers. The UC Davis Biotechnology Program (<https://biotech.ucdavis.edu/>) is the administrative home for this program.

## Computational Social Science, Designated Emphasis

### College of Letters & Science

Martin Hilbert, Ph.D., Chairperson of the Program

## **Program Office**

Communication; 370 Kerr Hall; 530-752-3464; Computational Social Science (<http://css.ucdavis.edu>); Faculty (<https://css.ucdavis.edu/our-people/>)

## **Graduate Study**

Computational social science provides scholars with the tools to deepen the understanding of long-standing questions in the social sciences, as well as explore new ones. The DE in Computational Social Science is both interdisciplinary in terms of requiring foundations in computational methods, data analysis, and social science theory, and it is multidisciplinary in terms of blurring the traditional boundaries between disciplines in the social sciences. This DE allows students with computational and mathematical skills to deepen their understanding of social science theory and to study unanswered social science research questions; and it allows students from the social sciences to improve their analytical skills in areas like big data analysis, computer simulations, network analysis and machine learning.

## **Graduate Advisor**

Consult Communication Program (<http://communication.ucdavis.edu/>) office.

# **Critical Theory, Designated Emphasis**

## **College of Letters & Science**

Kathleen Frederickson, Ph.D., Chairperson of the Program

## **Program Office**

207 Sproul Hall; 530-752-2115; Critical Theory (<http://crittheory.ucdavis.edu>)

## **Committee in Charge**

Executive Committee (<https://crittheory.ucdavis.edu/people/>); Faculty (<http://crittheory.ucdavis.edu/people/>)

## **Graduate Study**

The program in Critical Theory offers study and research leading to the Ph.D. with a designated emphasis in Critical Theory. The program provides theoretical emphasis and interdisciplinary perspective to students already preparing for the Ph.D. in one of 14 participating graduate programs (Anthropology, Comparative Literature, Cultural Studies, Education, English, French, German, History, Music, Psychology, Sociology, Spanish, Study of Religion, and Performance Studies). Students complete all requirements for the Ph.D., including the dissertation, in one of the participating departments. Minimum coursework for the Critical Theory Designated Emphasis consists of four courses. The first three of these, CRI 200A, CRI 200B, and CRI 200C are taught by affiliated faculty, with CRI 200A normally being taken first. For the fourth course, students have the option of taking another section of CRI 200B or an approved course from any affiliated department.

## **Graduate Advisor**

Consult Critical Theory Program (<http://crittheory.ucdavis.edu>) office.

# **Feminist Theory & Research, Designated Emphasis**

## **College of Letters & Science**

Rana Jaleel, Ph.D., Advisor

## **Program Office**

1200 Hart Hall; 530-752-6429; Gender, Sexuality & Women's Studies (<http://gsws.ucdavis.edu/welcome/>)

## **Graduate Study**

The Gender, Sexuality & Women's Studies Program at UC Davis offers a Designated Emphasis in Feminist Theory & Research. Currently, graduate students in the following sixteen affiliated Ph.D. programs are eligible to participate: Anthropology, Comparative Literature, Cultural Studies, Education, English, French, German, Geography, History, Native American Studies, Nursing, Performance Studies, Psychology, Sociology, Spanish, and the Study of Religion.

The Designated Emphasis in Feminist Theory & Research affords graduate students in affiliated programs the opportunity to augment their Ph.D. in a given discipline with a specialization in Feminist Theory & Research. Typically a doctoral student in good standing may seek admission to the Designated Emphasis in Feminist Theory & Research and enroll in Designated Emphasis in Feminist Theory & Research courses. Those students in affiliated Ph.D. programs who complete the requirements of the Designated Emphasis will have this noted on their transcripts and their Ph.D. diploma will note the "Special Emphasis in Feminist Theory & Research."

Students must complete all the requirements for the Ph.D. in their home department. The requirements for the Designated Emphasis in Feminist Theory & Research are the successful completion of the two core courses, Women's Studies GSW/WMS 200A & GSW 200B, and two additional courses focusing on gender, sexuality and women's studies; one in the student's home department and one outside their home department. A member of the DE affiliated faculty must be a member of the student's qualifying examination. As with the Qualifying Exam, one member of the candidate's dissertation committee must be a member of the DE. Analysis of gender or sexuality is expected to be a central component of both the student's qualifying examination and doctoral research.

Students should consult with the Chair of the Designated Emphasis in Feminist Theory & Research before enrolling in a graduate course for which they wish to receive credit to ensure that it will count toward fulfilling the requirements of the Designated Emphasis. If possible, please bring a copy of the syllabus or an expanded course description to your meeting.

## **Graduate Advisor**

Rana Jaleel ([rmjaleel@ucdavis.edu](mailto:rmjaleel@ucdavis.edu)); 1200 Hart Hall; 530-752-6429. For more information, see the Designated Emphasis (<https://gsws.ucdavis.edu/designated-emphasis/>).

# **Global Nutrition, Designated Emphasis**

Reina Engle-Stone, Ph.D., Chair

## **Program Office**

3253 Meyer Hall; 530-752-1992; Global Nutrition DE ([https://globalnutrition.ucdavis.edu/academics/designated\\_emphasis/](https://globalnutrition.ucdavis.edu/academics/designated_emphasis/)); Faculty (<https://globalnutrition.ucdavis.edu/people/faculty/>)

## Graduate Study

The Institute for Global Nutrition coordinates specialized course work and research leading to the Designated Emphasis in Global Nutrition for students in various graduate programs. The program focuses on both theoretical and practical issues concerning the identification, treatment, and prevention of human nutritional problems in low-income countries and in disadvantaged groups in the United States. Students enrolled in the Designated Emphasis are expected to (1) complete the course requirements already established by their respective graduate programs, (2) participate in a weekly advanced seminar in international and community nutrition, (3) complete additional core courses in international nutrition (NUT 219A, NUT 219B, NUT 258) and selected courses in the related disciplines of epidemiology, statistics, and social and behavioral sciences, and (4) conduct their dissertation research on a relevant topic under the supervision of a professor who is a member of the Institute for Global Nutrition.

Students accepted into the following doctoral programs are automatically eligible to participate in the Designated Emphasis: Nutrition, Agricultural & Resource Economics, Epidemiology, Anthropology, Geography, and Human Development. Students from other programs may also be accepted by special request to the Chair. Upon graduation, students receive a Ph.D. in their major field, with specific recognition for the Designated Emphasis in Global Nutrition.

## Graduate Advisor

Contact the Program office.

# Earth & Planetary Sciences

## College of Letters & Science

Kari M. Cooper, Ph.D., Chairperson of the Department  
 Ryosuke Motani, Ph.D., Vice-Chairperson, Undergraduate Program  
 Magali I. Billen, Ph.D., Vice-Chairperson, Graduate Program

## Programs

The Department of Earth & Planetary Sciences (<https://eps.ucdavis.edu/>) houses the following programs and courses; Faculty (<https://eps.ucdavis.edu/people/faculty/>).

### Major Programs

See Geology (p. 173) and Marine & Coastal Science (p. 177).

### Minor Programs

See Geology (p. 175), Environmental Geology (p. 170), Geophysics (p. 176), and Oceanography (p. 181).

### Graduate Programs

See Earth & Planetary Sciences, Master of Science (p. 170) and Earth & Planetary Sciences, Doctor of Philosophy (p. 170).

### Associated Program

Undergraduate students who might wish to become a K-12 STEM teacher should consult an advisor in the Cal Teach/Mathematics & Science Teaching Program (CalTeach/MAST) (<https://mast.ucdavis.edu/>) at their first opportunity in order to combine the prerequisites needed to apply for a credential program with general education requirements. The Teaching Credential Program (<https://education.ucdavis.edu/teaching-credentialma/>) at UC Davis resides in the School of Education.

## Courses

See courses listed under Geology (p. 868).

- Earth & Planetary Sciences, Master of Science (p. 170)
- Earth & Planetary Sciences, Doctor of Philosophy (p. 170)
- Environmental Geology, Minor (p. 170)
- Geology, Bachelor of Arts (p. 171)
- Geology, Bachelor of Science (p. 173)
- Geology, Minor (p. 175)
- Geophysics, Minor (p. 176)
- Marine & Coastal Science, Bachelor of Science (p. 177)
- Oceanography, Minor (p. 181)

# Earth & Planetary Sciences, Master of Science

## College of Letters & Science

The Earth & Planetary Sciences department offers programs of study and research leading to M.S. and Ph.D. degrees in Earth & Planetary Sciences. For more information, see Earth & Planetary Sciences Graduate Program (<https://eps.ucdavis.edu/students/grad/>).

## Graduate Advisors

M.I. Billen, B. C. Ratschbacher, S. Mukhopadhyay

# Earth & Planetary Sciences, Doctor of Philosophy

## College of Letters & Science

The Earth & Planetary Sciences department offers programs of study and research leading to M.S. and Ph.D. degrees in Earth & Planetary Sciences. For more information, see Earth & Planetary Sciences Graduate Program (<https://eps.ucdavis.edu/students/grad/>).

## Graduate Advisors

M.I. Billen, B. C. Ratschbacher, S. Mukhopadhyay

# Environmental Geology, Minor

## College of Letters & Science

The minor in Environmental Geology examines the multidisciplinary factors of geology and related earth science fields, and planning and resources-oriented programs. Students in the minor are encouraged to participate in internship programs that assist them in solidifying the Environmental Geology minor with their Geology major or other major field areas that include geologic components.

Students majoring in **Geology** may elect to complete a minor in Geophysics, Environmental Geology, or Oceanography. They may not complete a minor in Geology.

Students majoring in **Marine & Coastal Science** may elect to complete a minor in Geology, Geophysics, or Environmental Geology. They may not complete a minor in Oceanography.

The minor is sponsored by the Department of Earth & Planetary Sciences (p. 170).

## Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating minor requirements, policies, prerequisites, and course offerings. Visit the faculty major advisors (<https://eps.ucdavis.edu/students/undergrad/advising/>) for additional advice on courses, careers, and graduate school. Faculty Advisors: Same as Geology Major Faculty Advisors (p. 173).

Work with your major advisor and college advisors to fit a minor into your overall academic plan.

Declare your minor using the OASIS Minor Declaration form (<https://students.ucdavis.edu/forms/instructions/minordeclaration.aspx?sv=true>), due the quarter before graduation.

Code	Title	Units
GEL 130	Non-Renewable Natural Resources	3
GEL 134	Environmental Geology & Land Use Planning	3
ESM 186	Environmental Remote Sensing	5
SSC 118	Soils in Land Use & the Environment	4
HYD 141 or ECI 142	Physical Hydrology Engineering Hydrology	4
Choose two:		8-9
ESP 160	The Policy Process	
ESP 171	Urban & Regional Planning	
ESP 179	Environmental Impact Assessment	
HYD/EBS 144	Groundwater Hydrology	
HYD 146/GEL 156	Hydrogeology & Contaminant Transport	
<b>Total Units</b>		<b>27-28</b>

## Geology, Bachelor of Arts

### College of Letters & Science

"Civilization exists by geological consent—subject to change without notice." — Will Durant

Geology is the study of the Earth, and in particular its history, structure, and the processes that have molded our planet and its biosphere. Geology involves the origin of continents & ocean basins, earthquakes & volcanoes, variations in global climate, and how these physical changes impact the evolution of life. All of these planetary processes are viewed through the prism of "deep time," a perspective unique to geologists and one that distinguishes geology from most of the other physical sciences.

A significant component of geology is oriented toward the interaction between humans and the Earth. This aspect includes the study of resources such as minerals, oil, and water; identification & mitigation of Earth hazards such as earthquakes, landslides, floods, and volcanic eruptions; identification & mitigation of polluted ground water; land use planning; and the study of ancient & modern climate change.

## The Program

Students interested in becoming professional geologists or continuing their geological studies at the graduate level should choose the Bachelor of Science degree program. The Bachelor of Arts program is for students

interested in an interdisciplinary program of study, or who plan to go into pre-college teaching. The upper division electives are not restricted to geology courses but must be chosen to provide a relevant, coherent, and in-depth program of study.

## Undergraduate Research

The geosciences span many disciplines at UC Davis, and students have opportunities to participate in undergraduate research (<https://eps.ucdavis.edu/students/undergrad/gel/internships/>) in a variety of interest areas. Many students choose to complete a senior thesis to develop their research and writing skills during their senior year.

## Internships & Careers

A degree in Geology provides students with knowledge and practical experience needed to pursue careers (<https://eps.ucdavis.edu/students/careers/>) in the geosciences (government, private sector, research, teaching). The major program includes flexibility to participate in research, internships, and fieldwork to help prepare students for these career paths.

## Graduate Study

The coursework, research and internship opportunities, and fieldwork requirements in the Geology major help prepare students to enter graduate programs (<https://eps.ucdavis.edu/students/careers/gradschool/>) to continue their studies and prepare for their career. Students should meet with advisors and faculty to build a strong application for graduate school through additional independent research or other co-curricular involvements.

## Global Learning in Geology

Consider studying or interning abroad through programs available through the Global Learning Hub (<https://eps.ucdavis.edu/students/undergrad/gel/studyabroad/>).

## Get Involved

Find your community (<https://eps.ucdavis.edu/students/undergrad/gel/involved/>) through clubs, events, seminars, and workshops relating to geoscience.

## Graduation Honors

Students graduating from the College of Letters & Science are eligible for Departmental Honors, depending on their GPA and whether or not they complete a Senior Thesis. Students who graduate with a GPA in the top percentages of their college (<https://catalog.ucdavis.edu/academic-information-policies-regulations/honors-prizes/>) will automatically graduate with Honors. Students who qualify for Honors at graduation may also be eligible for High Honors or Highest Honors, based upon the quality of their Senior Thesis (<https://eps.ucdavis.edu/students/undergrad/gel/research/>) (course number 194A-194B) or Senior Honors Thesis (course number 194HA-194HB). It is Department of Earth and Planetary Sciences policy that an "A" grade on the thesis will earn the student High Honors, and an "A" grade will earn the student Highest Honors.

## Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating major requirements and planning for your degree. Visit the faculty major advisors (<https://eps.ucdavis.edu/students/undergrad/advising/>) for additional advice on

courses, careers, and graduate school. Faculty advisors: R. Motani, D. A. Osleger, M. Rudolph.

Visit the College of Letters & Science advisors (<https://lettersandscience.ucdavis.edu/advising/>) for help navigating university requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) and college requirements (<https://catalog.ucdavis.edu/academic-information-policies-regulations/college-major-minor-information/>).

The major requirements below are in addition to the University Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) and College Requirements (<https://catalog.ucdavis.edu/academic-information-policies-regulations/college-major-minor-information/>) for earning a Bachelor's Degree.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Geology</i>		
GEL 050	Physical Geology	3
GEL 050L	Physical Geology Laboratory	2
GEL 053	Introduction to Geobiology	3
GEL 055	Introduction to Geochemistry	3
GEL 060	Earth Materials: Introduction	4
<i>Mathematics</i>		
Choose a series:		6-8
MAT 016A & MAT 016B	Short Calculus and Short Calculus	
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B	Calculus and Calculus	
<i>Chemistry</i>		
Choose a series:		10
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<i>Physics</i>		
Choose a series:		8-10
PHY 007A & PHY 007B	General Physics and General Physics	
PHY 009A & PHY 009B	Classical Physics and Classical Physics	
PHY 009HA & PHY 009HB	Honors Physics and Honors Physics	
<i>Statistics</i>		
Choose one:		4
STA 013 or STA 013Y	Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
Preparatory Subject Matter Subtotal		43-47
<b>Depth Subject Matter</b>		
<i>Geology</i>		
EDU 183 or GEL 185A or 185B or 186 may be applied toward elective credit. Pre-selected non-GEL courses in related fields: CHE 100, ECI 171/ECI 171L, ECI 175, ESM 100, ESM 186, ESP 152, HYD 144, HYD 146, LDA 150/ABT 150, SSC 100, WFC 102. Other courses in related fields must be approved in advance by the major advisor. No more than 3 units of upper division elective credit for courses GEL 115-GEL 120. No more than 6 units of upper division elective credit for GEL 192 or GEL 194A-GEL 194B or GEL 194HA-GEL 194HB. Students who receive approval to do a senior thesis for part of the capstone requirement may not use GEL 194A-GEL 194B or GEL 194HA-GEL 194HB for the upper division elective courses.		
GEL 130	Non-Renewable Natural Resources	
GEL 131	Risk: Natural Hazards & Related Phenomena	
GEL 132	Introductory Inorganic Geochemistry	
GEL 133	Environmental Geochemistry	
GEL 134	Environmental Geology & Land Use Planning	
GEL 136	Ecogeomorphology of Rivers & Streams	
GEL 138	Introductory Volcanology	
GEL 139	Rivers: Form, Function & Management	
GEL 140	Introduction to Process Geomorphology	
GEL 141	Evolutionary History of Vertebrates	
GEL 142	Basin Analysis	
GEL 143	Advanced Igneous Petrology	
GEL 144	Historical Ecology	
GEL 145	Advanced Metamorphic Petrology	
GEL 146	Radiogenic Isotope Geochemistry & Cosmochemistry	
GEL 147	Geology of Ore Deposits	
GEL 148	Stable Isotopes & Geochemical Tracers	
GEL 149	Geothermal Systems	
GEL/ESP 150A	Physical & Chemical Oceanography	
GEL/ESP 150B	Geological Oceanography	
GEL/ESP 150C	Biological Oceanography	
GEL 152	Paleobiology of Protista	
GEL 156/HYD 146	Hydrogeology & Contaminant Transport	
GEL 160	Geological Data Analysis	
GEL 161	Geophysical Field Methods	
GEL 162	Geophysics of the Solid Earth	
GEL 163	Planetary Geology & Geophysics	

GEL 175	Advanced Field Geology
GEL/EDU 181	Teaching in Science & Mathematics
GEL 182	Field Studies in Marine Geochemistry
GEL/EDU 183	Teaching High School Mathematics & Science
GEL 185A	Conceptual Integrated Science for Non-Science Majors: The Physical World
GEL 185B	Conceptual Integrated Science for Non-Science Majors: Earth System Science
GEL 186	Facilitating Learning in STEM Classrooms
GEL 190	Seminar in Geology
GEL 192	Internship in Geology
GEL 194A	Senior Thesis
GEL 194B	Senior Thesis
GEL 194HA	Senior Honors Project
GEL 194HB	Senior Honors Project
CHE 100	Environmental Water Chemistry
ECI 171	Soil Mechanics
ECI 171L	Soil Mechanics Laboratory
ESM 100	Principles of Hydrologic Science
ESM 186	Environmental Remote Sensing
ESP 152	Coastal Oceanography
HYD/EBS 144	Groundwater Hydrology
HYD 146/GEL 156	Hydrogeology & Contaminant Transport
LDA/ABT 150	Introduction to Geographic Information Systems
SSC 100	Principles of Soil Science
WFC 102	Field Studies in Fish Biology
WFC 102L	Field Studies in Fish Biology: Laboratory
Depth Subject Matter Subtotal	36
Total Units	79-83

## Geology, Bachelor of Science

College of Letters & Science

"Civilization exists by geological consent—subject to change without notice." — Will Durant

Geology is the study of the Earth, and in particular its history, structure, and the processes that have molded our planet and its biosphere. Geology involves the origin of continents & ocean basins, earthquakes & volcanoes, variations in global climate, and how these physical changes impact the evolution of life. All of these planetary processes are viewed through the prism of "deep time," a perspective unique to geologists and one that distinguishes geology from most of the other physical sciences.

A significant component of geology is oriented toward the interaction between humans and the Earth. This aspect includes the study of resources such as minerals, oil, and water; identification & mitigation of Earth hazards such as earthquakes, landslides, floods, and volcanic eruptions; identification & mitigation of polluted ground water; land use planning; and the study of ancient & modern climate change.

## The Program

Students interested in becoming professional geologists or continuing their geological studies at the graduate level should choose the Bachelor

of Science degree program. The Bachelor of Arts program is for students interested in an interdisciplinary program of study, or who plan to go into pre-college teaching. The upper division electives are not restricted to geology courses but must be chosen to provide a relevant, coherent, and in-depth program of study.

## Undergraduate Research

The geosciences span many disciplines at UC Davis, and students have opportunities to participate in undergraduate research (<https://eps.ucdavis.edu/students/undergrad/gel/internships/>) in a variety of interest areas. Many students choose to complete a senior thesis to develop their research and writing skills during their senior year.

## Internships & Careers

A degree in Geology provides students with knowledge and practical experience needed to pursue careers (<https://eps.ucdavis.edu/students/careers/>) in the geosciences (government, private sector, research, teaching). The major program includes flexibility to participate in research, internships, and fieldwork to help prepare students for these career paths. The requirements for a B.S. in Geology satisfy the coursework required for the Professional Geologist licensing process in the State of California.

## Graduate Study

The coursework, research and internship opportunities, and fieldwork requirements in the Geology major help prepare students to enter graduate programs (<https://eps.ucdavis.edu/students/careers/gradschool/>) to continue their studies and prepare for their career. Students should meet with advisors and faculty to build a strong application for graduate school through additional independent research or other co-curricular involvements.

## Global Learning in Geology

Consider studying or interning abroad through programs available through the Global Learning Hub (<https://eps.ucdavis.edu/students/undergrad/gel/studyabroad/>).

## Get Involved

Find your community (<https://eps.ucdavis.edu/students/undergrad/gel/involved/>) through clubs, events, seminars, and workshops relating to geoscience.

## Graduation Honors

Students graduating from the College of Letters & Science are eligible for Departmental Honors, depending on their GPA and whether or not they complete a Senior Thesis. Students who graduate with a GPA in the top percentages of their college (<https://catalog.ucdavis.edu/academic-information-policies-regulations/honors-prizes/>) will automatically graduate with Honors. Students who qualify for Honors at graduation may also be eligible for High Honors or Highest Honors, based upon the quality of their Senior Thesis (<https://eps.ucdavis.edu/students/undergrad/gel/research/>) (course number 194A-194B) or Senior Honors Thesis (course number 194HA-194HB). It is Department of Earth and Planetary Sciences policy that an "A-" grade on the thesis will earn the student High Honors, and an "A" grade will earn the student Highest Honors.

## Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating major requirements and planning for your degree. Visit the faculty major advisors (<https://>

[eps.ucdavis.edu/students/undergrad/advising/](http://eps.ucdavis.edu/students/undergrad/advising/) for additional advice on courses, careers, and graduate school. Faculty advisors: R. Motani, D. A. Osleger, M. Rudolph.

Visit the College of Letters & Science advisors (<https://lettersandscience.ucdavis.edu/advising/>) for help navigating university requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) and college requirements (<https://catalog.ucdavis.edu/academic-information-policies-regulations/college-major-minor-information/>).

The major requirements below are in addition to the University Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) and College Requirements (<https://catalog.ucdavis.edu/academic-information-policies-regulations/college-major-minor-information/>) for earning a Bachelor's Degree.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Geology</i>		
GEL 050	Physical Geology	3
GEL 050L	Physical Geology Laboratory	2
GEL 053	Introduction to Geobiology	3
GEL 055	Introduction to Geochemistry	3
GEL 056	Introduction to Geophysics	4
GEL 060	Earth Materials: Introduction	4
<i>Mathematics</i>		
Choose a series		11-12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>or</b>		
MAT 021A & MAT 021B & MAT 022A	Calculus and Calculus and Linear Algebra	
<b>or</b>		
MAT 016A & MAT 016B & MAT 016C & MAT 022A	Short Calculus and Short Calculus and Short Calculus and Linear Algebra	
<i>Chemistry</i>		
Choose a series:		10
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<i>Statistics</i>		
Choose one:		4
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
<i>Physics</i>		
Choose a series:		8-10

PHY 007A & PHY 007B	General Physics and General Physics	
PHY 009A & PHY 009B	Classical Physics and Classical Physics	
PHY 009HA & PHY 009HB	Honors Physics and Honors Physics	
<b>Preparatory Subject Matter Subtotal</b>		52-55
<b>Depth Subject Matter</b>		
<i>Geology Courses</i>		
GEL 101	Structural Geology	3
GEL 101L	Structural Geology Lab	2
GEL 103	Field Geology	4
GEL 105	Earth Materials: Igneous Rocks	4
GEL 107	Earth History: Paleobiology	3
GEL 107L	Earth History: Paleobiology Laboratory	2
GEL 108	Earth History: Paleoclimates	3
GEL 109	Earth History: Sediments & Strata	3
GEL 109L	Earth History: Sediments & Strata Laboratory	2
<i>Upper Division Electives</i>		
Choose 18 units:		18
Choose from courses GEL 130-GEL 194 or pre-selected non-GEL courses. Only one of GEL 181/EDU 181 or GEL 183/EDU 183 or GEL 185A or 185B or 186 may be applied toward elective credit. Pre-selected non-GEL courses in related fields: CHE 100, ECI 171/ECI 171L, ECI 175, ESM 100, ESM 186, ESP 152, HYD 144, HYD 146, LDA 150/ABT 150, SSC 100, WFC 102. Other courses in related fields must be approved in advance by the major advisor. No more than 3 units of upper division elective credit for courses GEL 115-GEL 120. No more than 6 units of upper division elective credit for GEL 192 or GEL 194A-GEL 194B or GEL 194HA-GEL 194HB. Students who receive approval to do a senior thesis for part of the capstone requirement may not use GEL 194A-GEL 194B or GEL 194HA-GEL 194HB for the upper division elective courses.		
GEL 130	Non-Renewable Natural Resources	
GEL 131	Risk: Natural Hazards & Related Phenomena	
GEL 132	Introductory Inorganic Geochemistry	
GEL 133	Environmental Geochemistry	
GEL 134	Environmental Geology & Land Use Planning	
GEL 136	Ecogeomorphology of Rivers & Streams	
GEL 138	Introductory Volcanology	
GEL 139	Rivers: Form, Function & Management	
GEL 140	Introduction to Process Geomorphology	
GEL 141	Evolutionary History of Vertebrates	
GEL 142	Basin Analysis	
GEL 143	Advanced Igneous Petrology	
GEL 144	Historical Ecology	
GEL 145	Advanced Metamorphic Petrology	
GEL 146	Radiogenic Isotope Geochemistry & Cosmochemistry	
GEL 147	Geology of Ore Deposits	
GEL 148	Stable Isotopes & Geochemical Tracers	

GEL 149	Geothermal Systems	GEL 194A	Senior Thesis
GEL/ESP 150A	Physical & Chemical Oceanography	& GEL 194B	and Senior Thesis
GEL/ESP 150B	Geological Oceanography	or GEL 194HA	Senior Honors Project
GEL/ESP 150C	Biological Oceanography	& GEL 194HB	and Senior Honors Project
GEL 152	Paleobiology of Protista	Depth Subject Matter Subtotal	52-54
GEL 156/HYD 146	Hydrogeology & Contaminant Transport	Total Units	104-109
GEL 160	Geological Data Analysis		
GEL 161	Geophysical Field Methods		
GEL 162	Geophysics of the Solid Earth		
GEL 163	Planetary Geology & Geophysics		
GEL 175	Advanced Field Geology		
GEL/EDU 181	Teaching in Science & Mathematics		
GEL 182	Field Studies in Marine Geochemistry		
GEL/EDU 183	Teaching High School Mathematics & Science		
GEL 185A	Conceptual Integrated Science for Non-Science Majors: The Physical World		
GEL 185B	Conceptual Integrated Science for Non-Science Majors: Earth System Science		
GEL 186	Facilitating Learning in STEM Classrooms		
GEL 190	Seminar in Geology		
GEL 192	Internship in Geology		
GEL 194A	Senior Thesis		
GEL 194B	Senior Thesis		
GEL 194HA	Senior Honors Project		
GEL 194HB	Senior Honors Project		
CHE 100	Environmental Water Chemistry		
EDU/GEL 181	Teaching in Science & Mathematics		
EDU/GEL 183	Teaching High School Mathematics & Science		
ECI 171	Soil Mechanics		
ECI 171L	Soil Mechanics Laboratory		
ECI 175	Geotechnical Earthquake Engineering		
ESM 100	Principles of Hydrologic Science		
ESM 186	Environmental Remote Sensing		
ESP 152	Coastal Oceanography		
HYD/EBS 144	Groundwater Hydrology		
HYD 146/GEL 156	Hydrogeology & Contaminant Transport		
LDA/ABT 150	Introduction to Geographic Information Systems		
SSC 100	Principles of Soil Science		
WFC 102	Field Studies in Fish Biology		
<b>Capstone</b>		<b>Total Units</b>	<b>19-24</b>
Choose two summer field courses. A senior thesis may only be substituted for one of the summer field courses with the consent of the thesis advisor and an undergraduate advisor. The decision to undertake a thesis in lieu of a summer field course must be declared by the end of the spring term of a student's junior year.	8-10		
Choose two:			
GEL 110A	Summer Field Geology: Structures & Neotectonics	Code	Title
GEL 110B	Summer Field Geology: Volcanology	GEL 001 or GEL 050	The Earth Physical Geology
GEL 110C	Summer Field Geology: Special Projects	GEL 050L	Physical Geology Laboratory
		GEL 101	Structural Geology
		GEL 107	Earth History: Paleobiology
		GEL 108	Earth History: Paleoclimates
		GEL 109	Earth History: Sediments & Strata

## Geology, Minor

### College of Letters & Science

The minor in Geology offers students a chance to emphasize in one of four areas: General Geology, Engineering Geology, Geochemistry, or Paleobiology.

Students majoring in **Geology** may elect to complete a minor in Geophysics, Environmental Geology, or Oceanography. They may not complete a minor in Geology.

Students majoring in **Marine & Coastal Science** may elect to complete a minor in Geology, Geophysics, or Environmental Geology. They may not complete a minor in Oceanography.

The minor is sponsored by the Department of Earth & Planetary Sciences (p. 170).

## Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating minor requirements, policies, prerequisites, and course offerings. Visit the faculty major advisors (<https://eps.ucdavis.edu/students/undergrad/advising/>) for additional advice on courses, careers, and graduate school. Faculty Advisors: Same as Geology Major Faculty Advisors (p. 173); except Paleobiology emphasis: R. Motani, G. Vermeij.

Work with your major advisor and college advisors to fit a minor into your overall academic plan.

Declare your minor using the OASIS Minor Declaration form (<https://students.ucdavis.edu/forms/instructions/minordeclaration.aspx?sv=true>), due the quarter before graduation.

Code	Title	Units
Choose one of four emphases:		19-24
General Geology Emphasis (p. 175)		
Engineering Geology Emphasis (p. 176)		
Geochemistry Emphasis (p. 176)		
Paleobiology Emphasis (p. 176)		

**Total Units** **19-24**

## General Geology Emphasis

Code	Title	Units
GEL 001 or GEL 050	The Earth Physical Geology	3-4
GEL 050L	Physical Geology Laboratory	2
GEL 101	Structural Geology	3
GEL 107	Earth History: Paleobiology	3
GEL 108	Earth History: Paleoclimates	3
GEL 109	Earth History: Sediments & Strata	3

GEL/ESP 116N or GEL 134	Oceanography Environmental Geology & Land Use Planning	3	or GEL 144	Historical Ecology
Total Units	Choose at least 9 additional units:			
	ANT 151 Primate Evolution			
	ANT 152 Human Evolution			
	EVE 100 Introduction to Evolution			
	EVE 101 Introduction to Ecology			
	EVE 102 Population & Quantitative Genetics			
	EVE 105 Phylogenetic Analysis of Vertebrate Structure			
	EVE 112 Biology of Invertebrates			
	EVE 112L Biology of Invertebrates Laboratory			
	EVE 140 Paleobotany			
	EVE 149 Evolution of Ecological Systems			
	GEL 109 Earth History: Sediments & Strata			
	GEL/ESP 150C Biological Oceanography			
Total Units				

## Engineering Geology Emphasis

Code	Title	Units
GEL 050 & 050L	Physical Geology and Physical Geology Laboratory	5
ECI 171 & 171L	Soil Mechanics and Soil Mechanics Laboratory	5
Choose three:		9-14
GEL 134	Environmental Geology & Land Use Planning	
GEL 161	Geophysical Field Methods	
GEL 162	Geophysics of the Solid Earth	
HYD 103N/EBS 103	Fluid Mechanics Fundamentals	
HYD/EBS 144	Groundwater Hydrology	
HYD 146/GEL 156	Hydrogeology & Contaminant Transport	
SSC 118	Soils in Land Use & the Environment	
SSC 120	Soil Genesis, Morphology, & Classification	
Total Units		19-24

## Geochemistry Emphasis

Code	Title	Units
GEL 060	Earth Materials: Introduction	4
GEL 146	Radiogenic Isotope Geochemistry & Cosmochemistry	3
or GEL 148	Stable Isotopes & Geochemical Tracers	
CHE 110A	Physical Chemistry: Introduction to Quantum Mechanics	4
CHE 110B	Physical Chemistry: Properties of Atoms & Molecules <sup>1</sup>	4
Choose two electives:		6-9
CHE 110C	Physical Chemistry: Thermodynamics, Equilibria & Kinetics	
GEL 108	Earth History: Paleoclimates	
GEL 146	Radiogenic Isotope Geochemistry & Cosmochemistry	
GEL 148	Stable Isotopes & Geochemical Tracers	
HYD 134	Aqueous Geochemistry	
SSC 102	Environmental Soil Chemistry	
Total Units		21-24

<sup>1</sup> Chemistry majors may substitute one of the elective courses for Chemistry CHE 110B.

## Paleobiology Emphasis

Code	Title	Units
GEL 107	Earth History: Paleobiology	3
GEL 107L	Earth History: Paleobiology Laboratory	2
GEL 108	Earth History: Paleoclimates	3
GEL 141	Evolutionary History of Vertebrates	3

## Geophysics, Minor

### College of Letters & Science

Geophysics is the study of the physical properties and processes within and surrounding the Earth and other planets. Many problems in the Earth and Planetary Sciences require geophysical techniques for study. The minor in geophysics is designed for those Geology majors and non-Geology majors, who are interested in pursuing a graduate or professional career in geophysics, and/or those who desire a career in petroleum or civil engineering or environmental industries. The minor in geophysics may be particularly useful to those in related technical fields such as mathematics, physics, material science and engineering, who wish to apply their skills to problems in Earth science.

Students majoring in **Geology** may elect to complete a minor in Geophysics, Environmental Geology, or Oceanography. They may not complete a minor in Geology.

Students majoring in **Marine & Coastal Science** may elect to complete a minor in Geology, Geophysics, or Environmental Geology. They may not complete a minor in Oceanography.

The minor is sponsored by the Department of Earth & Planetary Sciences (p. 170).

## Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating minor requirements, policies, prerequisites, and course offerings. Visit the faculty major advisors (<https://eps.ucdavis.edu/students/undergrad/advising/>) for additional advice on courses, careers, and graduate school. Faculty Advisor: M. I. Billen.

Work with your major advisor and college advisors to fit a minor into your overall academic plan.

Declare your minor using the OASIS Minor Declaration form (<https://students.ucdavis.edu/forms/instructions/minordeclaration.aspx?sv=true>), due the quarter before graduation.

Code	Title	Units
Choose four:		12
GEL 131	Risk: Natural Hazards & Related Phenomena	
GEL 160	Geological Data Analysis	
GEL 161	Geophysical Field Methods	
GEL 162	Geophysics of the Solid Earth	
GEL 163	Planetary Geology & Geophysics	
Choose additional courses from above and/or from the following list to reach at least 18 total units for the minor.		6
GEL 101	Structural Geology	
GEL/ESP 116N	Oceanography	
GEL 130	Non-Renewable Natural Resources	
GEL 134	Environmental Geology & Land Use Planning	
GEL 142	Basin Analysis	
GEL 147	Geology of Ore Deposits	
GEL 149	Geothermal Systems	
GEL/ESP 150A	Physical & Chemical Oceanography	
GEL/ESP 150B	Geological Oceanography	
GEL 156/HYD 146	Hydrogeology & Contaminant Transport	
HYD/EBS 144	Groundwater Hydrology	
ESM 100	Principles of Hydrologic Science	
ECI 175	Geotechnical Earthquake Engineering	
Total Units		18

## Marine & Coastal Science, Bachelor of Science

### College of Agricultural & Environmental Sciences

The major in Marine & Coastal Science focuses on the interdisciplinary nature of marine sciences by exposing students to core, breadth, and focus area courses in the discipline, in addition to a strong foundation of science preparatory material. The major builds upon UC Davis strengths in marine and coastal sciences, including field-based courses offered at Bodega Marine Laboratory to provide students a unique, interdisciplinary, "hands on" education. Advising is provided by the Department of Earth & Planetary Sciences for interested students.

## The Program

The major begins with introductory courses in mathematics, chemistry, physics, biology, and earth sciences. These are followed by core courses in Marine Science. The major requirements provide focus and breadth, so that each student gains mastery in one area and broad exposure to many facets of Marine & Coastal Science. Focus areas are: (i) Coastal Environmental Processes, (ii) Marine Ecology & Organismal Biology, (iii) Marine Environmental Chemistry, and (iv) Oceans & the Earth System.

In this major, students will be exposed to the foundation disciplines within marine science (biology, chemistry, geology, physics) as well as modern issues facing marine and coastal environments; e.g., climate change, pollution, carbon cycling, and conservation. The major requires field experience, independent research or internship, and concludes with a capstone course featuring current research in marine science. These integrative experiences will require students to synthesize the interdisciplinary topics that they have encountered through this

degree program. The mastery achieved provides a strong foundation for future careers in academic science, government, policy, and the private sector. For more information, see Marine & Coastal Science (<https://eps.ucdavis.edu/mcs/>).

### Focus Areas

The student's chosen Focus Area will determine the college into which the student is admitted, the college where the degree is awarded, and the associated department:

- **Coastal Environmental Processes.** College of Agricultural & Environmental Sciences; Environmental Science & Policy
- **Marine Ecology & Organismal Biology.** College of Biological Sciences; Evolution & Ecology
- **Marine Environmental Chemistry.** College of Agricultural & Environmental Sciences; Environmental Toxicology
- **Oceans & the Earth System.** College of Letters & Science; Earth & Planetary Sciences

### Undergraduate Research

The marine sciences span many departments and colleges at UC Davis, and so students have opportunities to participate in undergraduate research (<https://eps.ucdavis.edu/students/undergrad/mcsci/research/>) in many disciplines.

### Internships & Careers

A B.S. in Marine & Coastal Science provides students with knowledge and practical experience needed to pursue careers (<https://eps.ucdavis.edu/students/undergrad/mcsci/careers/>) in marine science (government, private sector, research). The major program includes research and internship experiences as well as field experience to help prepare students for these career paths.

### Graduate Study

The coursework, research opportunities, and fieldwork requirements in the Marine & Coastal Science major help prepare students to enter graduate programs to continue their studies and prepare for their career in the marine sciences. Students should meet with advisors and faculty to build a strong application for graduate school through additional independent research or other co-curricular involvements.

### Bodega Marine Laboratory

Students in the Marine & Coastal Science major are required to complete some of their coursework at the Bodega Marine Laboratory (<https://marinescience.ucdavis.edu/bml/about/>) on the California Coast.

### Global Learning in Marine & Coastal Science

Consider studying or interning abroad through programs available through the Global Learning Hub (<https://eps.ucdavis.edu/students/undergrad/mcsci/studyabroad/>).

### Get Involved

Find your community (<https://eps.ucdavis.edu/students/undergrad/mcsci/involved/>) through clubs, events, seminars, and workshops relating to marine science.

### Graduation Honors

Students graduating from the College of Agricultural and Environmental Sciences or College of Biological Sciences are eligible for Departmental Honors, High Honors, or Highest Honors depending on their GPA (<https://catalog.ucdavis.edu/academic-information-policies->

regulations/honors-prizes/). This is calculated automatically and added to students' final transcripts.

Students graduating from the College of Letters & Science are eligible for Departmental Honors, depending on their GPA and whether or not they complete a Senior Thesis. Students who graduate with a GPA in the top percentages of their college (<https://catalog.ucdavis.edu/academic-information-policies-regulations/honors-prizes/>) will automatically graduate with Honors. Students who qualify for Honors at graduation may also be eligible for High Honors or Highest Honors, based upon the quality of their Senior Thesis (course number 194A-194B) or Senior Honors Thesis (course number 194HA-194HB). It is Department of Earth and Planetary Sciences policy that an "A-" grade on the thesis will earn the student High Honors, and an "A" grade will earn the student Highest Honors.

## Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating major requirements and planning for your degree. Visit the faculty major advisors (<https://eps.ucdavis.edu/students/undergrad/advising/>) for additional advice on courses, careers, and graduate school. Faculty advisors: Tessa Hill (College of Letters & Science), Anne Todgham (College of Agricultural & Environmental Sciences), Brian Gaylord (College of Biological Sciences).

Visit your college's advisors for help navigating university requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) and college requirements (<https://catalog.ucdavis.edu/academic-information-policies-regulations/college-major-minor-information/>).

The major requirements below are in addition to the University Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) and College Requirements (<https://catalog.ucdavis.edu/academic-information-policies-regulations/college-major-minor-information/>) for earning a Bachelor's Degree.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	15
<i>Chemistry</i>		
Choose a series: <sup>1</sup>		
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	15
<b>OR</b>		
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<i>Organic Chemistry</i>		

Choose a series; only required for students in the Marine Ecology & Organismal Biology focus area:<sup>2</sup>

CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	0-13
<b>OR</b>		
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
CHE 128A & CHE 128B & CHE 128C & CHE 129A & CHE 129B	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory and Organic Chemistry Laboratory	

**Mathematics**

Choose a series; students in Marine Ecology & Organismal Biology focus area must take MAT 017A-MAT 017B-MAT 017C or MAT 021A-MAT 021B.<sup>3</sup>

MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	8-12
<b>OR</b>		
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	

**Physics**

Choose a series:<sup>4</sup>

PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics <sup>6</sup>	12-15
<b>OR</b>		
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
<b>Recommended:</b>		

EVE 012	Life in the Sea	
GEL 016	The Oceans	
or GEL 016V		
The Oceans		

Preparatory Subject Matter Subtotal

50-70

**Depth Subject Matter**

STA 100	Applied Statistics for Biological Sciences	4
EVE/ESP 111	Marine Environmental Issues	1
Choose three of the following four:		
GEL/ESP 116N	Oceanography	
GEL/ESP 150A	Physical & Chemical Oceanography	
GEL/ESP 150B	Geological Oceanography	
GEL/ESP 150C	Biological Oceanography	

Choose two:

7-8

ATM 120	Atmospheric Thermodynamics & Cloud Physics	ESP 123	Introduction to Field & Laboratory Methods in Ecology
ESP 100	General Ecology	ESP 151L	Limnology Laboratory
ESP 110	Principles of Environmental Science	EVE 112L	Biology of Invertebrates Laboratory
ETX 101	Principles of Environmental Toxicology	EVE 115	Marine Ecology
EVE 100	Introduction to Evolution	GEL 109L	Earth History: Sediments & Strata Laboratory
EVE 101	Introduction to Ecology	GEL 182	Field Studies in Marine Geochemistry
EVE 112	Biology of Invertebrates	WFC 100	Field Methods in Wildlife, Fish, & Conservation Biology
HYD 103N/ EBS 103	Fluid Mechanics Fundamentals	WFC 102L	Field Studies in Fish Biology: Laboratory
Marine Ecology & Organismal Biology Focus Area Only:	0-13	WFC 157	Coastal Ecosystems
BIS 101	Genes & Gene Expression	Field Requirement Subtotal	
BIS 104	Cell Biology	0-14	
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	<b>Internship/Research</b>	
Depth Subject Matter Subtotal:	22-37	Choose three units:	3
Courses cannot be utilized to fulfill multiple requirements, with the exception that any Bodega Marine Laboratory course simultaneously fulfills the field requirement below and ETX 127/NUT 127 may satisfy both a course and the Research Requirement.		ETX/NUT 127	Environmental Stress & Development in Marine Organisms (may satisfy both a course above and the Internship/Research Requirement.)
<b>Focus Area</b>		BIS 124	Coastal Marine Research
Complete at least four courses from one category below, totaling at least 12 units.		ESP 192	Internship
Coastal Environmental Processes; College of Agricultural & Environmental Sciences; Environmental Science & Policy (p. 179)		EVE 192	Internship
Marine Ecology & Organismal Biology; College of Biological Sciences; Evolution & Ecology (p. 180)		EVE 199	Special Study for Advanced Undergraduates
Marine Environmental Chemistry; College of Agricultural & Environmental Sciences; Environmental Toxicology (p. 180)		GEL 192	Internship in Geology
Oceans & the Earth System; College of Letters & Science; Earth & Planetary Sciences (p. 180)		GEL 199	Special Study for Advanced Undergraduates (or the equivalent)
Focus Area Requirement Subtotal		Internship/Research Subtotal	
<b>Breadth Requirement</b>		3	
Complete one course from each category below, that is not the student's chosen Focus Area, totaling at least 8 units.		<b>Total Units</b>	
Coastal Environmental Processes (p. 181)		95-144	
Marine Ecology & Organismal Biology (p. 181)		1	
Marine Environmental Chemistry (p. 181)		With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units w/no lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.	
Oceans & the Earth System (p. 181)		2	
Breadth Requirement Subtotal		With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 118A-CHE 008B; CHE 128A-CHE 128B-CHE 008B; CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C; CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128C-CHE 129B.	
<b>Field Requirement</b>		3	
Fulfill the Field Requirement		With BASC advisor approval, these combinations also satisfy the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.	
The Field Requirement provides exposure to field techniques, experimental design, and the marine environment itself. It is highly recommended that students fulfill this requirement by residence at Bodega Marine Laboratory for one or more courses. Bodega Marine Laboratory courses may simultaneously fulfill an additional requirement in categories above		4	
<b>OR</b>		Students may be able to complete their Physics requirement by blending the PHY 007 & PHY 009 series. For more details about how to do so and course placement, students will need to follow up with the PHY department. Students in the College of Biological Sciences will also need to follow up with a BASC advisor to discuss their plans.	
Alternatively, students may fulfill the Field Requirement by taking two of the following courses; these courses cannot fulfill multiple requirements:		<b>Focus Area Requirement</b>	
Complete at least four courses from one category below, totaling at least 12 units.		Focus Area Requirement Subtotal	
<b>Coastal Environmental Processes</b>		3	
Emphasis on processes and environments of the coastal zone, and the strong physical-biological connection that exists here. Courses		95-144	

highlight the critical terrestrial marine interface and fundamental physical processes in the coastal zone.

*The focus area requirement can be fulfilled using:*

Code	Title	Units
ATM 121A	Atmospheric Dynamics	4
ATM 121B	Atmospheric Dynamics	4
ATM 158	Boundary-Layer Meteorology	4
ETX 102A	Environmental Fate of Toxicants	4
ESP 152	Coastal Oceanography	3
ESP 155	Wetland Ecology	4
ESP 155L	Wetland Ecology Laboratory	3
ESP 166	Ocean & Coastal Policy	3
GEL 156/HYD 146	Hydrogeology & Contaminant Transport	5
GEL 182	Field Studies in Marine Geochemistry	2-8
HYD 103N/EBS 103	Fluid Mechanics Fundamentals	4
HYD 134	Aqueous Geochemistry	6
HYD 143	Ecohydrology	4
HYD/EBS 144	Groundwater Hydrology	4
WFC 157	Coastal Ecosystems	4

## Marine Ecology & Organismal Biology

Focus on physiological adaptations to the marine environment, and the biology of marine species from the molecular to population levels. Courses include emphasis on the ecological processes that determine the distribution and abundance of marine organisms, and the patterns and mechanisms of evolution in the ocean.

*The focus area requirement can be fulfilled using:*

Code	Title	Units
ANS 131	Reproduction & Early Development in Aquatic Animals	4
BIS 122	Population Biology & Ecology	3
BIS 122P	Population Biology & Ecology/Advanced Laboratory Topics	5
BIS 124	Coastal Marine Research	6
ESP 100	General Ecology	4
ESP 121	Population Ecology	4
ESP 124	Marine & Coastal Field Ecology	3
ESP 155	Wetland Ecology	4
ESP 155L	Wetland Ecology Laboratory	3
EVE 100	Introduction to Evolution	4
EVE 101	Introduction to Ecology	4
EVE 106	Mechanical Design in Organisms	3
EVE 112	Biology of Invertebrates	3
EVE 112L	Biology of Invertebrates Laboratory	2
EVE 114	Experimental Invertebrate Biology	3
EVE 115	Marine Ecology	4
EVE 120	Global Change Ecology	3
ETX/NUT 127	Environmental Stress & Development in Marine Organisms	10
WFC 120	Biology & Conservation of Fishes	3
WFC 120L	Laboratory in Biology & Conservation of Fishes	2

WFC 121	Physiology of Fishes	4
WFC 122	Population Dynamics & Estimation	4
WFC 130	Physiological Ecology of Wildlife	4

## Marine Environmental Chemistry

Emphasis on major themes in marine chemistry, geochemistry, the carbon cycle, and contaminant fate and transport.

*The focus area requirement can be fulfilled using:*

Code	Title	Units
CHE 100	Environmental Water Chemistry	3
ECI 140A	Environmental Analysis of Aqueous Systems (Not open for credit to students who have taken CHE 100)	4
ETX 101	Principles of Environmental Toxicology	4
ETX 102A	Environmental Fate of Toxicants	4
ETX 120	Perspectives in Aquatic Toxicology	4
ETX/NUT 127	Environmental Stress & Development in Marine Organisms	10
GEL 148	Stable Isotopes & Geochemical Tracers	3
GEL 182	Field Studies in Marine Geochemistry	2-8
HYD 134	Aqueous Geochemistry	6
HYD 141	Physical Hydrology	4
WFC 153	Wildlife Ecotoxicology	4

## Oceans & the Earth System

A study of our changing oceans in the context of earth system history, including climate change, paleoceanography, ecological shifts, conservation, and marine policy.

*The focus area requirement can be fulfilled using:*

Code	Title	Units
ATM 116	Modern Climate Change	3
ESM 120	Global Environmental Interactions	4
ESM 121	Water Science & Management	3
ESP 110	Principles of Environmental Science	4
ESP 161	Environmental Law	4
ESP 162	Environmental Policy	4
ESP 166	Ocean & Coastal Policy	3
ESP 169	Water Policy & Politics	3
EVE 120	Global Change Ecology	3
GEL 107	Earth History: Paleobiology	3
GEL 107L	Earth History: Paleobiology Laboratory	2
GEL 108	Earth History: Paleoclimates	3
GEL 109	Earth History: Sediments & Strata	3
GEL 109L	Earth History: Sediments & Strata Laboratory	2
GEL 144	Historical Ecology	3
SAS 120	Science & Contemporary Societal Issues	3
WFC 144	Marine Conservation Science	4
WFC 154	Conservation Biology	4

## Breadth Requirement

Complete one course from each category below, that is not the student's chosen Focus Area, totaling at least 8 units.

### Coastal Environmental Processes

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
ATM 158	Boundary-Layer Meteorology	4
ECI 140B	Chemical Principles for Environmental Engineers	4
ESP 110	Principles of Environmental Science	4
ESP 152	Coastal Oceanography	3
ESP 155	Wetland Ecology	4
GEL 182	Field Studies in Marine Geochemistry	2-8
WFC 157	Coastal Ecosystems	4

### Marine Ecology & Organismal Biology

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
BIS 124	Coastal Marine Research	6
ESP 124	Marine & Coastal Field Ecology	3
ESP 155	Wetland Ecology	4
EVE 106	Mechanical Design in Organisms	3
EVE 114	Experimental Invertebrate Biology	3
EVE 115	Marine Ecology	4
EVE 120	Global Change Ecology	3
ETX/NUT 127	Environmental Stress & Development in Marine Organisms	10

### Marine Environmental Chemistry

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
CHE 100	Environmental Water Chemistry	3
ECI 140B	Chemical Principles for Environmental Engineers	4
ETX 120	Perspectives in Aquatic Toxicology	4
ETX/NUT 127	Environmental Stress & Development in Marine Organisms	10
GEL 182	Field Studies in Marine Geochemistry	2-8
HYD 134	Aqueous Geochemistry	6
HYD 141	Physical Hydrology	4

### Oceans & the Earth System

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
ATM 116	Modern Climate Change	3
ESP 166	Ocean & Coastal Policy	3
EVE 120	Global Change Ecology	3
GEL 107	Earth History: Paleobiology	3
GEL 108	Earth History: Paleoclimates	3

WFC 144	Marine Conservation Science	4
WFC 154	Conservation Biology	4

## Total Units for the Major by Chosen Focus Area

Focus Area	Units
Oceans & the Earth System (Letters & Science)	95-118
Marine Ecology & Organismal Biology (Biological Sciences)	110-144
Marine Environmental Chemistry (Agricultural & Environmental Sciences)	95-118
Coastal Environmental Processes (Agricultural & Environmental Sciences)	95-118

## Oceanography, Minor

### College of Letters & Science

Oceanography is the study of the earth's oceans, investigating connections between geological, biological, chemical and physical processes in the marine realm, and the interactions between the Earth's ocean/atmosphere system. The interdisciplinary minor in oceanography is for students with backgrounds in any of these fields, as well as those interested in marine policy and conservation. The curriculum reflects the integrative nature of oceanography, with core courses covering the major disciplines in oceanography and elective courses that allow students to cater the minor to their interests. The oceanography minor includes courses taught at the Davis campus and courses offered at Bodega Marine Laboratory.

Students majoring in **Geology** may elect to complete a minor in Geophysics, Environmental Geology, or Oceanography. They may not complete a minor in Geology.

Students majoring in **Marine & Coastal Science** may elect to complete a minor in Geology, Geophysics, or Environmental Geology. They may not complete a minor in Oceanography.

The minor is sponsored by the Department of Earth & Planetary Sciences (p. 170).

## Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating minor requirements, policies, prerequisites, and course offerings. Visit the faculty major advisors (<https://eps.ucdavis.edu/students/undergrad/advising/>) for additional advice on courses, careers, and graduate school. Faculty Advisor: T. M. Hill.

Work with your major advisor and college advisors to fit a minor into your overall academic plan.

Code	Title	Units
GEL/ESP 150A	Physical & Chemical Oceanography	4
GEL/ESP 150B	Geological Oceanography	3
GEL/ESP 150C	Biological Oceanography *	4
ESP 152	Coastal Oceanography *	3

Choose at least 8 units from the electives sequence; one course from group (a) and one-two courses from either groups (a) or (b):

(a)

GEL/ESP 116N	Oceanography
ATM 158	Boundary-Layer Meteorology
WFC 120	Biology & Conservation of Fishes
WFC 157	Coastal Ecosystems
ETX 120	Perspectives in Aquatic Toxicology
EVE 112	Biology of Invertebrates
EVE 115	Marine Ecology

(b)

ATM 121A	Atmospheric Dynamics
ATM 121B	Atmospheric Dynamics
GEL 108	Earth History: Paleoclimates
GEL 109	Earth History: Sediments & Strata
GEL 152	Paleobiology of Protista
ESP 124	Marine & Coastal Field Ecology *
ETX/NUT 127	Environmental Stress & Development in Marine Organisms *
EVE 106	Mechanical Design in Organisms *
EVE 114	Experimental Invertebrate Biology *

8-10

for students who have no Chinese-language background whatsoever and one for students with prior background.

## The Program

Practical language skills are taught using contemporary methods and materials, so that upon entering the upper division a student will have attained substantial fluency in the spoken language (listening and speaking) and the written language (reading and writing). Upper division courses balance the need to further develop language skills with the need to understand and appreciate the richness and diversity of Chinese culture. All students are encouraged to combine their study of language and literature with courses in related fields, and to study abroad through the Global Learning Hub (<https://globallearning.ucdavis.edu/>) or through internships in China or Taiwan.

## Career Opportunities

UC Davis graduates have learned that a major in Chinese is a meaningful, earned distinction that facilitates entrance to graduate programs and professional schools. In addition, job opportunities abound in virtually all career paths, especially for graduates who have completed study abroad.

## Honors Program

To be eligible to receive high or highest honors in the Chinese major, students must complete a senior thesis project. A student interested in pursuing a senior thesis project must enroll in CHN 194H and complete a scholarly paper or similar research project under the direction of a senate faculty member. The thesis project will have a minimum duration of two quarters and carry a minimum of 6 units of credit. Up to 4 CHN 194H units earned can be counted toward the major requirements. To qualify to undertake the senior thesis project, a student must have completed at least 135 units with a minimum GPA of 3.500 in courses counted toward the major. Interested students should consult with faculty in their field of interest by the quarter before they hope to commence work on the project (in most cases this will be the Spring Quarter of their junior year). Students who complete the senior thesis project and have an overall GPA that qualifies them for honors may be recommended by the faculty for honors, high honors, or highest honors at graduation.

## Education Abroad Program

The university maintains study abroad programs in China, Hong Kong, and Taiwan. They offer excellent opportunities for students to polish their language skills and experience Asian cultures firsthand. Students are encouraged to participate. Appropriate courses taken abroad can be applied toward the major or the minor. For details, see the department's undergraduate advisor or the Global Learning Hub (<https://globallearning.ucdavis.edu/>).

## Related Courses

See East Asian Studies (EAS) (p. 736) course list.

## Prerequisite Credit

No student may repeat a course if that course is a prerequisite for a course that has already been completed with a grade of C– or better.

## Placement

Chinese CHN 001 is intended for beginning students with no prior knowledge of the Chinese language. Students who do have some knowledge but wish to improve their skills should meet with an advisor to discuss appropriate placement. Students must follow departmental

Total Units	22-24
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\* Course taught at Bodega Marine Laboratory.

# East Asian Languages & Cultures

College of Letters & Science

Mark Halperin, Ph.D., Chairperson; term ends June 30, 2025

## Department Office

211 Sproul Hall; 530-752-4999; East Asian Languages & Cultures (<https://ealc.ucdavis.edu/>); Faculty (<https://ealc.ucdavis.edu/people/>)

## The Major Program

The department offers a core language program in both Chinese (p. 182) and Japanese (p. 184), and courses in literature and culture. The core language program in Chinese has two tracks: one for students who have no Chinese-language background whatsoever and one for students with prior background.

- Chinese, Bachelor of Arts (p. 182)
- Chinese, Minor (p. 184)
- Japanese, Bachelor of Arts (p. 184)
- Japanese, Minor (p. 186)

# Chinese, Bachelor of Arts

College of Letters & Science

## The Major Program

The department offers a core language program in Chinese, and courses in literature and culture. The core language program has two tracks: one

guidelines for placement in all language courses and instructor approval is required for enrollment.

## Backtracking

Satisfactory completion of a language course is evidence that a student's language skills are beyond the level of those expected in its prerequisite courses. Accordingly, students who have completed a language course cannot go back and take its prerequisites. If the prerequisite courses are required for the major, students may substitute other courses. Students who are not sure how this requirement applies to them should speak to the undergraduate advisor.

## Waived Language Courses

Students with exceptional language ability may waive required language courses. If lower division courses have been waived, students will not have to take courses in their place. If upper division courses have been waived, students can use other appropriate courses to earn the units they need to complete the major. Consult the undergraduate advisor regarding the selection of appropriate courses.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose a series:		0-30
CHN 001 & CHN 002 & CHN 003 & CHN 004 & CHN 005 & CHN 006	Elementary Chinese and Elementary Chinese and Elementary Chinese and Intermediate Chinese and Intermediate Chinese and Intermediate Chinese	
<b>OR</b>		
CHN 001BL & CHN 002BL & CHN 003BL	Accelerated Written Chinese I and Accelerated Written Chinese II and Accelerated Written Chinese III	
<b>OR</b>		
CHN 001CN & CHN 002CN & CHN 003CN	Mandarin for Cantonese Speakers I and Mandarin for Cantonese Speakers II and Mandarin for Cantonese Speakers III	
<b>OR</b>		
Equivalent as determined by a required language placement exam.		
<b>Recommended, but not required:</b>		
CHN 009	Introduction to Chinese Language & Culture	
CHN 010	Modern Chinese Literature (in English)	
CHN 011	Great Books of China (in English)	
CHN/JPN 050	Introduction to the Literature of China & Japan	
COM 014	Introduction to Poetry	
JPN 010	Masterworks of Japanese Literature (in English)	
LIN 001 or LIN 001Y	Introduction to Linguistics	
HIS 009A	History of East Asian Civilization	
Preparatory Subject Matter Subtotal		0-30

## Depth Subject Matter

Grading. Students may take up to two and no more than two (regular, letter-graded) courses for the major on a P/NP basis. Courses which are only offered on a P/NP basis do not count toward these limits.

Required Courses		
CHN 106	Chinese Poetry (in English)	4
CHN 107	Traditional Chinese Fiction (in English)	4
CHN 114	Introduction to Classical Chinese	4
CHN 160	The Chinese Language	4
Choose one:		4
CHN 101	Chinese Film	
CHN 103	Modern Chinese Drama	
CHN 104	Modern Chinese Fiction (in English)	
CHN 109G	Topics in Chinese Literature: The Literature of 20th-Century Taiwan (in English)	
Choose CHN 111A, or CHN 111, CHN 112, & CHN 113:		12
CHN 111A	Intensive Third-Year Chinese <sup>1</sup>	
or CHN 111 & CHN 112 & CHN 113	Modern Chinese: Reading & Discussion and Modern Chinese: Reading & Discussion and Modern Chinese: Reading & Discussion	
Note: With prior approval of the undergraduate advisor, students already proficient in Chinese at any third-year level <sup>2</sup> must take other upper division CHN courses to replace language course(s).		
Choose two; at least 8 units:		8
CHN 100A/ RST 175A	Daoist Traditions	
CHN 100B	Confucian Traditions	
CHN 101	Chinese Film	
CHN 103	Modern Chinese Drama	
CHN 104	Modern Chinese Fiction (in English)	
CHN 105	Western Influences on 20th-Century Chinese Literature (in English)	
CHN/JPN 108	Poetry of China & Japan (in English)	
CHN 109A	Topics in Chinese Literature: Crime & Punishment	
CHN 109C	Topics in Chinese Literature: Women Writers (in English)	
CHN 109D	Topics in Chinese Literature: The Knight-Errant (in English)	
CHN 109E	Topics in Chinese Literature: The City in Fiction (in English)	
CHN 109G	Topics in Chinese Literature: The Literature of 20th-Century Taiwan (in English)	
CHN 109H	Topics in Chinese Literature: Popular Literature (in English)	
CHN 109I	Topics in Chinese Literature: Scholar & The Courtesan (in English)	
CHN 110	Great Writers of China: Texts & Context (in English)	
CHN 115	Introduction to Classical Chinese II	
CHN 116	Introduction to Classical Chinese III	
CHN 120	Advanced Chinese (Can be repeated when content differs.)	
CHN 130	Readings in Traditional Chinese Fiction (Can be repeated when content differs.)	
CHN 131	Readings in Traditional Chinese Poetry	
CHN 132	Readings in Modern Chinese Poetry	

CHN 133	Readings in Modern Chinese Prose & Drama (Can be repeated when content differs.)
CHN 134	Chinese Film in Chinese Language
CHN 140	Readings in Classical Chinese (Can be repeated when content differs.)
CHN 150	Fifth-Year Chinese: Selected Topics in Chinese Language, Literature, & Culture (Can be repeated when content differs.)
Up to four (4) units from:	
CHN 194H	Senior Thesis Honors Project
CHN 198 & CHN 199	Directed Group Study and Special Study for Advanced Undergraduates
or CHN 199	Special Study for Advanced Undergraduates
<b>OR</b>	
From outside the department.	
Recommended substitutions from outside the department:	
JPN-Any upper division Japanese course (p. 963) <sup>3</sup>	
AHI 163A	Early Chinese Art
AHI 163B	Chinese Painting
ANT 148A	Culture & Political Economy in Contemporary China
COM 112	Japanese Cinema
ECN 171	Economy of East Asia
HIS 191A	Classical China
HIS 191B	High Imperial China
HIS 191C	Late Imperial China
HIS 191D	19th-Century China: The Empire Confronts the West
HIS 191E	The Chinese Revolution
HIS 191F	History of the People's Republic of China
HIS 191G	Special Topics in Chinese History to 1800
HIS 191H	Special Topics in Chinese History after 1800
HIS 191J	Sex & Society in Modern Chinese History
POL 148A	Government & Politics of East Asia: China
POL 148B	Government & Politics in East Asia: Japan
RST 170	(Discontinued)
RST 172	Ch'an (Zen) Buddhism
SOC 188	Markets, Culture & Inequality in China
<b>OR</b>	
Other advanced literature and culture courses selected in consultation with the undergraduate advisor.	
Depth Subject Matter Subtotal	40
<b>Total Units</b>	<b>40-70</b>

## Chinese, Minor

### College of Letters & Science

A minor is offered in Chinese for students wishing to follow a formally recognized program of study in Chinese language and literature. For the minor, students may take one (regular, letter-graded) course on a P/NP basis. Courses that are only offered on a P/NP basis do not count toward these limits.

Code	Title	Units
All upper division CHN courses, including both language courses and literature in translation courses, may be used to meet this requirement.		20
One approved lower division course may also be used:		
CHN 009	Introduction to Chinese Language & Culture	
CHN 010	Modern Chinese Literature (In English)	
CHN 011	Great Books of China (in English)	
CHN 050	Introduction to the Literature of China & Japan	
In addition, students must demonstrate their language proficiency, normally through completion of:		
CHN 003BL or CHN 006	Accelerated Written Chinese III Intermediate Chinese	
Only 4 units from the following may be applied to the minor:		
CHN 192	Chinese Internship	
CHN 197T	Tutoring in Chinese	
CHN 198	Directed Group Study	
CHN 199	Special Study for Advanced Undergraduates	
For details, consult the undergraduate advisor.		
<b>Total Units</b>		<b>20</b>

## Japanese, Bachelor of Arts

### College of Letters & Science

### The Major Program

The department offers a core language program in Japanese, and courses in literature and culture.

### The Program

Practical language skills are taught using contemporary methods and materials so that upon entering the upper division a student will have attained substantial fluency in the spoken language (listening and speaking) and the written language (reading and writing). Upper division courses balance the need to further develop language skills with the need to understand and appreciate the richness and diversity of Japanese culture. All students are encouraged to combine their study of language and literature with courses in related fields, and to study abroad through the Education Abroad Program, the UC Davis Study Abroad Program or through internships in Japan.

### Career Opportunities

UC Davis graduates have learned that a major in Japanese is a meaningful, earned distinction that facilitates entrance to graduate programs and professional schools. In addition, job opportunities abound

<sup>1</sup> CHN 111A content is equivalent to CHN 111, CHN 112, CHN 113.

<sup>2</sup> CHN 111-CHN 112-CHN 113

<sup>3</sup> Excluding JPN 192, JPN 194H, JPN 197T, JPN 198, JPN 199.

in virtually all career paths, especially for graduates who have completed study abroad.

## Honors Program

To be eligible to receive high or highest honors in the Japanese major, students must complete a senior thesis project. A student interested in pursuing a senior thesis project must enroll in JPN 194H and complete a scholarly paper or similar research project under the direction of a senate faculty member. The thesis project will have a minimum duration of two quarters and carry a minimum of 6 units of credit. To qualify to undertake the senior thesis project, a student must have completed at least 135 units with a minimum GPA of 3.500 in courses counted toward the major. Interested students should consult with faculty in their field of interest by the quarter before they hope to commence work on the project (in most cases this will be the Spring Quarter of their junior year). Students who complete the senior thesis project and have an overall GPA that qualifies them for honors may be recommended by the faculty for honors, high honors, or highest honors at graduation.

## Education Abroad Program

The university maintains study abroad programs in Japan. They offer excellent opportunities for students to polish their language skills and experience Asian cultures firsthand. Students are encouraged to participate. Appropriate courses taken abroad can be applied toward the major or the minor. For details, see the department's undergraduate advisor or the Global Learning Hub (<https://globalearning.ucdavis.edu/>).

## Related Courses

See East Asian Studies (EAS) (p. 472) course list.

## Prerequisite Credit

No student may repeat a course if that course is a prerequisite for a course that has already been completed with a grade of C– or better.

## Placement

JPN 001 is intended for beginning students with no prior knowledge of the Japanese language. Students who do have some knowledge but wish to improve their skills should meet with one of the advisors to discuss appropriate placement. Students must follow departmental guidelines for placement in all language courses and instructor approval is required for enrollment.

## Backtracking

Satisfactory completion of a language course is evidence that a student's language skills are beyond the level of those expected in its prerequisite courses. Accordingly, students who have completed a language course cannot go back and take its prerequisites. If the prerequisite courses are required for the major, students may substitute other courses. Students who are not sure how this requirement applies to them should speak to the undergraduate advisor.

## Waived Language Courses

Students with exceptional language ability may waive required language courses. If lower division courses have been waived, students will not have to take courses in their place. If upper division courses have been waived, students can use other appropriate courses to earn the units they need to complete the major. Consult the undergraduate advisor regarding the selection of appropriate courses.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose 0-30 units:		0-30
JPN 001      Elementary Japanese & JPN 002      and Elementary Japanese & JPN 003      and Elementary Japanese & JPN 004      and Intermediate Japanese & JPN 005      and Intermediate Japanese & JPN 006      and Intermediate Japanese		
<b>OR</b>		
Equivalent as determined by a language placement exam.		
Recommended but <b>not</b> required:		
JPN 010	Masterworks of Japanese Literature (in English)	
JPN 025	Japanese Language & Culture (in English)	
CHN 010	Modern Chinese Literature (In English)	
CHN 011	Great Books of China (in English)	
CHN/JPN 050	Introduction to the Literature of China & Japan	
LIN 001	Introduction to Linguistics	
HIS 009B	History of East Asian Civilization	
Preparatory Subject Matter Subtotal		0-30
<b>Depth Subject Matter</b>		
Grading. Students may take up to two and no more than two (regular, letter-graded) courses for the major on a P/NP basis. Courses which are only offered on a P/NP basis do not count toward these limits.		
JPN 101	Japanese Literature in Translation: The Early Period	4
JPN 102	Japanese Literature in Translation: The Middle Period	4
JPN 103	Japanese Literature in Translation: The Modern Period	4
JPN 111	Modern Japanese: Reading & Discussion	4
JPN 112	Modern Japanese: Reading & Discussion	4
JPN 113	Modern Japanese: Reading & Discussion	4
JPN 151	Japanese Linguistics	4
Note: With prior approval of the undergraduate advisor, students already proficient in Japanese at any third-year level <sup>1</sup> must take other upper division Japanese (JPN) courses to replace language course(s).		
Choose three; at least 12 units:		12
JPN 104	Modern Japanese Literature: War & Revolution	
JPN 105	Modern Japanese Literature: Hero & Anti-Hero	
JPN 106	Japanese Culture Through Film	
JPN 107	Modern Japanese Autobiographies (in English)	
JPN/CHN 108	Poetry of China & Japan (in English)	
JPN 109	Japanese Popular Culture	
JPN 114A	Spoken Japanese	
JPN 114B	Spoken Japanese	
JPN 114C	Spoken Japanese	
JPN 115	Japanese Composition	

		Depth Subject Matter Subtotal	40
	Total Units	40-70	
JPN 116	Culture & History in Kyoto	<sup>1</sup> JPN 111-JPN 112-JPN 113	
JPN 121	Advanced Japanese I	<sup>2</sup> Excluding CHN 111, CHN 112, CHN 113, CHN 120, CHN 150, CHN 192, CHN 194H, CHN 197T, CHN 198, CHN 199	
JPN 122	Advanced Japanese II		
JPN 123	Advanced Japanese III		
JPN 130	Readings in Modern Japanese Literature to 1926		
JPN 131	Readings in Modern Japanese Literature: 1920-1945		
JPN 132	Readings in Modern Japanese Literature: 1945-1970		
JPN 133	Readings in Modern Japanese Literature: 1970-Present		
JPN 134	Readings in the Humanities: Traditional Culture		
JPN 135	Readings in the Humanities: The Modern Period		
JPN 136	Readings in Japanese Newspapers		
JPN 137	Readings in Contemporary Japanese Literature		
JPN 138	Readings in the Humanities: Japan Today		
JPN 141	Introduction to Classical Japanese		
JPN 152	Traditional Japanese Drama		
JPN 153	Love, Sexuality & the Family in Modern Japanese Literature		
JPN 154	Tourism & Heritage in Japan		
JPN 155	Introduction to Japanese Folklore		
JPN 156/CTS 148B	Japanese Literature on Film		
JPN 157	Japanese Women Writers		
JPN 158	The Supernatural in Japan		
JPN 160	The Culture of Japanese Food		
JPN 162	Japan Travelogue: Ethnographic Writing on Japanese Culture & People		
Up to 4 units:			
JPN 194H	Special Thesis Honors Project		
Up to 4 units:			
JPN 198 & JPN 199	Directed Group Study and Special Study for Advanced Undergraduates		
or JPN 199	Special Study for Advanced Undergraduates		
Up to two (8 units) upper division Chinese courses <sup>2</sup>			
AHI 164	The Arts of Japan		
COM 112	Japanese Cinema		
ECN 171	Economy of East Asia		
HIS 194A	Aristocratic & Feudal Japan		
HIS 194B	Early Modern Japan		
HIS 194C	Modern Japan		
HIS 194D	Business & Labor in Modern Japan		
POL 148B	Government & Politics in East Asia: Japan		
RST 170	(Discontinued)		
RST 172	Ch'an (Zen) Buddhism		
OR			
Other advanced literature and culture courses selected in consultation with the undergraduate advisor.			

## Japanese, Minor

### College of Letters & Science

A minor is offered in Japanese for students wishing to follow a formally recognized program of study in Japanese language and literature. For the minor, students may take one (regular, letter-graded) course on a P/NP basis. Courses which are only offered on a P/NP basis do not count toward these limits.

Code	Title	Units
All upper division JPN courses, including both language courses and literature in translation courses, may be used to meet this requirement.		20
One approved lower division course may also be used:		
JPN 010	Masterworks of Japanese Literature (in English)	
JPN 025	Japanese Language & Culture (in English)	
JPN 050	Introduction to the Literature of China & Japan	
In addition, students must demonstrate their language proficiency, normally through completion of:		
JPN 006	Intermediate Japanese	
Only 4 units from the following may be applied to the minor:		
JPN 192	Japanese Internship	
JPN 197T	Tutoring in Japanese	
JPN 198	Directed Group Study	
JPN 199	Special Study for Advanced Undergraduates	
For details, consult the undergraduate advisor.		
<b>Total Units</b>		<b>20</b>

## East Asian Studies

### College of Letters & Science

Eddy U, Ph.D., Program Director

## Program Office

1277 Social Science & Humanities Building; 530-752-3406; East Asian Studies (<http://eastasian.ucdavis.edu>); Faculty (<https://eastasian.ucdavis.edu/person-type/affiliated-faculty/>)

- East Asian Studies, Bachelor of Arts (p. 186)
- East Asian Studies, Minor (p. 188)

## East Asian Studies, Bachelor of Arts

### College of Letters & Science

# The Major Program

The East Asian Studies major gives the student an understanding of East Asia and Southeast Asia through interdisciplinary studies, including courses on East Asian countries within the humanities and social sciences. Students are encouraged to pursue study abroad opportunities, as well as other guided studies pertaining to East and Southeast Asia.

## The Program

The program offers core courses in East Asian humanities and social sciences, including history, comparative literature, languages, philosophy and religion, political science, sociology, as well as courses focused on Southeast Asia. Science courses that closely engage the student of East and/or Southeast Asia are also eligible to count towards the major.

Along with taking the lower division and upper division depth subject courses; the student may choose additional courses that concentrate on a special field of interest, such as anthropology or history, or special courses such as honor thesis, independent study, internships, and study abroad.

## Programs, Internships, & Career Alternatives

To enhance the student's understanding of East and Southeast Asia, our majors are strongly encouraged to participate in UC Davis's Study Abroad Program, which gives students the opportunity to live and experience culture within East or Southeast Asia. Our majors are also encouraged to work with UC Davis's Internship and Career Center, which provides customized assistance for EAS students to obtain legislative, legal, and business internships and careers. Likewise, the UC Davis Sacramento and Washington Centers arrange internships and run full-credit academic programs in Sacramento and Washington D.C., with a wide range of opportunities for our majors. Graduating EAS majors are prepared for employment in government agencies (such as Foreign Service), state agencies, international or non-governmental organizations (NGO, such as the United Nations), foundations, journalism, teaching, counseling, and companies with international business interests, trade, or finance. The broad-based and multidisciplinary components of this major program enhance career prospects in jobs that demand knowledge of the cultures of East and Southeast Asia.

## Major Advisors

2216 Social Science & Humanities Building; 530-752-9241; Advisor (eheadvisingcenter@ucdavis.edu).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose two:		8
HIS 009A	History of East Asian Civilization	
HIS 009B	History of East Asian Civilization	
HIS 009C/EAS 088	Korean Culture & Society: From Ancient Three Kingdoms to the Global K-Pop	
Choose one:		3-4
AHI 001D	Arts of Asia	
AHI 001DY	Arts of Asia	
CHN 007	Chinese Business Culture	
CHN 010	Modern Chinese Literature (In English)	
CHN 011	Great Books of China (in English)	
COM 053A	Literature of East Asia	
JPN 010	Masterworks of Japanese Literature (in English)	

JPN 025	Japanese Language & Culture (in English)	
JPN/CHN 050	Introduction to the Literature of China & Japan	
RST 075	Introduction to Chinese Philosophy	
Choose two (or the equivalent) of Chinese, Japanese, or other East Asian language study:		10
Choose a series:		10
CHN 001 & CHN 002	Elementary Chinese and Elementary Chinese	
JPN 001 & JPN 002	Elementary Japanese and Elementary Japanese	
Preparatory Subject Matter Subtotal		21-22
<b>Depth Subject Matter</b>		
Choose 24 units:		24
ANT 134	Buddhism in Global Culture	
ANT 137	Meditation & Culture	
ANT 143A	Ethnology of Southeast Asia	
ANT 148A	Culture & Political Economy in Contemporary China	
AHI 157/RST 171	Buddhist Art	
AHI 163A	Early Chinese Art	
AHI 163B	Chinese Painting	
AHI 163C	Early Modern Chinese Painting	
AHI 163D	Art from China 1900 to the Present	
AHI 164	The Arts of Japan	
AHI 190F	Undergraduate Seminar in Art History: Chinese	
AHI 190G	Undergraduate Seminar in Art History: Japanese	
CHN 100A/ RST 175A	Daoist Traditions	
CHN 100B	Confucian Traditions	
CHN 101	Chinese Film	
CHN 103	Modern Chinese Drama	
CHN 104	Modern Chinese Fiction (in English)	
CHN 105	Western Influences on 20th-Century Chinese Literature (in English)	
CHN 106	Chinese Poetry (in English)	
CHN 107	Traditional Chinese Fiction (in English)	
CHN/JPN 108	Poetry of China & Japan (in English)	
CHN 109A	Topics in Chinese Literature: Crime & Punishment	
CHN 109C	Topics in Chinese Literature: Women Writers (in English)	
CHN 109D	Topics in Chinese Literature: The Knight-Errant (in English)	
CHN 109E	Topics in Chinese Literature: The City in Fiction (in English)	
CHN 109G	Topics in Chinese Literature: The Literature of 20th-Century Taiwan (in English)	
CHN 109H	Topics in Chinese Literature: Popular Literature (in English)	
CHN 109I	Topics in Chinese Literature: Scholar & The Courtesan (in English)	

CHN 110	Great Writers of China: Texts & Context (in English)	JPN 107	Modern Japanese Autobiographies (in English)
CRD 153A	International Community Development: Asia	JPN/CHN 108	Poetry of China & Japan (in English)
COM 110	Hong Kong Cinema	JPN 109	Japanese Popular Culture
COM 112	Japanese Cinema	JPN 152	Traditional Japanese Drama
COM 153	The Forms of Asian Literature	JPN 153	Love, Sexuality & the Family in Modern Japanese Literature
CTS 148B/ JPN 156	Japanese Literature on Film	JPN 154	Tourism & Heritage in Japan
DES 142A	World Textiles: Eastern Hemisphere	JPN 155	Introduction to Japanese Folklore
DRA 144A	Introduction to Traditional Chinese Embodied Culture	JPN 156/ CTS 148B	Japanese Literature on Film
DRA 144B	Traditional Chinese Physical Culture	JPN 157	Japanese Women Writers
DRA 144C	Daoist Philosophy in Traditional Chinese Movement Culture	JPN 158	The Supernatural in Japan
DRA 154	Asian Theatre & Drama: Contexts & Forms	JPN 159	The "Other" in Modern Japanese Literature & Culture
EAS 113	Cinema & Society in China	JPN 160	The Culture of Japanese Food
EAS 190	East Asian Studies Seminar	JPN 162	Japan Travelogue: Ethnographic Writing on Japanese Culture & People
ECN 171	Economy of East Asia	JPN 165	Sexuality & Love in Premodern Japanese Literature
HIS 102G	Undergraduate Proseminar in History: China to 1800	MUS 129C	Musics of East & Southeast Asia
HIS 102H	Undergraduate Proseminar in History: China Since 1800	POL 148B	Government & Politics in East Asia: Japan
HIS 102N	Undergraduate Proseminar in History: Japan	RST 165	Islam in Asia
HIS 191A	Classical China	RST 170	(Discontinued)
HIS 191B	High Imperial China	RST 171/AHI 157	Buddhist Art
HIS 191C	Late Imperial China	RST 172	Ch'an (Zen) Buddhism
HIS 191D	19th-Century China: The Empire Confronts the West	RST 175A/ CHN 100A	Daoist Traditions
HIS 191E	The Chinese Revolution	SOC 145A	Sociology of Third World Development
HIS 191F	History of the People's Republic of China	SOC 147	Sociological Perspectives on East Asia
HIS 191G	Special Topics in Chinese History to 1800	SOC 188	Markets, Culture & Inequality in China
HIS 191H	Special Topics in Chinese History after 1800	Depth Subject Matter Subtotal	24
HIS 191J	Sex & Society in Modern Chinese History	<b>Elective Requirement</b>	
HIS 194A	Aristocratic & Feudal Japan	Choose 16 units:	16
HIS 194B	Early Modern Japan	Any EAS special course <sup>1</sup> ; any CHN or JPN upper division course; any Depth Subject Matter course; any upper division EAP course focusing on East Asia or Southeast Asia.	
HIS 194C	Modern Japan	<b>Elective Requirement Subtotal</b>	16
HIS 194D	Business & Labor in Modern Japan	<b>Total Units</b>	<b>61-62</b>
HIS 194E	Education & Technology in Modern Japan		
HIS 195B	History of Modern Korea		
HIS 195C	A History of Vietnam		
JPN 101	Japanese Literature in Translation: The Early Period		
JPN 102	Japanese Literature in Translation: The Middle Period		
JPN 103	Japanese Literature in Translation: The Modern Period		
JPN 104	Modern Japanese Literature: War & Revolution		
JPN 105	Modern Japanese Literature: Hero & Anti-Hero		
JPN 106	Japanese Culture Through Film		

## East Asian Studies, Minor

### College of Letters & Science

Courses taken for the minor are expected to reflect a predominant interest in East Asia or Southeast Asia. All upper division courses counting towards the East Asian Studies major, may be used to fulfill the requirements for the minor program, as long as they deal predominantly with East Asia or Southeast Asia.

<sup>1</sup> Approved courses: EAS 190, EAS 192, EAS 194H, EAS 196A-EAS 196B, EAS 198—maximum 12 units from this list

Code	Title	Units	
Choose any five upper division courses from the Depth Subject Matter list for the major, or from the following list:		20	Students that choose the environmental policy and human ecology area of emphasis may also substitute one quantitative course in social science such as micro- or macro-economics for one chemistry or physics requirement.
Any CHN or JPN upper division course			
Chinese (CHN) (p. 627)			
Japanese (JPN) (p. 963)			
Any EAS special course; approved courses:			
EAS 190	East Asian Studies Seminar		
EAS 192	East Asian Studies Seminar		
EAS 194H	Special Study for Honors Students		
EAS 196A	Honors Seminar		
EAS 196B	Honors Seminar		
EAS 198	Directed Group Study		
Upper division Education Abroad course focusing on East Asia or Southeast Asia			
Total Units		20	

## Ecology (Graduate Group)

College of Agricultural & Environmental Sciences

Brian Gaylord, Ph.D., Chairperson of the Group

### Group Office

1005 Wickson Hall; 530-752-6752; Ecology Graduate Group (<http://ecology.ucdavis.edu>); Faculty (<https://ecology.ucdavis.edu/gge-faculty/>)

- Ecology, Master of Science (p. 189)
- Ecology, Doctor of Philosophy (p. 189)
- Ecology, Doctor of Philosophy (Joint Doctorate with SDSU) (p. 189)

## Ecology, Master of Science

College of Agricultural & Environmental Sciences

Brian Gaylord, Ph.D., Chairperson of the Group

### Graduate Study

The Graduate Group in Ecology offers M.S. and Ph.D. degrees. Ecology is a science that integrates numerous fields of study to attain deep understanding of natural and societal influences on the distribution, abundances, behaviors, traits, and ecosystem functions of organisms. In order to accommodate varied student interests, the Group has developed several 'areas of emphasis' with specialized programs of study: agricultural ecology, conservation ecology, ecological genomics and genetics, ecosystems and landscape ecology, ecotoxicology and physiological ecology, environmental policy and human ecology, integrative ecology, marine ecology, and restoration ecology. For further details, contact the Group office.

### Preparation

Appropriate preparation is undergraduate work in any of the biological, social or behavioral, and physical sciences, mathematics or engineering. Applicants will normally be expected to have completed the following courses during the undergraduate years or shortly after matriculating: one course each in introductory biology, general chemistry, physical science, calculus, statistics; and an upper division introduction to ecology course and an upper division introduction to evolution class. Students that choose the environmental policy and human ecology area of emphasis may also substitute one quantitative course in social science such as micro- or macro-economics for one chemistry or physics requirement.

## Ecology, Doctor of Philosophy

College of Agricultural & Environmental Sciences

Brian Gaylord, Ph.D., Chairperson of the Group

### Graduate Study

The Graduate Group in Ecology offers M.S. and Ph.D. degrees. Ecology is a science that integrates numerous fields of study to attain deep understanding of natural and societal influences on the distribution, abundances, behaviors, traits, and ecosystem functions of organisms. In order to accommodate varied student interests, the Group has developed several 'areas of emphasis' with specialized programs of study: agricultural ecology, conservation ecology, ecological genomics and genetics, ecosystems and landscape ecology, ecotoxicology and physiological ecology, environmental policy and human ecology, integrative ecology, marine ecology, and restoration ecology. For further details, contact the Group office.

### Preparation

Appropriate preparation is undergraduate work in any of the biological, social or behavioral, and physical sciences, mathematics or engineering. Applicants will normally be expected to have completed the following courses during the undergraduate years or shortly after matriculating: one course each in introductory biology, general chemistry, physical science, calculus, statistics; and an upper division introduction to ecology course and an upper division introduction to evolution class. Students that choose the environmental policy and human ecology area of emphasis may also substitute one quantitative course in social science such as micro- or macro-economics for one chemistry or physics requirement.

## Ecology, Doctor of Philosophy (Joint Doctorate with SDSU)

College of Agricultural & Environmental Sciences

Walt Oechel, Ph.D., Chairperson of the JDPE Program

### Graduate Study

The JDPE is a doctoral degree that is run jointly by the Ecology Program at San Diego State University and the Ecology Graduate Group at UC Davis. The joint nature of the doctoral program offers two primary advantages. First, students benefit from contact and expertise in and outside of the classroom with faculty members of two strong ecology programs. Second, across the two campuses, students have the opportunity to access facilities and field sites in nearly all the major biomes of California. JDPE students spend their first year at San Diego State University with their advisor to begin the preparation of a thesis proposal. The student then moves to UC Davis for additional course work and for the Qualifying Examination. On return to San Diego State University, the thesis research is completed, and the dissertation is prepared and defended. The Ph.D. degree is awarded jointly by San Diego State University and UC Davis.

## Preparation

Appropriate preparation is undergraduate work in any of the biological, social or behavioral, and physical sciences, mathematics or engineering. Applicants will normally be expected to have completed the following courses during the undergraduate years or shortly after matriculating: one course each in introductory biology, general chemistry, physical science, calculus, statistics; and an upper division introduction to ecology course and an upper division introduction to evolution class. Students that choose the environmental policy and human ecology area of emphasis may also substitute one quantitative course in social science such as micro- or macro-economics for one chemistry or physics requirement.

# Economics

## College of Letters & Science

Katheryn Russ, Ph.D., Chairperson of the Department; term ends June 30, 2025.

## Department Office

2216 Social Sciences & Humanities Building; 530-752-9241; Economics (<http://www.econ.ucdavis.edu>); Faculty (<http://www.econ.ucdavis.edu/directory-of-people/econ-faculty/>)

- Economics, Bachelor of Arts (p. 190)
- Economics, Minor (p. 195)
- Economics, Master of Arts (p. 196)
- Economics, Doctor of Philosophy (p. 196)

# Economics, Bachelor of Arts

## College of Letters & Science

## The Major Program

Economics is the study of how individuals, organizations, and societies choose among alternative uses of resources and how these resources are turned into the things people want.

## The Program

Economics majors complete an introductory course sequence in economics, in addition to several courses in quantitative methods. Intermediate theory and economic history are taken on the upper division level and then students are free to concentrate the remainder of their units in various areas of interest, including more courses in economic theory or history, international economics, labor, industry, alternative economic systems, economic development, public finance, econometrics, or mathematical economics.

## Major Advisors

Contact Department office at [eheadvisingcenter@ucdavis.edu](mailto:eheadvisingcenter@ucdavis.edu) or 530-752-9142.

**Internships & Career Alternatives.** Internships for economics majors have been arranged at banks, brokerages, other business enterprises, and governmental units. The internships must complement the student's course work. A degree in economics is excellent preparation for students who want to go on to law school, business school, advanced work in economics, or graduate work in international relations. It is also a

good background for careers in management and positions with the government.

## Course Limits

Except under extraordinary circumstances, not more than two economics courses should be taken in any one quarter. In special cases, the department will accept a limited number of related upper division courses from other departments in satisfaction of the economics upper division course requirements. Approval from a departmental advisor is required in all such cases.

Graduation with High or Highest Honors. To be eligible for departmental recommendation for High or Highest Honors in Economics at graduation, a student must take all upper division courses in Economics for a letter grade, earn at least a 3.500 grade point average in those courses, and complete at least eight units of course work that result in the submission of an Honors project. Consult the College of Letters and Science section of this catalog and contact the Department for more information.

## Study Abroad

The Economics Department wishes to accommodate students who would like to complement their economics degree with a study abroad experience. Up to 20 units of upper division credit from foreign campuses (excluding ECN 100A and ECN 101) may be used towards the completion of the degree. To ensure that foreign courses will apply towards the economics degree, students need to select courses from the pre-approved list at the UC Davis Study Abroad office or seek pre-approval in the economics department for the foreign courses they wish to complete.

## Recommended

Students considering graduate study in economics are strongly urged to take MAT 021A-MAT 021B-MAT 021C and MAT 022A.

## American History & Institutions

This University requirement can be satisfied by completion of ECN 111A, ECN 111B; see also under Bachelor's Degree Requirements (p. 36).

## Graduate Study

Students who meet the admission requirements of Graduate Studies and the Department of Economics may pursue studies leading to the M.A. and Ph.D. degrees. Fields of emphasis for graduate study include: Microeconomic Theory, Macroeconomic Theory, Econometrics, Economic Development, Economic History, Industrial Organization, International Economics, Labor Economics and Public Economics. For information on admission to graduate study, degree requirements, and financial aid, consult the Graduate Announcement and Department of Economics (<https://www.econ.ucdavis.edu/graduate-program/>).

## Graduate Advisors

Contact Department office (<https://www.econ.ucdavis.edu/contact/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Economics</i>		
ECN 001A	Principles of Microeconomics	
or ECN 001AV	Principles of Microeconomics	
or ECN 001AY	Principles of Microeconomics	
ECN 001B	Principles of Macroeconomics	
or ECN 001BV	Principles of Macroeconomics	
<b>Statistics</b>		
		4

Choose one:		ECN 131	Public Finance
STA 013	Elementary Statistics	ECN 132	Health Economics
or STA 013Y	Elementary Statistics	ECN 134	Financial Economics
STA 032	Gateway to Statistical Data Science	ECN 135	Money, Banks, & Financial Institutions
<b>Mathematics</b>	<b>6-8</b>	ECN 136	Topics in Macroeconomic Theory
Choose one:		ECN 137	Macroeconomic Policy
MAT 016A	Short Calculus	ECN 138	Public Economics in International Perspective
MAT 017A	Calculus for Biology & Medicine	ECN 140	Econometrics
MAT 019A	Calculus for Data-Driven Applications	ECN 141	Economic & Financial Forecasting
MAT 021A	Calculus	ECN 142	Economics & Business Data Analytics
Choose one:		ECN 145	Transportation Economics
MAT 016B	Short Calculus	ECN 151A	Economics of the Labor Market
MAT 017B	Calculus for Biology & Medicine	ECN 151B	Economics of Human Resources
MAT 019B	Calculus for Data-Driven Applications	ECN 152	Economics of Education
MAT 021B	Calculus	ECN 160A	International Microeconomics
Preparatory Subject Matter Subtotal	18-20	ECN 160B	International Macroeconomics
<b>Depth Subject Matter</b>	<b>20</b>	ECN 164	International Finance
<b>Economics</b>		ECN 167	Economic Development in Weak States
ECN 100A	Intermediate Micro Theory: Consumer & Producer Theory	ECN 194HA	Special Study for Honors Students
ECN 100B	Intermediate Micro Theory: Imperfect Competition & Market Failure	ECN 194HB	Special Study for Honors Students
ECN 101	Intermediate Macro Theory	ARE 139	Futures & Options Markets
ECN 102	Analysis of Economic Data	ARE 156	Introduction to Mathematical Economics
Choose one:		ARE 166	Economics of Global Poverty Reduction: What Works & Why
ECN 110A	World Economic History Before the Industrial Revolution	ARE/ESP 175	Natural Resource Economics
ECN 110B	World Economic History Since the Industrial Revolution	ARE 176	Environmental Economics
ECN 111A	Economic History	Additional upper division Economics courses.	
ECN 111B	Economics History	<b>Total Units</b>	<b>12</b>
Choose one specialization below:	24	<b>Total Units</b>	<b>24</b>
Specialization: General (p. 191)			
Specialization: Behavior & Strategy (p. 191)			
Specialization: Data Analytics & Economics Analysis (p. 192)			
Specialization: International Macro-Finance (p. 192)			
Specialization: Policy (p. 192)			
Specialization: Poverty & Inequality (p. 193)			
Specialization: Economic History (p. 193)			
Depth Subject Matter Subtotal	44		
<b>Total Units</b>	<b>62-64</b>		

## Specialization: General

Code	Title	Units
Choose 12 units:		12
ECN 103	Economics of Uncertainty & Information	
ECN 106	Decision Making	
ECN 116	Comparative Economic Systems	
ECN 121A	Industrial Organization	
ECN 121B	Industrial Organization	
ECN 122	Theory of Games & Strategic Behavior	
ECN 125	Energy Economics	
ECN 130	Public Microeconomics	

## Specialization: Behavior & Strategy

Code	Title	Units
Choose one:		
ECN 121A	Industrial Organization	
ECN 122	Theory of Games & Strategic Behavior	
Choose two:		8
ECN 103	Economics of Uncertainty & Information	
ECN 106	Decision Making	
ECN 107/ PSC 133/CGS 107	Neuroeconomics/Reinforcement Learning & Decision Making	
ECN 121A	Industrial Organization	
ECN 121B	Industrial Organization	
ECN 122	Theory of Games & Strategic Behavior	
ARE 133	Introduction to Behavioral Economics	
Choose one:		4
ECN 103	Economics of Uncertainty & Information	
ECN 106	Decision Making	
ECN 116	Comparative Economic Systems	
ECN 121A	Industrial Organization	
ECN 121B	Industrial Organization	
ECN 122	Theory of Games & Strategic Behavior	
ECN 125	Energy Economics	

ECN 130	Public Microeconomics		ECN 134	Financial Economics
ECN 131	Public Finance		ECN 135	Money, Banks, & Financial Institutions
ECN 132	Health Economics		ECN 136	Topics in Macroeconomic Theory
ECN 134	Financial Economics		ECN 137	Macroeconomic Policy
ECN 135	Money, Banks, & Financial Institutions		ECN 141	Economic & Financial Forecasting
ECN 136	Topics in Macroeconomic Theory		ECN 160B	International Macroeconomics
ECN 137	Macroeconomic Policy		ECN 164	International Finance
ECN 138	Public Economics in International Perspective		ECN 171	Economy of East Asia
ECN 140	Econometrics		Choose three:	
ECN 141	Economic & Financial Forecasting		ECN 103	Economics of Uncertainty & Information
ECN 142	Economics & Business Data Analytics		ECN 106	Decision Making
ECN 145	Transportation Economics		ECN 116	Comparative Economic Systems
ECN 151A	Economics of the Labor Market		ECN 121A	Industrial Organization
ECN 151B	Economics of Human Resources		ECN 121B	Industrial Organization
ECN 152	Economics of Education		ECN 122	Theory of Games & Strategic Behavior
ECN 160A	International Microeconomics		ECN 125	Energy Economics
ECN 160B	International Macroeconomics		ECN 130	Public Microeconomics
ECN 164	International Finance		ECN 131	Public Finance
ECN 167	Economic Development in Weak States		ECN 132	Health Economics
ECN 194HA	Special Study for Honors Students		ECN 134	Financial Economics
ECN 194HB	Special Study for Honors Students		ECN 135	Money, Banks, & Financial Institutions
ARE 139	Futures & Options Markets		ECN 136	Topics in Macroeconomic Theory
ARE 156	Introduction to Mathematical Economics		ECN 137	Macroeconomic Policy
ARE 166	Economics of Global Poverty Reduction: What Works & Why		ECN 138	Public Economics in International Perspective
ARE/ESP 175	Natural Resource Economics		ECN 140	Econometrics
ARE 176	Environmental Economics		ECN 141	Economic & Financial Forecasting
Additional upper division Economics courses.		8	ECN 142	Economics & Business Data Analytics
Total Units		20	ECN 145	Transportation Economics
Total Units		20	ECN 151A	Economics of the Labor Market
Choose two:		8	ECN 151B	Economics of Human Resources
ECN 103	Economics of Uncertainty & Information		ECN 152	Economics of Education
ECN 106	Decision Making		ECN 160A	International Microeconomics
ECN 122	Theory of Games & Strategic Behavior		ECN 160B	International Macroeconomics
ECN 132	Health Economics		ECN 164	International Finance
ECN 140	Econometrics		ECN 167	Economic Development in Weak States
ECN 142	Economics & Business Data Analytics		ECN 194HA	Special Study for Honors Students
ECN 145	Transportation Economics		ECN 194HB	Special Study for Honors Students
Additional upper division Economics courses.		12	ARE 139	Futures & Options Markets
Total Units		24	ARE 156	Introduction to Mathematical Economics
Total Units		24	ARE 166	Economics of Global Poverty Reduction: What Works & Why
Total Units		24	ARE/ESP 175	Natural Resource Economics
Total Units		24	ARE 176	Environmental Economics

## Specialization: Data Analytics & Economics Analysis

Code	Title	Units
ECN 140	Econometrics	4
Choose two:		8
ECN 103	Economics of Uncertainty & Information	
ECN 106	Decision Making	
ECN 122	Theory of Games & Strategic Behavior	
ECN 132	Health Economics	
ECN 140	Econometrics	
ECN 142	Economics & Business Data Analytics	
ECN 145	Transportation Economics	
Additional upper division Economics courses.		12
Total Units		24
Total Units		24

## Specialization: International Macro-Finance

Code	Title	Units
Choose three:		12
ECN 110B	World Economic History Since the Industrial Revolution	

## Specialization: Policy

Code	Title	Units
Choose three:		12
ECN 125	Energy Economics	
ECN 130	Public Microeconomics	
ECN 131	Public Finance	

ECN 138	Public Economics in International Perspective	ARE 166	Economics of Global Poverty Reduction: What Works & Why
ECN 145	Transportation Economics	ARE/ESP 175	Natural Resource Economics
ECN 151A	Economics of the Labor Market	ARE 176	Environmental Economics
ECN 151B	Economics of Human Resources		
ECN 152	Economics of Education		
ECN 160A	International Microeconomics		
Additional upper division Economics courses.		Total Units	24
<b>Total Units</b>			

## Specialization: Poverty & Inequality

Code	Title	Units
Choose three:		12
ECN/ARE 115A	Economic Development	
ECN 115B/115BY/	Economic Development	
ARE 115B/115BY		
ECN 117	Economics of International Immigration	
ECN 130	Public Microeconomics	
ECN 138	Public Economics in International Perspective	
ECN 151B	Economics of Human Resources	
ECN 167	Economic Development in Weak States	
Choose three:		12
ECN 103	Economics of Uncertainty & Information	
ECN 106	Decision Making	
ECN 116	Comparative Economic Systems	
ECN 121A	Industrial Organization	
ECN 121B	Industrial Organization	
ECN 122	Theory of Games & Strategic Behavior	
ECN 125	Energy Economics	
ECN 130	Public Microeconomics	
ECN 131	Public Finance	
ECN 132	Health Economics	
ECN 134	Financial Economics	
ECN 135	Money, Banks, & Financial Institutions	
ECN 136	Topics in Macroeconomic Theory	
ECN 137	Macroeconomic Policy	
ECN 138	Public Economics in International Perspective	
ECN 140	Econometrics	
ECN 141	Economic & Financial Forecasting	
ECN 142	Economics & Business Data Analytics	
ECN 151A	Economics of the Labor Market	
ECN 151B	Economics of Human Resources	
ECN 152	Economics of Education	
ECN 160A	International Microeconomics	
ECN 160B	International Macroeconomics	
ECN 164	International Finance	
ECN 167	Economic Development in Weak States	
ECN 194HA	Special Study for Honors Students	
ECN 194HB	Special Study for Honors Students	
ARE 139	Futures & Options Markets	
ARE 156	Introduction to Mathematical Economics	

## Specialization: Economic History

Code	Title	Units
Choose three:		12
ECN 110A	World Economic History Before the Industrial Revolution	
ECN 110B	World Economic History Since the Industrial Revolution	
ECN 111A	Economic History	
ECN 111B	Economics History	
ECN 117	Economics of International Immigration	
One of which may be from:		
HIS 107	Medicine's Histories: Human & Veterinary Medicine from the Ancient World to One Health	
HIS 108	Global Environmental History	
HIS/SAS 109	Environmental Change, Disease & Public Health	
HIS 110	Themes in World History	
HIS 110A	Colonialism & the Making of the Modern World	
HIS 111A	Ancient History	
HIS 111B	Ancient History	
HIS 111C	Ancient History	
HIS 112A	Topics in Pre-Modern Jewish History	
HIS 112B	Topics in Modern Jewish History	
HIS 112C	History of Jews in the Muslim World	
HIS 113	History of Modern Israel	
HIS 115A	History of West Africa	
HIS 115B	History of East Africa & the Indian Ocean	
HIS 115C	History of Southern Africa from Exploration to the Rainbow Nation	
HIS 115D	Postcolonial Africa	
HIS 115E	Slavery, Africa, & the Atlantic World	
HIS 115F	History of Modern North Africa, 1800 to the Present	
HIS 116	African History: Special Themes	
HIS 119	World War I	
HIS 120	World War II	
HIS 121A	Medieval History	
HIS 121B	Medieval History	
HIS 121C	Medieval History	
HIS 122	Selected Themes in Medieval History	
HIS 125	Topics in Early Modern European History	
HIS 126Y/	The History of Human Rights in Europe	
HMR 162Y		
HIS 130A	Christianity & Culture in Europe: 50-1450	
HIS 130B	Christianity & Culture in Europe: 1450-1600	

HIS 130C	Christianity & Culture in Europe: 1600-1850	HIS 165	Latin American Social Revolutions
HIS 131A	Early Modern European History	HIS 166A	History of Mexico to 1848
HIS 131B	European History During the Renaissance & Reformation	HIS 166B	History of Mexico since 1848
HIS 131C	The Old Regime: Absolution, Enlightenment & Revolution in Europe	HIS 167	Modern Latin American Cultural & Intellectual History
HIS 132	Crime & Punishment in Early Modern Europe	HIS 168	History of Inter-American Relations
HIS 133	European Thought & Culture from the Renaissance to the Enlightenment	HIS 169A	Mexican-American History
HIS 134A	The Age of Revolution	HIS 169B	Mexican-American History
HIS 135A	History of Science to the 18th Century	HIS 170A	Colonial America
HIS 135B	History of Science, 18th to 20th Centuries	HIS 170B	The American Revolution
HIS/STS 136	Scientific Revolution	HIS 170C	The Early National Period, 1789-1815
HIS 138A	The Rise of the Russian Empire, 1304-1825	HIS 171A	Slavery, Society & Expansion in the Early U.S.
HIS 138B	Reform & Revolution in Tsarist Russia, 1825-1917	HIS 171B	Civil War Era
HIS 138C	Russian History: The Rise & Fall of the Soviet Union, 1917 to Present	HIS 171C	Reconstruction, America's Second Founding
HIS 139A	Medieval & Renaissance Medicine	HIS 171D	Selected Themes in 19th-Century American History
HIS 140	The Rise of Capitalism in Europe	HIS 172	American Environmental History
HIS 141	France Since 1815	HIS 173	Becoming an American: Immigration & American Culture
HIS 142A	History of the Holocaust	HIS 174A	The Gilded Age & Progressive Era: United States, 1876-1917
HIS 142B	The Memory of the Holocaust	HIS 174B	War, Prosperity, & Depression: United States, 1917-1945
HIS 143	History of Eastern Europe & the Balkans	HIS 174C	The United States Since World War II, 1945 to the Present
HIS 144A	History of Germany, 1450 to 1789	HIS 174D	Selected Themes in 20th-Century American History
HIS 144B	History of Germany since 1789	HIS 175	American Intellectual History
HIS 145	War & Revolution in Europe: 1789-1918	HIS 176A	Cultural & Social History of United States
HIS 146A	Europe in the 20th Century	HIS 176B	Cultural & Social History of United States
HIS 146B	Europe in the 20th Century	HIS 177A	History of Black People & American Race Relations: 1450-1860
HIS 147A	European Intellectual History: 1800-1870	HIS 177B	History of Black People & American Race Relations: 1860-Present
HIS 147B	European Intellectual History: 1870-1920	HIS 178	Water in the West: Environment & Politics in America's Arid Lands
HIS 147C	European Intellectual History: 1920-1970	HIS 179	Asian American History, 1850-Present
HIS 148A	Women & Society in Europe: 1500-1789	HIS 180AN	American Political History, 1789-1896
HIS 148B	Women & Society in Europe: 1789-1920	HIS 180BN	American Political History, 1896-present
HIS 148C	Women in Society in Europe: 1914-Present	HIS 180C	The Fight for the Right to Vote
HIS 149	Comparative Cultural History of Modern Britain & France, 1880-1914	HIS 181	Religion in American History to 1890
HIS 151A	England: The Middle Ages	HIS 182	Gender & Justice in American History
HIS 151B	England: The Early Modern Centuries	HIS 183A	The Frontier Experience: Trans-Mississippi West
HIS 151C	18th-Century England	HIS 183B	The Frontier Experience: Trans-Mississippi West
HIS 151D	Industrial England	HIS 184	History of Sexuality in America
HIS 156	Latin American Migration History	HIS 185A	History of Science in America
HIS 157	Business, Biomes & Knowledge: Latin American Environmental History	HIS 185B	History of Technology in America
HIS 158	Special Topics in Latin American History	HIS 187	History of US Foreign Relations in the 20th Century
HIS 159	Women & Gender in Latin American History	HIS 188	America in the 1960s
HIS 160	Spain & America in the 16th Century		
HIS/HMR 161	Human Rights in Latin America		
HIS 162	History of the Andean Region		
HIS 163A	History of Brazil		
HIS 163B	History of Brazil		
HIS 164	History of Chile		

HIS 189	California History	ECN 140	Econometrics
HIS 190A	Middle Eastern History I: The Rise of Islam, 600-1000	ECN 141	Economic & Financial Forecasting
HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400	ECN 142	Economics & Business Data Analytics
HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730	ECN 145	Transportation Economics
HIS 190D	Middle Eastern History IV: Safavids Iran, 1300-1720	ECN 151A	Economics of the Labor Market
HIS 191A	Classical China	ECN 151B	Economics of Human Resources
HIS 191B	High Imperial China	ECN 152	Economics of Education
HIS 191C	Late Imperial China	ECN 160A	International Microeconomics
HIS 191D	19th-Century China: The Empire Confronts the West	ECN 160B	International Macroeconomics
HIS 191E	The Chinese Revolution	ECN 164	International Finance
HIS 191F	History of the People's Republic of China	ECN 167	Economic Development in Weak States
HIS 191G	Special Topics in Chinese History to 1800	ECN 194HA	Special Study for Honors Students
HIS 191H	Special Topics in Chinese History after 1800	ECN 194HB	Special Study for Honors Students
HIS 191J	Sex & Society in Modern Chinese History	ARE 139	Futures & Options Markets
HIS 193A	History of the Modern Middle East, 1750-1914	ARE 156	Introduction to Mathematical Economics
HIS 193B	History of the Modern Middle East, From 1914	ARE 166	Economics of Global Poverty Reduction: What Works & Why
HIS 193C	The Middle East Environment: Historical Change & Current Challenges	ARE/ESP 175	Natural Resource Economics
HIS 193D	History of Modern Iran, From 1850 to Present	ARE 176	Environmental Economics
HIS 194A	Aristocratic & Feudal Japan	<b>Total Units</b>	
HIS 194B	Early Modern Japan	<b>24</b>	
HIS 194C	Modern Japan		
HIS 194D	Business & Labor in Modern Japan		
HIS 194E	Education & Technology in Modern Japan		
HIS 195B	History of Modern Korea		
HIS 195C	A History of Vietnam		
HIS 196A	Medieval India		
HIS 196B	Modern India		
Choose three:	12		
ECN 103	Economics of Uncertainty & Information		
ECN 106	Decision Making		
ECN 116	Comparative Economic Systems		
ECN 121A	Industrial Organization		
ECN 121B	Industrial Organization		
ECN 122	Theory of Games & Strategic Behavior		
ECN 125	Energy Economics		
ECN 130	Public Microeconomics		
ECN 131	Public Finance		
ECN 132	Health Economics		
ECN 134	Financial Economics		
ECN 135	Money, Banks, & Financial Institutions		
ECN 136	Topics in Macroeconomic Theory		
ECN 137	Macroeconomic Policy		
ECN 138	Public Economics in International Perspective		

## Economics, Minor

### College of Letters & Science

Economics is the study of how individuals, organizations, and societies choose among alternative uses of resources and how these resources are turned into the things people want.

### Course Limits

Except under extraordinary circumstances, not more than two economics courses should be taken in any one quarter. In special cases, the department will accept a limited number of related upper division courses from other departments in satisfaction of the economics upper division course requirements. Approval from a departmental advisor is required in all such cases.

### Preparation

ECN 001A or ECN 001AV or ECN 001AY, ECN 001B; STA 013 or STA 013Y, STA 032; MAT 016A, MAT 016B or MAT 017A, MAT 017B or MAT 021A, MAT 021B. MAT 016A, MAT 016B or MAT 017A, MAT 017B or MAT 021A, MAT 021B should be completed before taking ECN 100A and ECN 101. Students need to complete ECN 100A and ECN 101 before taking the advanced courses.

Code	Title	Units
ECN 100A	Intermediate Micro Theory: Consumer & Producer Theory	4
ECN 101	Intermediate Macro Theory	4
Choose 8 units:		8
ECN 100B	Intermediate Micro Theory: Imperfect Competition & Market Failure	
ECN 103	Economics of Uncertainty & Information	
ECN 106	Decision Making	
ECN 116	Comparative Economic Systems	
ECN 121A	Industrial Organization	

ECN 121B	Industrial Organization
ECN 122	Theory of Games & Strategic Behavior
ECN 125	Energy Economics
ECN 130	Public Microeconomics
ECN 131	Public Finance
ECN 132	Health Economics
ECN 134	Financial Economics
ECN 135	Money, Banks, & Financial Institutions
ECN 136	Topics in Macroeconomic Theory
ECN 137	Macroeconomic Policy
ECN 140	Econometrics
ECN 141	Economic & Financial Forecasting
ECN 145	Transportation Economics
ECN 151A	Economics of the Labor Market
ECN 151B	Economics of Human Resources
ECN 152	Economics of Education
ECN 160A	International Microeconomics
ECN 160B	International Macroeconomics
ECN 167	Economic Development in Weak States
ARE 139	Futures & Options Markets
ARE 156	Introduction to Mathematical Economics
ARE 166	Economics of Global Poverty Reduction: What Works & Why
ARE/ESP 175	Natural Resource Economics
ARE 176	Environmental Economics
Choose 4 units in upper division Economics (ECN) courses.	
Economics (ECN) (p. 739)	
Total Units	20

## Economics, Master of Arts

College of Letters & Science

### Graduate Study

Students who meet the admission requirements of Graduate Studies and the Department of Economics may pursue studies leading to M.A. and Ph.D. degrees. Fields of emphasis for graduate study include: Microeconomic Theory, Macroeconomic Theory, Econometrics, Economic Development, Economic History, Industrial Organization, International Economics, Labor Economics and Public Economics. For information on admission to graduate study, degree requirements, and financial aid, consult the Graduate Announcement and Economics.

The Master of Arts degree is offered only in route to the Ph.D.

### Graduate Advisors

Contact econgradadmit@ucdavis.edu, 2229 Social Science & Humanities Building.

### Recommended

Students considering graduate study in economics are strongly urged to take MAT 021A-MAT 021B-MAT 021C and MAT 022A.

## Economics, Doctor of Philosophy

College of Letters & Science

### Graduate Study

Students who meet the admission requirements of Graduate Studies and the Department of Economics may pursue studies leading to M.A. and Ph.D. degrees. Fields of emphasis for graduate study include: Microeconomic Theory, Macroeconomic Theory, Econometrics, Economic Development, Economic History, Industrial Organization, International Economics, Labor Economics and Public Economics. For information on admission to graduate study, degree requirements, and financial aid, consult the Graduate Announcement and Economics (<http://www.econ.ucdavis.edu>).

### Graduate Advisors

For updated information, see Graduate Advisor ([econgradadmit@ucdavis.edu](mailto:econgradadmit@ucdavis.edu)).

### Recommended

Students considering graduate study in economics are strongly urged to take MAT 021A-MAT 021B-MAT 021C and MAT 022A.

## Education, School of

### School of Education

Lauren E. Lindstrom, Ph.D., Dean

Cynthia Carter Ching, Ph.D., Associate Dean for Academic Programs & Instruction; July 1, 2022-June 30, 2024

Rebecca Ambrose, Ph.D., Department Chair; July 1, 2022-June 30, 2023

### Group Office

School of Education Building; 530-752-7259; School of Education (<https://education.ucdavis.edu/>); Advising ([eduadvising@ucdavis.edu](mailto:eduadvising@ucdavis.edu)); Faculty (<https://education.ucdavis.edu/graduate-group-education-faculty/>)

- Education, Minor (p. 196)
- Education, Master of Arts (p. 198)
- Education, Doctor of Philosophy (p. 198)
- Education Leadership, Doctorate of Education (CANDEL) (p. 198)
- Integrated Teaching Credential, Teaching Credential, Master of Arts (p. 198)

## Education, Minor

### School of Education

Yuuko Uchikoshi Tonkovich, Ph.D., Program Chair; term ends June 30, 2023

530-752-8258; School of Education (<http://education.ucdavis.edu>); Faculty (<https://education.ucdavis.edu/faculty-and-instructors-directory/>)

### Program Coordinator

530-752-2367; Advising ([eduadvising@ucdavis.edu](mailto:eduadvising@ucdavis.edu))

The UC Davis School of Education is committed to developing informed citizens and advocates for equitable educational environments in a democratic society. Education courses are designed for undergraduate student from all majors.

A Minor in Education helps students:

- Develop an understanding of the issues and concerns of public and private education, especially with regard to the education of students with diverse learning needs.
- Complete prerequisites for the teaching credential program.
- Work towards a master's degree or doctoral degree in education or related field.
- Seek employment in policy, advocacy, or other education-related careers.

## Courses

Students must complete 20 units in the Minor program in Education. At least 12 units of the 20-unit minimum for the minor must be in Education. The remaining units for the minor may be in education or a related field as approved on the electives list. See About the Education Minor (<https://education.ucdavis.edu/about-education-minor/>).

## Minor Advisors

A designated faculty member in the School of Education may advise students and give final approval on the minor. For additional information, contact Student Services (<https://education.ucdavis.edu/student-services/>).

Code	Title	Units
<b>Upper Division Required Courses</b>		
EDU 100	Introduction to Schools <sup>1</sup>	4
EDU 110	Educational Psychology: General	4
EDU 120	Philosophical & Social Foundations of Education	4
Upper Division Required Courses Subtotal		12
<b>Elective Courses</b>		
Not all courses in the list are 4 units.		
Remaining 8 units may be:		8
EDU 114	Quantitative Methods in Educational Research	
EDU 115	Educating Children with Disabilities	
EDU 119	Use & Misuse of Standardized Tests	
EDU 121	Introduction to Education Policy Analysis: Tools, Methods & Frameworks	
EDU 122	Children, Learning & Material Culture	
EDU 130	Issues in Higher Education	
EDU 142	Introduction to Environmental Education	
EDU/SPA 147	Anglos, Latinos, & Spanish Black Legend: Anti-Hispanic Prejudice Origins & Educational Implications	
EDU 150	Cultural Diversity & Education in a Sociopolitical Context	
EDU 151	History & Approaches to Multilingualism in K-12 Contexts	
EDU 152	Academic Spanish for Bilingual Teachers	
EDU 154	Languaging in Chicanx & Latinx Communities & Schools	
EDU 155	Ethnic Studies in K-12 Schools	
EDU 163	Guidance & Counseling	
EDU/LIN 173	Language Development	

EDU/GEL 181	Teaching in Science & Mathematics <sup>1</sup>
EDU/GEL 183	Teaching High School Mathematics & Science <sup>1</sup>
EDU 185	Learning in a Digital Age: Information, Schooling, & Society
EDU 192	Internship <sup>2</sup>
EDU 198	Directed Group Study <sup>2</sup>
EDU 199	Special Study for Advanced Undergraduates <sup>2</sup>
Elective Courses Subtotal	
8	
<b>Approved Courses Outside of Education</b>	
AAS 130	Education in the African-American Community
AED 100	Concepts in Agricultural & Environmental Education <sup>1</sup>
AMS 152	The Lives of Children in America
BIS 195A	Science Teaching Internship Program <sup>2</sup>
BIS 195B	Science Teaching Internship <sup>2</sup>
CHI 102A	Chicana/o Feminist Theoretical Understandings of K-20 Educational Disparities
CHI 102B	Grassroots Community Activism & Mobilization Efforts Challenging Educational Inequity
CHI 102C	Policy & Law Challenging Segregation & Educational Inequity
CHI 132	Political Economy of Chicana/o Communities
CHI 192	Internship in the Chicana/Chicano/Latina/Latino Community <sup>2</sup>
ECN 152	Economics of Education
GEL 185A	Conceptual Integrated Science for Non-Science Majors: The Physical World
GEL 185B	Conceptual Integrated Science for Non-Science Majors: Earth System Science
HDE 100A or HDE 100AV	Infancy & Early Childhood Infancy & Early Childhood
HDE 100B	Middle Childhood & Adolescence
HDE 101	Cognitive Development
LIN/EDU 173	Language Development
LIN 180	Second Language Learning & Teaching
MAT 197TC	Tutoring Mathematics in the Community <sup>2</sup>
PSC 130	Human Learning & Memory
PSC 132	Language & Cognition
PSC 141/HDE 101	Cognitive Development
SAS 120	Science & Contemporary Societal Issues
SOC 124	Education & Inequality in the U.S.
SPA 116	Applied Spanish Linguistics
SPA 117	Teaching Spanish as a Native Tongue in the U.S.: Praxis & Theory
UWP 104D	Writing in the Professions: Elementary & Secondary Education
UWP 197TC	Community Tutoring in Writing <sup>2</sup>

Approved Courses Outside of Education Subtotal	0
Total Units	20

<sup>1</sup> EDU 181 and EDU 183-4 units or AED 100-3 units may serve as course substitutes for EDU 100; if EDU 100 is taken, EDU 181, EDU 183 and/or AED 100 may not be taken as electives.

<sup>2</sup> Internship (192, 195A or B, 195TC, 197TC), Group Study (198) and Independent Study (199), or a combination of both, may not exceed a total of 4 units. Elective courses may include only one internship.

## Education, Master of Arts

### School of Education

Admissions are suspended while our faculty review the program's current topical focus and requirements. We are not offering the Master of Arts General Track for this admissions cycle.

The Master of Arts in Education provides a course of study for examining research and theory about learners, teachers, schools, and related social institutions. The program prepares professionals to conduct research about the education of children, youth, and adults in a multicultural society. Graduates may assume leadership positions in school districts, state education agencies, and private organizations concerned with instructional research, policy and practice.

## Education, Doctor of Philosophy

### School of Education

Danny C. Martinez, Ph.D., GGE Chair; term ends June 30, 2023

## Graduate Study

The Graduate Group in Education offers programs of study and research leading to the Ph.D. degree. Students may concentrate in; language, literacy and culture; learning and mind sciences; mathematics education; school organization and educational policy; or science and agriculture education. Students may also combine these fields of study with designated emphasis areas such as Critical Theory; Second Language Acquisition, Women's Studies, and Writing, Rhetoric, and Composition Studies. Detailed information regarding graduate study may be obtained by writing the Graduate Coordinator or see Education Ph.D. Program (<https://education.ucdavis.edu/phd-education/>).

## Preparation

Students should have earned a Bachelor's or M.A. degree or the equivalent in a discipline relevant to their proposed emphasis program. For example, students applying for the mathematics education emphasis should have earned the B.A. or M.A. or M.A.T. degree in mathematics or mathematics education.

## Graduate Advisors

Prof. Darnel Degand (Primary Advisor), Prof. Heidi Ballard, Prof. Cassie Hart, Prof. of Teaching Torry Winn

## Graduate Coordinator

Briana Rodriguez

## Courses

See Education, School of (p. 196).

## Education Leadership, Doctorate in Education (CANDEL)

### School of Education

Elizabeth Montaño, Ph.D., Program Chair; term ends June 30, 2023

School of Education Building; Advising ([candeledd@ucdavis.edu](mailto:candeledd@ucdavis.edu)); School of Education (<http://education.ucdavis.edu>); Faculty (<https://education.ucdavis.edu/candel-program-faculty/>)

The Educational Leadership (CANDEL) Program leading to a Doctor of Education (Ed.D.) degree, is intended primarily for working professionals in schools, community colleges, and related educational capacities that reside in the greater Sacramento Valley, Bay Area, Central Valley, and Northern California. Graduates of this program will be prepared to lead in educational environments that promote learning, equity and achievement for all students. Armed with both real-world, problem-based learning, and scholarship skills, program graduates will be uniquely ready to manage the complexities of educational organizations, effect school change processes and shape the educational policies that bear on the practice of education in the public setting.

## Integrated Teaching Credential, Teaching Credential, Master of Arts

### School of Education

Cary Trexler, Ph.D., Program Chair; term January 1-June 30, 2023

School of Education Building; 530-752-5887; Advising ([eduadvising@ucdavis.edu](mailto:eduadvising@ucdavis.edu)); Faculty (<https://education.ucdavis.edu/faculty-directory/>)

The Teaching Credential with Master's Degree Program offers an opportunity for qualified students to complete the requirements for both a Masters of Arts in Education degree and a Multiple Subject or Single Subject Credential in English, mathematics, science, social science or agriculture in a six-quarter program completed in less than two years. A Bilingual authorization in Spanish or Mandarin, is available to credential candidates in multiple subjects or the single subjects of English, mathematics, science or social science.

The Credential Program prepares students for the teaching profession by immersing them in the total environment of a public school classroom while enrolled in required coursework. The coursework incorporates a theoretical practical approach to the teaching-learning process, encouraging close interactions among teacher candidates and teacher education faculty. Students complete requirements for the M.A. degree during two part-time quarters following the credential year. This coursework introduces the integration of research into teaching practice, making teachers more informed and pro-active practitioners.

## Graduate Advisor

Cary Trexler, Ph.D.

## Graduate Coordinator

Janelle Barnes

## Courses

See Education, School of (p. 472).

## Teaching Credential/M.A. Degree Program

Applicants are encouraged to have program prerequisites and testing requirements completed prior to submitting an application. Credential requirements are regularly revised by the State of California. To obtain the most current information, students considering a career in teaching are encouraged to see Credential/MA (<https://education.ucdavis.edu/teaching-credentialma/>) and consult with the School of Education advisors throughout their undergraduate career.

## M.A. in Education Degree Programs

Applicants to the General Track M.A. must have completed an undergraduate degree with a major in a field that supports their intended area of emphasis. A minimum undergraduate GPA of 3.000 is necessary for graduate admission at the University of California, Davis. Please consult with advisors in the School of Education regarding additional testing or supplemental information that may be required for application to a specific program.

## Electrical & Computer Engineering

### College of Engineering

Andre Knoesen, Ph.D., Chair of the Department; term ends June 30, 2023  
 Hussain Al-Asaas, Ph.D., Vice Chair for Undergraduate Studies  
 Lifeng Lai, Ph.D., Vice Chair for Graduate Studies

### Department Office

2064 Kemper Hall; 530-752-0583; Electrical & Computer Engineering (<http://www.ece.ucdavis.edu>); Faculty (<https://ece.ucdavis.edu/directory/>)

- Computer Engineering, Bachelor of Science (p. 199)
- Electrical & Computer Engineering, Bachelor of Science/Master of Science Integrated Degree Programs (IDP) (p. 201)
- Electrical & Computer Engineering, Master of Science (p. 202)
- Electrical & Computer Engineering, Doctor of Philosophy (p. 202)
- Electrical Engineering, Bachelor of Science (p. 203)
- Electrical Engineering, Minor (p. 207)

## Computer Engineering, Bachelor of Science

### College of Engineering

Faculty (<https://ece.ucdavis.edu/directory/>)

## The Electrical & Computer Engineering Undergraduate Programs

The department administers two undergraduate curricula in the College of Engineering: (1) the Electrical Engineering curriculum and (2) the Computer Engineering curriculum.

### Integrated Degree Programs (IDP)

The IDP leads to both the Bachelor of Science and the Master of Science degrees. The program provides a student the opportunity to obtain

superior breadth and depth of technical material. The IDP program in the Department of Electrical & Computer Engineering is available only to UC Davis undergraduates with strong academic records enrolled in the Electrical Engineering, Computer Engineering or Applied Physics curricula. Applicants in their junior year must apply for the IDP by March 31. For more information on IDP, see B.S./M.S. Integrated Degree Programs.

### Mission

Under its land grant status, the University of California has a mission to provide the state with the trained workforce it needs and to advance knowledge and research in directions that contribute to the general welfare of the state and the nation. The Department of Electrical & Computer Engineering contributes to the mission of the University in three ways. First, its undergraduate and graduate education programs seek to provide students with an understanding of the fundamental principles of electrical and computer engineering, the skills needed to solve the complex technological problems of modern society and the ability to continue to learn and develop throughout their careers. Second, through its research programs, the department contributes to the development and progress of electronics, communications, and computer technology. Finally, the department helps to transfer research results to industry through publication, public service and professional activities.

### Objectives

*Teaching*—To provide undergraduate students with sufficient breadth to allow them to participate in teams, continue their own education after graduation and select a focus area intelligently; to provide undergraduate students with sufficient depth in a narrower discipline to allow them to develop the ability to solve complex engineering problems; to educate the students in the graduate program to be leaders in industry or to do meaningful research in industry, government or academia.

*Research*—To develop and maintain research programs that produce useful technological advances while simultaneously training the next generation of researchers and leaders; to update and/or shift the foci of these programs frequently in response to the needs of our constituency and the nation; to provide a stimulating environment that encourages our graduate students to develop their abilities as far as possible.

## Computer Engineering Undergraduate Program

The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

### Objectives

The Electrical & Computer Engineering program educational objectives have been developed to address the needs of our constituencies. The objectives of the Electrical & Computer Engineering programs are as follow:

- Graduates will create value for their employers, demonstrating knowledge and initiative and making beneficial contributions beyond the workplace. This can also result in patents, awards, publications and presentations.
- Graduates will grow their capabilities through advanced education and professional development.
- Graduates will provide leadership and be proactive in their profession and/or communities.

Exclusive of General Education units, the minimum number of units required for the Computer Engineering undergraduate major is 138.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Code	Title	Units	Lower Division Required Course Subtotal	76
<b>Upper Division Required Courses</b>				
<i>Electrical &amp; Computer Engineering</i>				
EEC 100	Circuits II			5
EEC 111	Digital Electronic Circuits			4
EEC 161	Applied Probability for Electrical & Computer Engineers			4
EEC 170	Introduction to Computer Architecture			4
EEC 172	Embedded Systems			4
EEC 173A/ECS 152A	Computer Networks			4
EEC 180	Digital Systems II			5
EEC 196	Issues in Engineering Design			1
<i>Computer Engineering</i>				
ECS 122A	Algorithm Design & Analysis			4
ECS 150	Operating Systems & System Programming			4
Choose one:				3-4
ENG/PHY 160	Environmental Physics & Society			
ENG 190	Professional Responsibilities of Engineers			
<b>Upper Division Electives</b>				
All Design Project courses are also considered Design Laboratory electives and may be counted in both categories simultaneously.				
Both A and B need to be taken to receive credit for the Design Project.				
EEC 119A	Integrated Circuit Design Project			
EEC 119B	Integrated Circuit Design Project			
EEC 134A	RF/Microwave Systems Design			
EEC 134B	RF/Microwave Systems Design			
EEC 136A	Electronic Design Project			
EEC 136B	Electronic Design Project			
EEC 174AY	Applied Machine Learning			
EEC 174BY	Applied Machine Learning Senior Design Projects			
EEC 175A	Internet of Things			
EEC 175B	Internet of Things Senior Design Project			
EEC 181A	Digital Systems Design Project			
EEC 181B	Digital Systems Design Project			
EEC 193A	Senior Design Project			
EEC 193B	Senior Design Project			
EEC 195A	Autonomous Vehicle Design Project			
EEC 195B	Autonomous Vehicle Design Project			
Choose four letter graded upper division EEC or ECS courses <sup>2</sup>				
12-16				
<i>Technical Electives</i>				
Choose 8 units:				
8				
Chemistry				
CHE 002A	General Chemistry			
CHE 002B	General Chemistry			
CHE 002C	General Chemistry			
Any upper division course <sup>3</sup>				
<i>Engineering</i>				
ENG 035	Statics			
ENG 045	Properties of Materials			
Any upper division engineering course not used in satisfaction of core degree requirements <sup>4</sup>				

A maximum of 6 units for any combination of engineering courses numbered 190C, 192, 198, and 199 may be used.		
<b>Mathematics</b>		
Any upper division course <sup>5</sup>		UWP 102H Writing in the Disciplines: Human Development & Psychology
<b>Physics</b>		UWP 102I Writing in the Disciplines: Ethnic Studies
Any upper division course <sup>6</sup>		UWP 102J Writing in the Disciplines: Fine Arts
<b>Statistics</b>		UWP 102K Writing in the Disciplines: Sociology
Any upper division course <sup>7</sup>		UWP 102L Writing in the Disciplines: Film Studies
<b>Biological Sciences</b>		UWP 104A Writing in the Professions: Business Writing
BIS 101 Genes & Gene Expression		or UWP 104AY Writing in the Professions: Business Writing
BIS 101D Genes & Gene Expression Discussion		UWP 104B Writing in the Professions: Law
BIS 102 Structure & Function of Biomolecules		UWP 104C Writing in the Professions: Journalism
BIS 103 Bioenergetics & Metabolism		UWP 104D Writing in the Professions: Elementary & Secondary Education
BIS 104 Cell Biology		UWP 104E Writing in the Professions: Science
BIS 122 Population Biology & Ecology		UWP 104F Writing in the Professions: Health or UWP 104FY Writing in the Professions: Health
BIS 122P Population Biology & Ecology/Advanced Laboratory Topics		UWP 104I Writing in the Professions: Internships
<b>Economics</b>		UWP 104J Writing in the Professions: Writing for Social Justice
ECN 100A Intermediate Micro Theory: Consumer & Producer Theory		UWP 104T Writing in the Professions: Technical Writing
ECN 100B Intermediate Micro Theory: Imperfect Competition & Market Failure		Passing the Upper Division Composition Exam.
ECN 101 Intermediate Macro Theory		Upper Division Required Course Subtotal 68-77
ECN 102 Analysis of Economic Data		<b>Total Units</b> 138-147
ECN 103 Economics of Uncertainty & Information		
ECN 122 Theory of Games & Strategic Behavior		
ECN 140 Econometrics		
<b>Management</b>		
MGT 011A Elementary Accounting		<sup>1</sup> Transfer and change of major students who do not take EEC 010 will substitute 4 additional units of upper division electives.
MGT 011B Elementary Accounting		<sup>2</sup> Excluding ECS 132, ECS 155 Discontinued, ECS 157 Discontinued, ECS 188, ECS 154A, ECS 154B.
MGT 100 Introduction to Financial Accounting		<sup>3</sup> Except CHE 195, CHE 197.
MGT 120 Managing & Using Information Technology		<sup>4</sup> Excluding ENG 100, ENG 160, ENG 190 (each restricted to 1 unit of technical elective), ENG 198, ECS 132, ECS 154A, ECS 154B, ECS 188.
MGT 140 Marketing for the Technology-Based Enterprise		<sup>5</sup> Except MAT 135A, MAT 197TC.
MGT 150 Technology Management		<sup>6</sup> Except PHY 116 Discontinued, PHY 137 Discontinued, PHY 160 (restricted to 1 unit of technical elective), PHY 195, PHY 197T.
MGT 160 Financing New Business Ventures		<sup>7</sup> Except STA 100, STA 102 Discontinued, STA 103, STA 104, STA 106, STA 108, STA 120 Discontinued, STA 130A.
MGT 170 Management Accounting & Control		<sup>8</sup> Transfer students take 1 additional Technical Elective; instead of EEC 001 .
MGT 180 Supply Chain Planning & Management		
<i>Upper Division Composition Requirement</i>		
Choose one; a grade of a C- or better is required:	0-4	
UWP 101 Advanced Composition		
or UWP 101V Advanced Composition		
or UWP 101Y Advanced Composition		
UWP 102A Writing in the Disciplines: Special Topics		
UWP 102B Writing in the Disciplines: Biology		
UWP 102C Writing in the Disciplines: History		
UWP 102D Writing in the Disciplines: International Relations		
UWP 102E Writing in the Disciplines: Engineering		
UWP 102F Writing in the Disciplines: Food Science & Technology		
UWP 102G Writing in the Disciplines: Environmental Writing		

## Electrical & Computer Engineering, Bachelor of Science/Master of Science Integrated Degree Programs (IDP)

College of Engineering

### Bachelor of Science/Master of Science Integrated Degree Programs (IDP)

M.S. and Ph.D.

Electrical & Computer Engineering (<http://www.ece.ucdavis.edu>);  
530-752-8251

The Department of Electrical & Computer Engineering prepares graduate students to do meaningful research and acquire skills and insights vital to solving some of the world's most complex technological problems. Our graduate program offers a challenging and stimulating environment, covering optical, wireline and wireless communications, telecommunication networks, computer engineering, circuits, electromagnetics, physical electronics, optoelectronics, control, and signal processing. The depth of resources in the study of circuit design alone, with one of the largest faculty groups in the field in the UC system, distinguishes us from other programs, while our program in microwave communications and devices is unique.

The Electrical & Computer Engineering Graduate Program benefits from the highly interdisciplinary culture at UC Davis and attracts faculty from biomedical, chemical, electrical, computer, civil, and mechanical engineering, as well as computer science and mathematics.

Many of our graduates go on to leadership and technology management roles in industry, returning each year for our industrial affiliates meeting to network with other industry representatives, current students and faculty.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

## Research Highlights

- Communications, control, networking, and signal processing
- Computer engineering
- Electronic circuits
- Optoelectronics
- RF, micro- and millimeter waves
- Physical electronics

## Research Facilities and Partnerships

- Center for Information Technology in the Interest of Society
- Northern California Center for Nanotechnology
- Center on Polymer Interfaces and Macromolecular Assemblies
- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- California Lighting Technology Center
- PlanetLab Consortium
- Sandia National Laboratory

Complete Information is on our website.

# Electrical & Computer Engineering, Master of Science

College of Engineering

## The Graduate Program in Electrical & Computer Engineering

M.S. and Ph.D.

Electrical & Computer Engineering (<http://www.ece.ucdavis.edu>);  
530-752-8251

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vital to solving some of the world's most complex technological problems. Our graduate program offers a challenging and stimulating environment, covering optical, wireline and wireless communications, telecommunication networks, computer engineering, circuits, electromagnetics, physical electronics, optoelectronics, control, and signal processing. The depth of resources in the study of circuit design alone, with one of the largest faculty groups in the field in the UC system, distinguishes us from other programs, while our program in microwave communications and devices is unique.

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- Center on Polymer Interfaces and Macromolecular Assemblies
- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- California Lighting Technology Center
- PlanetLab Consortium
- Sandia National Laboratory

Complete Information is on our website.

# Electrical & Computer Engineering, Doctor of Philosophy

College of Engineering

## The Graduate Program in Electrical & Computer Engineering

M.S. and Ph.D.

Electrical & Computer Engineering (<http://www.ece.ucdavis.edu>);  
530-752-8251

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environment, covering optical, wireline and wireless communications, telecommunication networks, computer engineering, circuits, electromagnetics, physical electronics, optoelectronics, control, and signal processing. The depth of resources in the study of circuit design alone, with one of the largest faculty groups in the field in the UC system, distinguishes us from other programs, while our program in microwave communications and devices is unique.

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Many of our graduates go on to leadership and technology management roles in industry, returning each year for our industrial affiliates meeting to network with other industry representatives, current students and faculty.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

## **Research Highlights**

- Communications, control, networking, and signal processing
- Computer engineering
- Electronic circuits
- Optoelectronics
- RF, micro- and millimeter waves
- Physical electronics

## **Research Facilities and Partnerships**

- Center for Information Technology in the Interest of Society
- Northern California Center for Nanotechnology
- Center on Polymer Interfaces and Macromolecular Assemblies
- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- California Lighting Technology Center
- PlanetLab Consortium
- Sandia National Laboratory

Complete information is on our website.

# **Electrical Engineering, Bachelor of Science**

College of Engineering

## **The Electrical & Computer Engineering Undergraduate Programs**

The department administers two undergraduate curricula in the College of Engineering: (1) the Electrical Engineering curriculum and (2) the Computer Engineering curriculum.

### **Integrated Degree Program (IDP)**

The IDP leads to both the Bachelor of Science and the Master of Science degrees. The program provides a student the opportunity to obtain superior breadth and depth of technical material. The IDP program in the Department of Electrical & Computer Engineering is available only

to UC Davis undergraduates with strong academic records enrolled in the Electrical Engineering, Computer Engineering, Electronic Materials Engineering or Applied Physics curricula. Applicants in their junior year must apply for the IDP by March 31. For more information on IDP, see Electrical & Computer Engineering (<http://www.ece.ucdavis.edu>).

## **Mission**

Under its land grant status, the University of California has a mission to provide the state with the trained workforce it needs and to advance knowledge and research in directions that contribute to the general welfare of the state and the nation. The Department of Electrical & Computer Engineering contributes to the mission of the University in three ways. First, its undergraduate and graduate education programs seek to provide students with an understanding of the fundamental principles of electrical and computer engineering, the skills needed to solve the complex technological problems of modern society and the ability to continue to learn and develop throughout their careers. Second, through its research programs, the department contributes to the development and progress of electronics, communications, and computer technology. Finally, the department helps to transfer research results to industry through publication, public service and professional activities.

## **Objectives**

*Teaching*—To provide undergraduate students with sufficient breadth to allow them to participate in teams, continue their own education after graduation and select a focus area intelligently; to provide undergraduate students with sufficient depth in a narrower discipline to allow them to develop the ability to solve complex engineering problems; to educate the students in the graduate program to be leaders in industry or to do meaningful research in industry, government or academia.

*Research*—To develop and maintain research programs that produce useful technological advances while simultaneously training the next generation of researchers and leaders; to update and/or shift the foci of these programs frequently in response to the needs of our constituency and the nation; to provide a stimulating environment that encourages our graduate students to develop their abilities as far as possible.

## **Electrical Engineering Undergraduate Program**

The Electrical Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Electrical engineering involves the design, analysis, and effective use of electrical systems including electronic computers. Electrical systems and computers play a central role in nearly all aspects of modern life, including communication, medicine, education, environmental protection, space exploration, defense, and home entertainment.

Students who complete the Electrical Engineering curriculum will obtain a Bachelor of Science in Electrical Engineering, one of the engineering degrees recognized in all fifty states as eligible for registration as a Professional Engineer.

## **Objectives**

The Electrical & Computer Engineering program educational objectives have been developed to address the needs of our constituencies. The objectives of the Electrical & Computer Engineering programs are as follow:

- Graduates create value for their employers, demonstrating knowledge and initiative and making beneficial contributions beyond the

workplace. This can also result in patents, awards, publications and presentations.

- Graduates grow their capabilities through advanced education and professional development.
- Graduates provide leadership and be proactive in their profession and/or communities.

Exclusive of General Education units, the minimum number of units for the Electrical Engineering major is 146.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

## Electrical Engineering Curriculum

### Areas of Specialization

For updated recommended courses, see Electrical & Computer Engineering (<https://www.ece.ucdavis.edu/undergraduate/majors-and-minor/>).

### Physical Electronics

Solid-state devices, circuits and fabrication and the theory courses supporting those subjects.

Code	Title	Units
<b>Recommended Elective Courses</b>		
<i>Core Electives</i>		
EEC 130B	Introductory Electromagnetics II	4
EEC 140B	Principles of Device Physics II	4
<i>Design Laboratory Electives</i>		
EEC 118 or EEC 132A	Digital Integrated Circuits RF & Microwaves in Wireless Communication	4-5
EEC 132B or EEC 135	RF & Microwaves in Wireless Communication Optoelectronics for High-Speed Data Networking & Computing Systems	4-5
Select remaining upper division design electives from:		
EEC 110B	Electronic Circuits II	4
EEC 146A	Integrated Circuits Fabrication	4
EEC 146B	Advanced Integrated Circuits Fabrication	3
<i>Technical Electives</i>		
EEC 112	Communication Electronics	4
EEC 180	Digital Systems II	5

### Electromagnetics

Microwave circuits and systems, and fiber optical systems.

Code	Title	Units
<b>Recommended Elective Courses</b>		
<i>Core Electives</i>		
EEC 130B	Introductory Electromagnetics II	4
EEC 140B	Principles of Device Physics II	4
<i>Design Laboratory Electives</i>		
EEC 132A	RF & Microwaves in Wireless Communication	5
EEC 132B	RF & Microwaves in Wireless Communication	5

EEC 134A & EEC 134B	RF/Microwave Systems Design and RF/Microwave Systems Design	6
Select remaining upper division design electives from:		
EEC 110B	Electronic Circuits II	4
EEC 132C	RF & Microwaves in Wireless Communications	5
EEC 133	Electromagnetic Radiation & Antenna Analysis	4
<i>Technical Electives</i>		
EEC 112	Communication Electronics	4

### Analog Electronics

Transistor- and system-level analog circuit design.

Code	Title	Units
<b>Recommended Elective Courses</b>		
<i>Core Electives</i>		
EEC 110B	Electronic Circuits II	4
EEC 157A or EEC 157AV	Control Systems	4
EEC 160	Signal Analysis & Communications	4
<i>Design Laboratory Electives</i>		
At least two from:		
EEC 112	Communication Electronics	4
EEC 113	Power Electronic Circuits	4
EEC 136A & EEC 136B	Electronic Design Project and Electronic Design Project	6
EEC 165	Statistical & Digital Communication	4
EEC 195A & EEC 195B	Autonomous Vehicle Design Project and Autonomous Vehicle Design Project	6
Select remaining upper division design electives from:		
EEC 116	VLSI Design	4
EEC 118	Digital Integrated Circuits	4
EEC 132A	RF & Microwaves in Wireless Communication	5
EEC 132B	RF & Microwaves in Wireless Communication	5
EEC 132C	RF & Microwaves in Wireless Communications	5
EEC 140B	Principles of Device Physics II	4
EEC 157B or EEC 157BY	Control Systems	4
EEC 160	Signal Analysis & Communications	4
EEC 210	MOS Analog Circuit Design	4
<i>Technical Electives</i>		
Select from:		
EEC 130B	Introductory Electromagnetics II	4
EEC 146A	Integrated Circuits Fabrication	4

### Digital Electronics

Transistor- and system-level digital circuit design.

Code	Title	Units
<b>Recommended Elective Courses</b>		
<i>Core Electives</i>		

EEC 110B	Electronic Circuits II	4	MAT 021A	Calculus	4
EEC 140B	Principles of Device Physics II	4	MAT 021B	Calculus	4
<i>Design Laboratory Electives</i>			MAT 021C	Calculus	4
EEC 118 & EEC 180	Digital Integrated Circuits and Digital Systems II	9	MAT 021D	Vector Analysis	4
or EEC 172	Embedded Systems		MAT 022A	Linear Algebra	3
or EEC 183	Testing & Verification of Digital Systems		MAT 022B	Differential Equations	3
or EEC 181A & EEC 181B	Digital Systems Design Project and Digital Systems Design Project		<i>Physics</i>		
			PHY 009A	Classical Physics	5
			PHY 009B	Classical Physics	5
			PHY 009C	Classical Physics	5
			PHY 009D	Modern Physics	4
Select remaining upper division design electives from:			<i>Chemistry</i>		
EEC 116	VLSI Design	4	CHE 002A	General Chemistry	5
EEC 170	Introduction to Computer Architecture	4			
EEC 171	Parallel Computer Architecture	4	<i>Engineering</i>		
<i>Technical Electives</i>			ENG 006	Engineering Problem Solving	4
Select from:			ENG 017	Circuits I	4
EEC 130B & EEC 112	Introductory Electromagnetics II and Communication Electronics	8	or ENG 017V	Circuits I	
or EEC 146A	Integrated Circuits Fabrication		<i>Electrical &amp; Computer Engineering</i>		
or EEC 157A	Control Systems		EEC 001	Introduction to Electrical & Computer Engineering	1
or EEC 157AV	Control Systems		EEC 007	Introduction to Programming & Microcontrollers	4
or EEC 160	Signal Analysis & Communications		EEC 010	Introduction to Digital & Analog Systems <sup>1</sup>	4
or EEC 210	MOS Analog Circuit Design			Transfer and change of major students in their junior year will substitute four additional units of upper division electives.	

## Communication Controls & Signal Processing

Digital communication, robotics, classical controls and communication, wireless & cellular digital communication systems, signal & image processing, and computer vision.

Code	Title	Units			
<b>Recommended Elective Courses</b>					
<i>Core Electives</i>					
EEC 180	Digital Systems II	5	COM 001	Major Works of the Ancient World	
<i>Design Laboratory Electives</i>			COM 002	Major Works of the Medieval & Early Modern World	
EEC 157A	Control Systems	8	COM 003	Major Works of the Modern World	
or EEC 157AV	Control Systems		COM 004	Major Works of the Contemporary World	
&			ENL 003	Introduction to Literature	
EEC 157B	Control Systems		NAS 005	Introduction to Native American Literature	
or EEC 157BY	Control Systems		UWP 001	Introduction to Academic Literacies (Recommended)	
or EEC 165	Statistical & Digital Communication		UWP 001V	Introduction to Academic Literacies: Online (Recommended)	
Select remaining upper division design electives from:			UWP 001Y	Introduction to Academic Literacies (Recommended)	
EEC 160	Signal Analysis & Communications	4			
<i>Technical Electives</i>					
Select from:					
EEC 112	Communication Electronics	4			
EEC 195A & EEC 195B	Autonomous Vehicle Design Project and Autonomous Vehicle Design Project	6			

## Requirements

Code	Title	Units			
<b>Lower Division Required Courses</b>					
<i>Mathematics</i>					
CMN 001	Introduction to Public Speaking	4			
or ENG 003	Introduction to Engineering Design				
or ENG 003Y	Introduction to Engineering Design				

Choose one:		3-4	
ENG/PHY 160	Environmental Physics & Society		
ENG 190	Professional Responsibilities of Engineers		
<i>Upper Division Electives</i>			
Choose at least eight courses for a minimum of 32 units:		32	
After completion of the upper division elective requirement (at least 8 courses, 2 core, 2 with labs, 1 project) any units in excess of 32 will count toward the Technical Elective requirement.			
Two Core Electives (p. 206)			
Design Laboratory Electives (p. 206)			
<i>Technical Electives</i>			
Choose 9 units (p. 207)		9	
<i>Upper Division Composition Requirement</i>			
Choose one; a grade of C- or better is required:		0-4	
UWP 101	Advanced Composition		
or UWP 101V	Advanced Composition		
or UWP 101Y	Advanced Composition		
UWP 102A	Writing in the Disciplines: Special Topics		
UWP 102B	Writing in the Disciplines: Biology		
UWP 102C	Writing in the Disciplines: History		
UWP 102D	Writing in the Disciplines: International Relations		
UWP 102E	Writing in the Disciplines: Engineering		
UWP 102F	Writing in the Disciplines: Food Science & Technology		
UWP 102G	Writing in the Disciplines: Environmental Writing		
UWP 102H	Writing in the Disciplines: Human Development & Psychology		
UWP 102I	Writing in the Disciplines: Ethnic Studies		
UWP 102J	Writing in the Disciplines: Fine Arts		
UWP 102K	Writing in the Disciplines: Sociology		
UWP 102L	Writing in the Disciplines: Film Studies		
UWP 104A	Writing in the Professions: Business Writing		
or UWP 104AY	Writing in the Professions: Business Writing		
UWP 104B	Writing in the Professions: Law		
UWP 104C	Writing in the Professions: Journalism		
UWP 104D	Writing in the Professions: Elementary & Secondary Education		
UWP 104E	Writing in the Professions: Science		
UWP 104F	Writing in the Professions: Health		
or UWP 104FY	Writing in the Professions: Health		
UWP 104I	Writing in the Professions: Internships		
UWP 104J	Writing in the Professions: Writing for Social Justice		
UWP 104T	Writing in the Professions: Technical Writing		
Passing the Upper Division Composition Exam.			
Upper Division Required Courses Subtotal		70-75	
<b>Total Units</b>		<b>146-151</b>	
<sup>1</sup> Transfer and change of major students who do not take EEC 010 will substitute 4 additional units of upper-division electives.			
<b>Two Core Electives</b>			
Code	Title	Units	
A maximum of one course appearing on both the Core Elective list and the Design Laboratory Elective list may be counted in both categories.			
EEC 110B	Electronic Circuits II	4	
EEC 130B	Introductory Electromagnetics II	4	
EEC 140B	Principles of Device Physics II	4	
EEC 170	Introduction to Computer Architecture	4	
EEC 180	Digital Systems II	5	
Only one of the following may be used:			
EEC 151	Digital Signals & Systems		
EEC 157A	Control Systems		
or EEC 157AV	Control Systems		
EEC 160	Signal Analysis & Communications		
<b>Design Laboratory Electives</b>			
Code	Title	Units	
A maximum of one course appearing on both the Core Elective list and the Design Laboratory Elective list may be counted in both categories.			
Choose at least two Design electives with lab:			
EEC 110B	Electronic Circuits II		
EEC 112	Communication Electronics		
EEC 116	VLSI Design		
EEC 118	Digital Integrated Circuits		
EEC 132A	RF & Microwaves in Wireless Communication		
EEC 132B	RF & Microwaves in Wireless Communication		
EEC 132C	RF & Microwaves in Wireless Communications		
EEC 135	Optoelectronics for High-Speed Data Networking & Computing Systems		
EEC 146A	Integrated Circuits Fabrication		
EEC 146B	Advanced Integrated Circuits Fabrication		
EEC 152	Digital Signal Processing		
EEC 157B	Control Systems		
or EEC 157BY	Control Systems		
EEC 165	Statistical & Digital Communication		
EEC 172	Embedded Systems		
EEC 180	Digital Systems II		
EEC 183	Testing & Verification of Digital Systems		
Choose at least one Design Project course:			
All Design Project courses are also considered Design Laboratory electives and may be counted in both categories simultaneously.			
Both A and B need to be taken to receive credit for the Design Project.			
EEC 119A	Integrated Circuit Design Project		
EEC 119B	Integrated Circuit Design Project		

EEC 134A	RF/Microwave Systems Design		BIS 122P	Population Biology & Ecology/Advanced Laboratory Topics	5
EEC 134B	RF/Microwave Systems Design				
EEC 136A	Electronic Design Project		ECN 100A	Intermediate Micro Theory: Consumer & Producer Theory	4
EEC 136B	Electronic Design Project		ECN 100B	Intermediate Micro Theory: Imperfect Competition & Market Failure	4
EEC 174AY	Applied Machine Learning	3	ECN 101	Intermediate Macro Theory	4
EEC 174BY	Applied Machine Learning Senior Design Projects	3	ECN 102	Analysis of Economic Data	4
EEC 175A	Internet of Things	3	ECN 103	Economics of Uncertainty & Information	4
EEC 175B	Internet of Things Senior Design Project	3	ECN 122	Theory of Games & Strategic Behavior	4
EEC 181A	Digital Systems Design Project		ECN 140	Econometrics	4
EEC 181B	Digital Systems Design Project		MGT 011A	Elementary Accounting	4
EEC 193A	Senior Design Project		MGT 011B	Elementary Accounting	4
EEC 193B	Senior Design Project		MGT 100	Introduction to Financial Accounting	3
EEC 195A	Autonomous Vehicle Design Project		MGT 120	Managing & Using Information Technology	4
EEC 195B	Autonomous Vehicle Design Project		MGT 140	Marketing for the Technology-Based Enterprise	4
The remaining electives may be any letter-graded upper division Electrical & Computer Engineering course not used to satisfy another major requirement or the following ECS courses:					
ECS 036B	Software Development & Object-Oriented Programming in C++		MGT 150	Technology Management	4
ECS 150	Operating Systems & System Programming		MGT 160	Financing New Business Ventures	4
ECS 152B	Computer Networks		MGT 170	Management Accounting & Control	4
ECS 163	Information Interfaces		MGT 180	Supply Chain Planning & Management	4
ECS 175	Computer Graphics				
ECS 177	Scientific Visualization				
ECS 178	Geometric Modeling				

## Technical Electives

Code	Title	Units
<b>Technical Electives</b>		
After completion of the upper division elective requirement (at least 8 courses, 2 core, 2 with labs, 1 project) any units in excess of 32 will count toward the technical elective requirement. <sup>5</sup>		
CHE 002B	General Chemistry <sup>1</sup>	5
ENG 035	Statics <sup>2</sup>	4

A maximum of 6 units for any combination of engineering courses numbered 190C, 192, 198, and 199 may be used.

### Mathematics

Any upper division course<sup>3</sup>

### Physics

Any upper division PHY course, except:

PHY/ENG 160	Environmental Physics & Society (restricted to 1 unit of technical elective)
PHY 195	Senior Thesis
PHY 197T	Tutoring in Physics & Astronomy

### Statistics

Any upper division course<sup>4</sup>

BIS 101	Genes & Gene Expression	4
BIS 101D	Genes & Gene Expression Discussion	1
BIS 102	Structure & Function of Biomolecules	3
BIS 103	Bioenergetics & Metabolism	3
BIS 104	Cell Biology	3
BIS 122	Population Biology & Ecology	3

<sup>1</sup> CHE 002C and any upper division course; except CHE 195, CHE 197.

<sup>2</sup> ENG 045, and any upper division engineering course not used in satisfaction of core degree requirements, excluding ENG 100, ENG 160 (restricted to 1 unit of technical elective; same as PHY 160.), PHY 190 (restricted to 1 unit of technical elective), PHY 198, ECS 132, ECS 154A, ECS 154B, & ECS 188 (ECS 154A ECS 154B courses may be used by EEEL majors who did not take EEC 170).

<sup>3</sup> Except MAT 135A & MAT 197TC.

<sup>4</sup> Except STA 100, STA 102 Discontinued, STA 103, STA 104, STA 106, STA 108, STA 120 Discontinued, STA 130A.

<sup>5</sup> Transfers and change of majors take 1 additional Technical elective unit in place of EEC 001.

## Electrical Engineering, Minor

### College of Engineering

There has been an increasing need for professionals in most engineering disciplines to understand the fundamentals of electronic circuits, electronic signals, semiconductor devices, applied electromagnetics, control systems, computer systems, and communication systems.

The objective of this minor program is to prepare students with the necessary theoretical and practical training in one or many of the above mentioned fields. The minor program curriculum is designed to allow flexibility while ensuring a solid foundation of fundamental electrical engineering concepts. The program is expected to accommodate students of diverse backgrounds.

The minor must be outside the department or program of your major and no more than one course may be counted toward both your minor and your major. The courses you take to satisfy the requirements of a minor, including those completed elsewhere, must be approved by an advisor in the Department of Electrical & Computer Engineering. You must have a minimum overall GPA of 2.000 and satisfy the minor course requirements, listed below. To receive notation of this minor on your diploma, you must

obtain a minor petition and file it no later than the deadline for filing for graduation.

Code	Title	Units
EEC 100	Circuits II	5
Choose at least one of the following combinations:		8-10
<i>Analog Circuits</i>		
EEC 110A & EEC 110B	Electronic Circuits I and Electronic Circuits II	
<i>Electromagnetics</i>		
EEC 130A & EEC 130B	Electromagnetics I and Introductory Electromagnetics II	
<i>Physical Electronics</i>		
EEC 140A or EEC 140AV	Principles of Device Physics I	
&		
EEC 140B	Principles of Device Physics II	
<i>Signals &amp; Systems</i>		
EEC 150	Introduction to Signals & Systems	
EEC 151	Digital Signals & Systems	
<i>Communication</i>		
EEC 150	Introduction to Signals & Systems	
EEC 160	Signal Analysis & Communications	
<i>Control Systems</i>		
EEC 150	Introduction to Signals & Systems	
EEC 157A or EEC 157AV	Control Systems	
<i>Digital Systems</i>		
EEC 018 & EEC 180	Digital Systems I and Digital Systems II	
Choose at least 8 additional units of EEC courses numbered 101 or above <sup>1</sup> ; if you elect to do a design project, you must be registered for both quarters.		8-10
Electrical & Computer Engineering (EEC) courses (p. 763)		
<b>Total Units</b>		<b>21-25</b>

- Energy Systems, Master of Science (p. 208)
- Energy Systems, Doctor of Philosophy (p. 208)

## Energy Systems, Master of Science

### Graduate Studies

#### Graduate Study

The Energy Graduate Group offers the M.S. (Plan 1—Thesis, and Plan II—Exam) and Ph.D. degrees in two tracks of study: Energy Science & Technology, and Energy Policy & Management. The program is designed to meet the world's growing needs for highly qualified, thoughtful and dedicated leaders in sustainable energy systems. Both tracks are aimed at a wide range of students, though Energy Science & Technology students are expected to come from disciplinary backgrounds in engineering or the physical sciences, while Energy Management & Policy students are expected to come from a wider range of disciplines interested in economic, policy, business and social aspects of energy systems.

#### Graduate Advisors

Zhiliang Fan (Energy Science & Technology), Frank Loge (Energy Policy & Management), Alan Meier (Admissions)

## Energy Systems, Doctor of Philosophy

### Graduate Studies

#### Graduate Study

The Energy Graduate Group offers the M.S. (Plan 1—Thesis, and Plan II—Exam) and Ph.D. degrees in two tracks of study: Energy Science & Technology, and Energy Policy & Management. The program is designed to meet the world's growing needs for highly qualified, thoughtful and dedicated leaders in sustainable energy systems. Both tracks are aimed at a wide range of students, though Energy Science and Technology students are expected to come from disciplinary backgrounds in engineering or the physical sciences, while Energy Management & Policy students are expected to come from a wider range of disciplines interested in economic, policy, business and social aspects of energy systems.

#### Graduate Advisors

Zhiliang Fan (Energy Science & Technology), Frank Loge (Energy Policy & Management), Alan Meier (Admissions)

## Engineering, College of

### College of Engineering

Richard Corsi, Ph.D., Dean

Alyssa Panitch, Ph.D., Associate Dean—Academic Personnel & Planning

Cristina Davis, Ph.D., Executive Associate Dean—Research

Ralph C. Aldredge, Ph.D., PE, Associate Dean—Undergraduate Studies

Rolland Faller, Ph.D., Associate Dean—Facilities & Capital Planning, & Graduate Studies

## Energy Systems (Graduate Group)

### Graduate Studies

Alissa Kendall (<https://energy.ucdavis.edu/people/alissa-kendall/>), Ph.D., Chairperson of the Group

Annemarie Schaaf, Graduate Program Coordinator

## Group Office

Energy and Efficiency Institute (<https://energy.ucdavis.edu/>), West Village, 1605 Tilia Street, Suite 100, Davis, CA 95616; 530-752-0247; Energy Graduate Group (<https://energy.ucdavis.edu/education/energy-graduate-group/>); Faculty (<https://energy.ucdavis.edu/education/energy-graduate-group-faculty/>)

## College Office

1050 Kemper Hall; 530-752-1979; College of Engineering (<http://engineering.ucdavis.edu>); Facebook (<http://www.facebook.com/UCDavisEngineering/>)

## Undergraduate Study

The college has eight departments:

- Biological & Agricultural Engineering (p. 96)
- Biomedical Engineering (p. 118)
- Chemical Engineering (p. 123)
- Civil & Environmental Engineering (p. 141)
- Computer Science & Engineering (p. 160)
- Electrical & Computer Engineering (p. 199)
- Materials Science & Engineering (p. 293)
- Mechanical & Aerospace Engineering (p. 305)

## Graduate Study

Graduate degrees (M.S & Ph.D.) are offered in the following engineering disciplines:

- Biological Systems Engineering (p. 96)
- Biomedical Engineering (p. 121)
- Chemical Engineering (p. 123)
- Civil & Environmental Engineering (p. 141)
- Computer Science (p. 160)
- Electrical & Computer Engineering (p. 199)
- Materials Science & Engineering (p. 293)
- Mechanical & Aerospace Engineering (p. 305)
- Transportation Technology & Policy (p. 458)

## The Major Programs

Twelve majors, leading to the B.S. degree, are open to students:

- Aerospace Science & Engineering (p. 306)
- Biochemical Engineering (p. 124)
- Biological Systems Engineering (p. 101)
- Biomedical Engineering (p. 118)
- Chemical Engineering (p. 126)
- Civil Engineering (p. 141)
- Computer Engineering (p. 199)
- Computer Science & Engineering (p. 161)
- Electrical Engineering (p. 203)
- Environmental Engineering (p. 145)
- Materials Science & Engineering (p. 293)
- Mechanical Engineering (p. 308)

## Minor Programs

The College of Engineering offers nine undergraduate minors:

- Biomedical Engineering (Department of Biomedical Engineering) (p. 121)
- Computational Biology (Department of Computer Science) (p. 161)
- Construction Engineering & Management (Department of Civil & Environmental Engineering) (p. 144)

- Electrical Engineering (Department of Electrical & Computer Engineering) (p. 207)
- Energy Science & Technology (Department of Biological & Agricultural Engineering) (p. 109)
- Energy Policy (Department of Biological & Agricultural Engineering) (p. 109)
- Energy Efficiency (Department of Biological & Agricultural Engineering) (p. 109)
- Materials Science (Department of Materials Science & Engineering) (p. 295)
- Sustainability in the Built Environment (Department of Civil & Environmental Engineering) (p. 146)

## English

**College of Letters & Science**

Claire Waters, Ph.D., Chairperson of the Department; July 1, 2021-June 30, 2024

## Department Office

176 Voorhies Hall; 530-752-2257; English (<http://english.ucdavis.edu>); Faculty (<http://english.ucdavis.edu/people/faculty/>)

- Creative Writing, Master of Fine Arts (p. 209)
- English, Bachelor of Arts (p. 209)
- English, Minor (p. 212)
- English, Master of Arts (p. 212)
- English, Doctor of Philosophy (p. 212)

## Creative Writing, Master of Fine Arts

**College of Letters & Science**

## Graduate Study

The Department of English (<http://english.ucdavis.edu>) offers programs of study and research leading to the M.F.A. in Creative Writing. Detailed information may be obtained from the graduate advisor, the chairperson of the Department, or the English Department (<https://english.ucdavis.edu/mfa-creative-writing/>).

## Director of Creative Writing

Katie Peterson, Ph.D.

## English, Bachelor of Arts

**College of Letters & Science**

## The Major Program

The study of English develops skills in reading analytically and perceptively and in writing clearly and effectively. Students major in English by taking courses in a wide variety of media, genres, topics, and historical periods. All students are introduced to the major by completing 20 units spread over courses in writing, any one of many topics courses, and the gateway series to the English major that covers "Literature in English" from the earliest medieval texts to the present. Students then build their own path through the major depending upon their particular interests, eventually completing 44 more units covering different historical periods, methods of theory and criticism, and thematic

focuses. After a shared set of courses, students choose to specialize either in Literary Criticism and Theory or Creative Writing. All majors have the opportunity to work with distinguished writers, critics, scholars, and teachers.

English majors learn how to:

- Write clearly and effectively.
- Think creatively and analytically.
- Organize and communicate ideas creatively and efficiently.
- Analyze and critically evaluate language and other forms of representation.
- Understand texts within their historical, political, and cultural contexts.
- Recognize and evaluate various perspectives, through creating or reading fiction, drama, and poetry.
- Evaluate how fictional and non-fictional narratives structure thought and action.
- Read long texts closely, analytically, and efficiently.
- Respond spontaneously with organized, clear statements and ideas.

## Career Options

Graduates have found the major excellent pre-professional training for careers in teaching, writing, law, medicine, library work, journalism, and more. Many graduates are employed in publishing, marketing, advertising, or the tech sector. Others have worked in local, state, and federal government agencies, as well as in industry. Many have gone on to graduate study in a wide range of fields including English, education, counseling, and more.

## Major Advisors

G. Bloom, S. Boluk, S. Chaganti, Z. Clemons, J. Clover, L. Corin, G. Dobbins, F. Dolan, K. Frederickson, E. Freeman, E. Gray, P. Houston, H. Hsu, M. Jerng, D. Martin, J. Marx, T. Menely, C. Milburn, E. Miller, K. Peterson, M. Ronda, M. Stratton, M. Vernon, C. Waters, J. Wenderoth, T. Werth, M. Ziser

## Major Advising

All new and prospective English majors are encouraged to see an undergraduate staff advisor, individually, once per year, at minimum.

## Foreign Languages

Students who contemplate advanced study in English should prepare for foreign language requirements for higher degrees and should consult with the graduate advisor.

## Undergraduate Advisor

See English (<http://english.ucdavis.edu>) or the Departmental Advising Office in 177/179 Voorhies Hall.

## Honors & Honors Program

A Senior Honors Program is available to an invited group of English majors, who prepare and write a Senior Thesis (either a research paper or creative writing) in their final year. The critical honors program consists of 4 units of 194H and 4 units of 195H, normally taken during winter and spring quarters of the senior year. The creative writing honors program consists of 4 units of 100FA or 100PA, normally taken during spring quarter of the junior year, and 4 units of 195H, normally taken winter quarter of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. Eligibility criteria and application

materials may be obtained at the Undergraduate Advising office in 177 Voorhies Hall or see English (<http://english.ucdavis.edu>). For more details, see Graduation Honors.

## Education Abroad Options

The department strongly encourages interested students to pursue their studies abroad. It is possible for students to complete significant portions of the English major provided that the course is evaluated as at least 4 UC Davis units; the course is considered upper division by the standards set forth by UC Davis Study Abroad; and the student presents copies of the coursework, syllabus, and writing assignments to the department's advising staff.

## Teaching Credential Subject Representative

A major in English qualifies students for subject matter preparation for the teaching credential.

## Entry Level Writing

Students must have met the Entry Level Writing requirement before taking any course in English.

## Prerequisites

ENL 003 or UWP 001 is required for admission into all preparatory courses (ENL 040, ENL 041, ENL 043, ENL 044, ENL 045, ENL 010A, ENL 010B, ENL 010C), and all upper division courses, unless otherwise stated in the course listings. COM 001, COM 002, COM 003, or COM 004 or NAS 005 may normally be substituted for ENL 003 or UWP 001.

## Coursework

Up to 4 upper division units in a literature class outside of English may count toward the requirements of the major.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose one:		4
ENL 003	Introduction to Literature	
UWP 001	Introduction to Academic Literacies	
or UWP 001V	Introduction to Academic Literacies: Online	
or UWP 001Y	Introduction to Academic Literacies	
Or equivalent		
ENL 010A	Literatures in English I: To 1700	4
ENL 010B	Literatures in English II: 1700-1900	4
ENL 010C	Literatures in English III: 1900 to Present	4
Choose one:		4
ENL 040	Introductory Topics in Literature	
ENL 041	Introductory Topics in Literature & Media	
ENL 043	Introductory Topics in Drama	
ENL 044	Introductory Topics in Fiction	
ENL 045	Introductory Topics in Poetry	
Preparatory Subject Matter Subtotal		20
<b>Depth Subject Matter</b>		
ENL 110A	Introduction to Literary Theory	4
or ENL 110B	Introduction to Modern Literary & Critical Theory	
<i>Historical Distribution Requirements</i>		
Choose three courses focusing on literature written in English before 1800, at least one of which must be on literature written primarily before 1500:		12

Before 1500			
ENL 111	Topics in Medieval Literature	ENL 179	Topics in Comparative Racial & Ethnic Literary Studies
ENL 113A	Chaucer: Troilus & the "Minor" Poems	ENL 181A	African American Literature to 1900
ENL 113B	Chaucer: The Canterbury Tales	ENL 181B	African American Literature 1900-Present
1500-1800		ENL 182	Literature of California
ENL 115	Topics in 16th- & 17th-Century Literature	Choose one in-depth topic course in language, media, and literature:	
ENL 117	Shakespeare	ENL 105	History of the English Language
ENL 122	Milton	ENL/LIN/UWP 106	English Grammar
ENL 123	18th-Century British Literature	ENL 107	Freedom of Expression
ENL 142	Early American Literature	ENL 120	Law & Literature
ENL 150A	British Drama to 1800	ENL 160	Film as Narrative
ENL 155A	18th-Century British Novel	ENL 162	Film Theory & Criticism
ENL 185A	Literature by Women Before 1800	ENL/STS 164	Writing Science
Choose one course focusing on literature written in English between 1800 and 1900:		ENL 171A	The Bible as Literature: The Old Testament
ENL 130	British Romantic Literature	ENL 171B	The Bible as Literature: Prophets & New Testament
ENL 133	19th-Century British Literature	ENL/CDM/STS 172	Video Games & Culture
ENL 143	19th-Century American Literature to the Civil War	ENL/STS 173	Science Fiction
ENL 144	Post-Civil War American Literature	ENL 180	Children's Literature
ENL 155B	19th-Century British Novel	ENL 183	Young Adult Literature
ENL 158A	The American Novel to 1900	ENL 184	Literature & the Environment
ENL 181A	African American Literature to 1900	ENL 186	Literature, Sexuality, & Gender
ENL 185B	Literature by Women from 1800-1900	CDM/ENL/STS 172	Video Games & Culture
Choose one course focusing on literature written in English between 1900 and present:		LIN/ENL/UWP 106	English Grammar
ENL 125	Topics in Irish Literature	STS/CDM/ENL 172	Video Games & Culture
ENL 137	British Literature, 1900-1945	STS/ENL 173	Science Fiction
ENL 138	British Literature, 1945 to Present	UWP/ENL/LIN 106	English Grammar
ENL 146	American Literature 1900-1945	Please note that while some courses are identified as fulfilling more than one distribution requirement, a given course can only fulfill one such requirement.	
ENL 147	American Literature, 1945 to the Present	<i>Area of Emphasis</i>	
ENL 150B	Drama from 1800 to the Present	Choose at least one:	
ENL 154	The Graphic Novel	Literature, Criticism, & Theory (p. 211)	
ENL 155C	20th-Century British Novel	Creative Writing (p. 212)	
ENL 156	The Short Story	Depth Subject Matter Subtotal	
ENL 157	Detective Fiction	44	
ENL 158B	The American Novel from 1900 to the Present	Total Units	64
ENL 166	Love & Desire in Contemporary American Poetry		
ENL 167	20th-Century African American Poetry		
ENL 168	20th-Century American Poetry		
ENL 181B	African American Literature 1900-Present		
ENL 185C	Literature by Women after 1900		
<i>Non-Historical Distribution Requirements</i>			
Choose one course on literatures, race, and ethnicity:		Code	Title
4		One upper division English elective.	Units
ENL 139	Topics in Global Literatures & Cultures		4
ENL 140	Topics in Postcolonial Literatures & Cultures	Choose two advanced courses, one of which can be a seminar:	
ENL 141	Topics in Diasporic Literatures & Migration	ENL 149	Topics in Literature
ENL 167	20th-Century African American Poetry	ENL 153	Topics in Drama
ENL 178	Topics in Nations, Regions, & Other Cultural Geographies	ENL 159	Topics in the Novel
		ENL 163	Literary Study in the British Isles
		ENL 165	Topics in Poetry
		ENL 177	Study of an Individual Author

## Literature, Criticism, & Theory Emphasis

Please note that English ENL 110A or ENL 110B is a prerequisite for advanced study in the major.

Code	Title	Units
One upper division English elective.		4
Choose two advanced courses, one of which can be a seminar:		8
ENL 149	Topics in Literature	
ENL 153	Topics in Drama	
ENL 159	Topics in the Novel	
ENL 163	Literary Study in the British Isles	
ENL 165	Topics in Poetry	
ENL 177	Study of an Individual Author	

ENL 187A	Topics in Literature & Media
ENL 188A	Topics in Literary & Critical Theory
ENL 189	Seminar in Literary Studies
ENL 194H	Seminar for Honors Students
ENL 195H	Honors Thesis

Total Units **12**

## Creative Writing Emphasis

Code	Title	Units
Please note that students must select courses in more than one genre.		
Three sections of:		<b>12</b>
ENL 100F	Creative Writing: Fiction	
ENL 100P	Creative Writing: Poetry	
ENL 100NF	Creative Writing: Non-Fiction	
ENL 100FA	Creative Writing Advanced Fiction	
ENL 100PA	Creative Writing Advanced Poetry	

Total Units **12**

## English, Minor

College of Letters & Science

### The Minor Program

Pursuing a minor in English allows students to develop their abilities to read critically and to write clearly while enjoying the pleasures that great literature has to offer. To complete the minor, students take five upper division courses, at least four of which focus on literature, film, or other media. Choices within the curriculum are unlimited by historical period, and can include a course in creative writing. All minors have the opportunity to work with distinguished writers, critics, scholars, and teachers.

### Career Alternatives

Graduates have found the minor to be an excellent complement to their training in other fields, helping to demonstrate their writing and critical thinking skills to employers and graduate schools.

Code	Title	Units
Five upper division (100 level) English (ENL) courses; at least four of these must be literature courses (numbered 107-186).		<b>20</b>
English (ENL) (p. 788)		

Total Units **20**

## English, Master of Arts

College of Letters & Science

### Graduate Study

The department offers an M.A. in Literature in route to the Ph.D. Detailed information may be obtained from the graduate advisor or the Chairperson of the Department.

### Graduate Director

Hsuan Hsu, Ph.D.

## English, Doctor of Philosophy

College of Letters & Science

### Graduate Study

The Department of English offers a program of study and research leading to the Ph.D. in literature. Detailed information may be obtained from the graduate advisor or the Chairperson of the Department.

The department's affiliation with the Critical Theory Program also provides the opportunity for Ph.D. students in English to prepare for the designated emphasis in Critical Theory (an interdisciplinary program in theories and methodologies in the humanities and social sciences). There is a range of other programs in which students may pursue a Designated Emphasis; see Designated Emphasis (<https://english.ucdavis.edu/graduate/phd-literature/designated-emphasis/>).

### Graduate Director

Hsuan Hsu, Ph.D.

## Entomology & Nematology

College of Agricultural & Environmental Sciences

Steve Nadler, Ph.D., Chairperson of the Department; term ends June 30, 2023.

Joanna Chiu, Ph.D., Chairperson of the Department; July 1, 2023-June 30, 2028.

### Department Office

367 Briggs Hall; 530-752-0492; Entomology & Nematology (<http://entomology.ucdavis.edu>); Faculty ([https://entomology.ucdavis.edu/people/?first=&last=&title=&unit=&field\\_sf\\_person\\_type\\_target\\_id%5B0%5D=26](https://entomology.ucdavis.edu/people/?first=&last=&title=&unit=&field_sf_person_type_target_id%5B0%5D=26))

### Minor Requirements

The Department of Entomology & Nematology has six minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the area of entomology or nematology.

### Minor Advisors

L. Kimsey, S. Nadler

### Graduate Study

The Department of Entomology & Nematology offers a program of study and research leading to M.S. and Ph.D. degrees. For further details, see Graduate Studies (<http://gradstudies.ucdavis.edu/>) and the Graduate Announcement.

### Related Courses

See courses in Entomology (p. 802) & Nematology (p. 1146).

- Agricultural Pest Management, Minor (p. 213)
- Animal Biology, Bachelor of Science (p. 213)
- Entomology, Bachelor of Science (p. 214)
- Entomology, Master of Science (p. 215)
- Entomology, Doctor of Philosophy (p. 215)
- Forensic Entomology, Minor (p. 215)

- Insect Biology, Minor (p. 216)
- Insect Ecology & Evolution, Minor (p. 216)
- Medical-Veterinary Entomology, Minor (p. 216)
- Nematology, Minor (p. 216)

## Agricultural Pest Management, Minor

### College of Agricultural & Environmental Sciences

The Department of Entomology & Nematology has six minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the areas of entomology or nematology.

### Minor Advisor

L. Kimsey, S. Nadler

Code	Title	Units
ENT 100	General Entomology	4
ENT 100L	General Entomology Laboratory	2
ENT 110	Arthropod Pest Management	5
Choose at least three:		9-12
NEM 100	Plant Nematology	
PLS 105	Concepts in Pest Management	
PLS 176	Introduction to Weed Science	
PLP 120	Introduction to Plant Pathology	
ENT 135	Introduction to Biological Control	
Of the three, one can be ENT 123 or PLB 123 or PLP 123:		
ENT/PLB/PLP 123 Plant-Virus-Vector Interaction		
Total Units		20-23

## Animal Biology, Bachelor of Science

### College of Agricultural & Environmental Sciences

### The Major

Animal Biology Major (<https://abi.ucdavis.edu/>); Faculty ([https://entomology.ucdavis.edu/people/?first=&last=&title=&unit=&field\\_sf\\_person\\_type\\_target\\_id%5B0%5D=26](https://entomology.ucdavis.edu/people/?first=&last=&title=&unit=&field_sf_person_type_target_id%5B0%5D=26))

### The Major Program

The Animal Biology major offers students training in the biological and natural sciences as they apply to animals. The major covers basic biological sciences foundational to understanding animal evolution, systematics, ecology, physiology and molecular biology. Students in the Animal Biology major are encouraged to think beyond particular groups of animals in which they are interested and to consider science as a process and a way of learning new things about them, and of advancing society. The program emphasizes biological principles used in research and in solving societal conflicts with animals in agriculture, urban areas, or natural environments.

### The Program

The major consists of core courses in the sciences that build an understanding of animal biology from the molecular to the ecological and evolutionary levels of organization. After completing these core courses, students choose an interdisciplinary practicum project from

general animal biology, predicated on their ultimate career goals. They plan this emphasis of study in a required discussion-seminar course and in consultation with a mentor. The program includes a senior thesis, which each student employs the process and principles of science to propose and carry out the practicum project they choose, integrating the disciplines of the major. The Animal Biology major emphasizes research in biological principles as opposed to animal care and husbandry.

### Practicum Research & Career Alternatives

The Animal Biology program and professional research interests of each student guides him or her in Practicum and career choices. On-and off-campus Practicum research opportunities occur in research laboratories, at field situations, in zoos and public aquariums, with governmental agencies, national and state parks with private industry, and in international programs. A degree in Animal Biology prepares students for careers in research, teaching, academia, governmental regulation, health, or agriculture where these emphasize integrative biology of animals. Careers in veterinary medicine, animal husbandry and animal management remain open to Animal Biology majors as well, however, other preparation may be required. Students in the major focus on gaining research experience, and become well prepared to continue their training at the graduate or professional level in a variety of biological disciplines.

### Master Advisor

R. Kimsey

### Major Advisor

E. Galvan Hack

**Advising Center** for the major, including peer advising, is located in 150 and Academic Advisor located in 160 Hutchison Hall; 530-754-7277; abi-advising@ucdavis.edu.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry</i>		
CHE 002A	General Chemistry	
CHE 002B	General Chemistry	
CHE 002C	General Chemistry	
Choose a series:		
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
CHE 118A & CHE 118B	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<i>Mathematics; choose a series:</i>		
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	9-12

MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine		Restricted Electives Subtotal	25
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus		Total Units	123-135
<b>Physics</b>		12		
PHY 007A	General Physics			
PHY 007B	General Physics			
PHY 007C	General Physics			
<b>Statistics; choose one:</b>		4		
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics			
STA 100	Applied Statistics for Biological Sciences			
<b>Animal Biology</b>		8		
ABI 050A	Animal Biology Laboratory			
ABI 050B	Animal Biology			
ABI 050C	Animal Biology			
<b>Preparatory Subject Matter Subtotal</b>		69-74		
<b>Depth Subject Matter</b>				
<b>Animal Biology</b>		5		
ABI 187	Animal Biology Seminar			
ABI 189	Senior Practicum			
ABI 189D	Senior Practicum Discussion			
<b>Biological Science</b>		4		
BIS 101	Genes & Gene Expression			
<b>Choose a series:</b>		6-10		
ABI 102	Animal Biochemistry & Metabolism			
ABI 103	Animal Biochemistry & Metabolism			
BIS 102	Structure & Function of Biomolecules			
BIS 103	Bioenergetics & Metabolism			
<b>Choose one:</b>		3-5		
NPB 101	Systemic Physiology			
NPB 117	Avian Physiology			
ENT 102	Insect Physiology			
WFC 121	Physiology of Fishes			
<b>Choose one:</b>		3-4		
APC 100/NPB 123	Comparative Vertebrate Organology			
ENT 101	Functional Insect Morphology			
<b>Evolution &amp; Ecology</b>		4		
EVE 100	Introduction to Evolution			
<b>Choose one:</b>		4		
ESP 100	General Ecology			
ESP 121	Population Ecology			
EVE 101	Introduction to Ecology			
EVE 102	Population & Quantitative Genetics			
<b>Depth Subject Matter Subtotal</b>		29-36		
<b>Restricted Electives</b>		25		
Focused specialty upper division courses as outlined in the student's major proposal (from ABI 187) with approval of an advisor.				

# Entomology, Bachelor of Science

College of Agricultural & Environmental Sciences

## The Major Program

The Entomology major is a general biological science program. The curriculum is designed to develop an understanding of fundamental biological concepts by studying insects. Insects offer unique opportunities to study biological systems and are model experimental animals. Many insects are either pests, or beneficial species that have great importance to the economy, environment or public health. Students may focus on specific areas of interest including agricultural entomology; insect systematics & evolution; behavior & ecology; medical entomology; and insect molecular biology, physiology & toxicology.

## The Program

Students begin their study in Entomology with selected insect biology courses. After completing these courses, students may enroll in courses in their particular area of interest. The faculty encourages students to do research internships in their laboratories.

## Career Alternatives

Entomology graduates find careers in many different areas of applied or basic biology. Graduates have the opportunity to continue in professional graduate programs such as veterinary or human medicine, or get advanced degrees leading to careers in biotechnology, conservation biology, or academic teaching and research. Many graduates have participated in internship programs with the California Department of Food and Agriculture and found careers in insect diagnostic laboratories, conducting insect surveys, and/or developing entomological collections. Other graduates have worked in agriculture in the area of insect pest management. Graduates are prepared for managerial and technical positions with state and federal agencies and in agricultural production and supporting industries. Some Entomology graduates pursue careers in primary, secondary, and college level science education.

## Major Advisors

L. Kimsey, S. Nadler

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
<b>Choose a series:</b>		6-8
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	

CHE 118A & CHE 118B	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences		ENT 107	California Insect Diversity
<b>Math</b>			ENT 109	Field Taxonomy & Ecology
Choose a series:		6-8	NEM 110	Introduction to Nematology
MAT 016A	Short Calculus		Depth Subject Matter Subtotal	31-43
MAT 016B	Short Calculus		<b>Restricted Electives</b> <sup>1</sup>	
OR			Upper division Entomology (ENT) and Nematology (ENM) courses.	14
MAT 017A	Calculus for Biology & Medicine		Upper division electives related to student's interest with approval of advisor. Any courses in the life sciences, scientific writing, or statistics will be automatically approved; see advisor for other choices.	9
MAT 017B	Calculus for Biology & Medicine			
OR			Restricted Electives Subtotal	23
MAT 021A	Calculus			
MAT 021B	Calculus		<b>Total Units</b>	<b>100-117</b>
<b>Physics</b>				
PHY 001A	Principles of Physics	3		
PHY 001B	Principles of Physics	3		
Choose one:		3-4		
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics			
STA 032	Gateway to Statistical Data Science			
STA 100	Applied Statistics for Biological Sciences			
PLS 120	Applied Statistics in Agricultural Sciences			
Preparatory Subject Matter Subtotal		46-51		
<b>Depth Subject Matter</b>				
<i>Biological Science</i>				
BIS 101	Genes & Gene Expression	4		
<i>Evolution &amp; Ecology</i>				
EVE 100	Introduction to Evolution	4		
<i>General Entomology</i>				
ENT 100	General Entomology	4		
ENT 100L	General Entomology Laboratory	2		
ENT 102	Insect Physiology	4		
Choose one:		3-4		
MIC 102	Introductory Microbiology			
MIC 162	General Virology			
PLB/PLP 148	Introductory Mycology			
PLP 120	Introduction to Plant Pathology			
Choose one:		4		
ENT 105	Insect Ecology			
ESP 100	General Ecology			
EVE 101	Introduction to Ecology			
Choose BIS 105 or a series:		3-10		
BIS 105	Biomolecules & Metabolism			
OR				
BIS 102 & BIS 103	Structure & Function of Biomolecules and Bioenergetics & Metabolism			
OR				
ABI 102 & ABI 103	Animal Biochemistry & Metabolism and Animal Biochemistry & Metabolism			
Choose at least 3 units:		3-7		
ENT 103	Insects Systematics			
ENT 104	Behavioral Ecology of Insects			

<sup>1</sup> Note: No more than a total of 6 units from ENT 192, ENT 197T and ENT 199 may count toward fulfilling depth subject matter or restricted elective units.

## Entomology, Master of Science

College of Agricultural & Environmental Sciences

### Graduate Study

The Department of Entomology & Nematology offers a program of study and research leading to M.S. and Ph.D. degrees. For further details, see Graduate Studies and the Graduate Announcement.

### Graduate Advisors

See Entomology & Nematology Graduate Information (<https://entomology.ucdavis.edu/graduate-programs/>).

## Entomology, Doctor of Philosophy

College of Agricultural & Environmental Sciences

### Graduate Study

The Department of Entomology & Nematology offers a program of study and research leading to M.S. and Ph.D. degrees. For further details, see Graduate Studies and the Graduate Announcement.

### Graduate Advisors

See Entomology & Nematology Graduate Information (<https://entomology.ucdavis.edu/graduate-programs/>).

## Forensic Entomology, Minor

College of Agricultural & Environmental Sciences

The Department of Entomology & Nematology has six minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the areas of entomology or nematology.

### Minor Advisor

L. Kimsey, S. Nadler

Code	Title	Units			
ENT 100	General Entomology	4	ENT 104 or ENT 105	Behavioral Ecology of Insects Insect Ecology	3-4
ENT 100L	General Entomology Laboratory	2	Choose at least 7 units:		7-9
ENT 102	Insect Physiology	4	ENT 103	Insects Systematics	
ENT 104	Behavioral Ecology of Insects	3	ENT 107	California Insect Diversity	
ENT 158	Forensic Entomology	3	ENT 109	Field Taxonomy & Ecology	
Choose one:		4	ENT 158	Forensic Entomology	
ENT 105	Insect Ecology		EVE 149	Evolution of Ecological Systems	4
EVE 101	Introduction to Ecology		or ESP 121	Population Ecology	
ESP 100	General Ecology				
<b>Total Units</b>		<b>20</b>			<b>20-23</b>

## Insect Biology, Minor

College of Agricultural & Environmental Sciences

The Department of Entomology & Nematology has six minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the areas of entomology or nematology.

### Minor Advisor

L. Kimsey, S. Nadler

Code	Title	Units
<b>Entomology</b>		
ENT 100	General Entomology	4
ENT 100L	General Entomology Laboratory	2
Choose at least 7 units:		7-9
ENT 102	Insect Physiology	
ENT 103	Insects Systematics	
ENT 104	Behavioral Ecology of Insects	
ENT 105	Insect Ecology	
ENT 107	California Insect Diversity	
ENT 109	Field Taxonomy & Ecology	
Choose at least two additional upper division Entomology (ENT) courses (except 192, 198, 199) adding to at least 6 units.		6-12
Upper division Entomology (ENT) courses. (p. 802)		
<b>Total Units</b>		<b>19-27</b>

## Insect Ecology & Evolution, Minor

College of Agricultural & Environmental Sciences

### Minor Requirements

The Department of Entomology & Nematology has six minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the areas of entomology or nematology.

### Minor Advisor

L. Kimsey, S. Nadler

Code	Title	Units
ENT 100	General Entomology	4
ENT 100L	General Entomology Laboratory	2

## Medical-Veterinary Entomology, Minor

College of Agricultural & Environmental Sciences

The Department of Entomology & Nematology has five six minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the areas of entomology or nematology.

### Minor Advisor

L. Kimsey, S. Nadler

Code	Title	Units
ENT 100	General Entomology	4
ENT 100L	General Entomology Laboratory	2
ENT 104	Behavioral Ecology of Insects	3
ENT 153	Medical Entomology	3
ENT 156	Biology of Parasitism	3
ENT 156L	Biology of Parasitism Laboratory	1
Choose one:		3
ENT 158	Forensic Entomology	
MIC 162	General Virology	
<b>Total Units</b>		<b>19</b>

## Nematology, Minor

College of Agricultural & Environmental Sciences

### Minor Advisor

S. Nadler

For further information, see Entomology & Nematology. (p. 212)

### Graduate Study

Graduate degrees for those wanting to specialize in nematology are offered through the Departments of Entomology & Nematology, & Plant Pathology, and through various Graduate Groups (Biochemistry, Ecology, Genetics, Plant Protection and Pest Management). Refer also to Graduate Studies (<http://gradstudies.ucdavis.edu/>).

Code	Title	Units
NEM 100	Plant Nematology	4
NEM 110	Introduction to Nematology	2
ENT 156	Biology of Parasitism	3

Choose at least 9 units:		9-10
MIC 102	Introductory Microbiology	
ENT 100	General Entomology	
ENT 100L	General Entomology Laboratory	
ENT 110	Arthropod Pest Management	
ENT 135	Introduction to Biological Control	
ENT 153	Medical Entomology	
ENT 156L	Biology of Parasitism Laboratory	
EVE 112	Biology of Invertebrates	
PLP 120	Introduction to Plant Pathology	
PLP/PLB 148	Introductory Mycology	
SSC 100	Principles of Soil Science	
SSC 111	Soil Microbiology	
SSC 112	Soil Ecology	
<b>Total Units</b>		<b>18-19</b>

## Environmental Policy & Management (Graduate Group)

### Graduate Studies

Affiliated with the Institute of the Environment (<https://environment.ucdavis.edu/>)

Environmental Policy & Management (<https://epm.ucdavis.edu/>)

### Director

Jessica Penrose ([japenrose@ucdavis.edu](mailto:japenrose@ucdavis.edu)), 1007 Wickson Hall,  
530-752-8318

### Program Coordinator

Jessica Chalfin ([jrchalfin@ucdavis.edu](mailto:jrchalfin@ucdavis.edu)), 1001 Wickson Hall, 530-754-1754

### Program Chair

Mark Lubell (<https://epm.ucdavis.edu/people/mark-lubell/>), 530-752-5880

- Environmental Policy & Management, Master of Science (p. 217)

## Environmental Policy & Management, Master of Science

### Graduate Studies

### Graduate Study

The Master of Science in Environmental Policy & Management (EPM) program provides training in applying science, engineering and economics to real-world environmental policy and management issues. Graduates of this program are equipped to integrate technical and scientific expertise in a social-political-natural context to provide effective environmental policy and management solutions; for more information, see Environmental Policy & Management (<http://epm.ucdavis.edu/>).

### Preparation

Before enrolling, a student should have completed a program of study equivalent to a B.A. or B.S. in a Science, Technology, Engineering & Math (STEM) field. Students without a prior degree in a STEM field are required

to complete preparatory courses, or their equivalents. Students should have a minimum of two quarters of introductory science and two quarters of upper division STEM or economics coursework.

## Environmental Science & Policy

### College of Agricultural & Environmental Sciences

Susan Harrison, Ph.D., Chairperson of the Department

Marissa L. Baskett, Ph.D., Co-Vice Chairperson

Gwen Arnold, Ph.D., Co-Vice Chairperson

### Department Office

2132 Wickson Hall; 530-752-3026; Environmental Science & Policy (<http://desp.ucdavis.edu/>); Faculty (<http://desp.ucdavis.edu/faculty/>)

### The Program of Study

Environmental Science & Policy is a teaching and research department offering courses, workshops, and directed group study classes that focus on the complex trade-offs that arise from interdependencies between natural and human systems. The department offers Bachelor of Science degrees in Environmental Science & Management (p. 221) and in Environmental Policy Analysis & Planning (p. 218). Courses in Environmental Science & Policy (p. 217) also supplement major programs in a wide variety of established disciplines.

### Current Information

Through its continuing contacts with many other departments and teaching divisions on the campus, the department develops a variety of special courses and workshops each year. Check with the Department office for up-to-date information about our courses and workshops.

### Graduate Study

The Graduate Group in Ecology (<https://ecology.ucdavis.edu/>) offers an M.S. and Ph.D. degree program. The Environmental Policy & Management (<https://epm.ucdavis.edu/>) graduate program offers an M.S. degree program.

- Climate Science & Policy, Minor (p. 217)
- Environmental Policy Analysis & Planning, Bachelor of Science (p. 218)
- Environmental Policy Analysis & Planning, Minor (p. 221)
- Environmental Science & Management, Bachelor of Science (p. 221)

## Climate Science & Policy, Minor

### College of Agricultural & Environmental Sciences

Susan Harrison, Ph.D., Chairperson of the Department

Gwen Arnold, Ph.D., Co-Vice Chairperson

Marissa Baskett, Ph.D., Co-Vice Chairperson

The Climate Science & Policy minor provides students with basic background in climate change science as well as mitigation and adaptation strategies. Students gain an understanding of scientific, social, institutional, and economic dimensions of climate change.

### Minor Advisor

M. Springborn (Environmental Science & Policy)

Code	Title	Units	Careers
ATM 116	Modern Climate Change	3	
ESP 165	Climate Policy	3	
LDA 003 or DES 127A	Sustainable Development: Theory & Practice Sustainable Design	4	
Choose one:		3-4	Environmental policy analysis and planning graduates are prepared for employment in environmental, natural resource, energy, and transportation focused public agencies, consulting firms, non-governmental organizations, and businesses, or as legislative aides for elected representatives. The major is also excellent preparation for students who want to go on to graduate work in law, planning, public policy, political science, economics, or business.
ATM 005	Global Climate Change		
SAS 025 or SAS 025V	Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences		
Choose 11 units:		11	
AMS 150	Interdisciplinary Approaches to Environmental Justice/Injustice		
ATM 128	Radiation & Satellite Meteorology		
ATM 133	Biometeorology		
CRD 158	Community Governance		*OR* any course from the UWP 102 or UWP 104 series. (p. 1370)
ECI 123	Urban Systems & Sustainability		
ECI/ATM 149	Air Pollution		UWP 102G or UWP 104A or UWP 104AY or UWP 104B recommended
ENL 184	Literature & the Environment		
ESM 131	Air as a Resource		Passing the Upper Division English Composition exam.
ESP/ECI 163	Energy & Environmental Aspects of Transportation		
ESP 171	Urban & Regional Planning		
GEL 108	Earth History: Paleoclimates		
PMI 129Y	One Health: Human, Animal & Environment Interfaces		
WFC 168	Climate Change Ecology		
Total Units		24-25	

## Environmental Policy Analysis & Planning, Bachelor of Science

College of Agricultural & Environmental Sciences

### The Major Program

The major in Environmental Policy Analysis & Planning develops skills for designing and assessing sustainable policies for environmental quality and natural resource management.

Any student in good standing is eligible to transfer to the major; to do so, please see the staff advisor, Melissa Whaley, in 2134 Wickson Hall, or the lead faculty advisor, Prof. G. Arnold, in 2144 Wickson Hall.

### The Program

This major provides students with a strong background in policy analysis, including the evaluation of policy alternatives and the study of factors affecting policy formulation and implementation. Key components of this interdisciplinary training include a general background in the natural sciences relevant to environmental policy, economics, political science, statistics, and research methodology to quantitatively analyze environmental problems and policy options. In addition, students are encouraged to develop substantive knowledge in a specific field of environmental policy, such as urban and regional planning, water policy, transportation and energy, climate policy, or conservation management.

Code	Title	Units
<b>English Composition &amp; Communication Requirement</b>		
Choose one:		0-4
UWP 101 or UWP 101V or UWP 101Y	Advanced Composition	
*OR* any course from the UWP 102 or UWP 104 series. (p. 1370)		
UWP 102G or UWP 104A or UWP 104AY or UWP 104B recommended		
Passing the Upper Division English Composition exam.		
Communication		4
Choose one:		
CMN 001	Introduction to Public Speaking	
CMN 003	Interpersonal Communication Competence	
CMN 003V	Interpersonal Communication Competence	
CMN 003Y	Interpersonal Communication Competence	
DRA 010	Introduction to Acting	
English Composition & Communication Requirement Subtotal		
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
Choose one:		4-5
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIS 010	Everyday Biology	
<i>Chemistry</i>		
CHE 002A or CHE 010	General Chemistry Concept of Chemistry	4-5
<i>Physics</i>		
PHY 001A	Principles of Physics	3
<i>Second Quarter Natural Science</i>		
Choose one:		3-5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
CHE 002B	General Chemistry	
PHY 001B	Principles of Physics	
Cannot use BIS 002B to fulfill both the biological sciences requirement and the second quarter natural science requirement at the same time		

<b><i>Introduction to Data Analytics</i></b>		<b><i>Statistics</i></b>
Choose one:	3-4	Choose one: 4-5
CMN/SOC/POL/ PSC 012Y	Data Visualization in the Social Sciences	ESP 106 Environmental Data Science
PLS 021 or PLS 021V	Application of Computers in Technology	SOC 106 Intermediate Social Statistics
	Application of Computers in Technology	STA 100 Applied Statistics for Biological Sciences
		STA 103 Applied Statistics for Business & Economics
<b><i>Economics</i></b>		STA 108 Applied Statistical Methods: Regression Analysis
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics	<b><i>Microeconomics</i></b>
	Principles of Microeconomics	ARE 100A Intermediate Microeconomics: Theory of Production & Consumption
	Principles of Microeconomics	or ECN 100A Intermediate Micro Theory: Consumer & Producer Theory
<b><i>Environmental Science</i></b>		<b><i>Applied Biological Systems Technology</i></b>
Choose one:	3-4	ABT/LDA 150 Introduction to Geographic Information Systems
ANS 001	Domestic Animals & People	
ATM 060	Introduction to Atmospheric Science	
ESM 100	Principles of Hydrologic Science	
GEL 001	The Earth	<b><i>Resource Economics</i></b>
GEL 134	Environmental Geology & Land Use Planning	Choose one: 4
PLS/SAS 012	Plants & Society	ARE 176 Environmental Economics
WFC 051	Introduction to Conservation Biology	ECN 125 Energy Economics
		ESP/ARE 175 Natural Resource Economics
<b><i>Environmental Science &amp; Policy</i></b>		<b><i>Recommended, Not Required</i></b>
ESP 001	Environmental Analysis	ABT 181N Concepts & Methods in Geographic Information Systems
<b><i>Mathematics</i></b>		ABT/HYD 182 Environmental Analysis Using GIS
Choose one:	3-4	ESM 185 Aerial Photo Interpretation & Remote Sensing
MAT 016A	Short Calculus	ESM 186 Environmental Remote Sensing
MAT 017A	Calculus for Biology & Medicine	Depth Subject Matter Subtotal 45-46
MAT 021A	Calculus	
Choose one:	3-4	<b><i>Areas of Specialization</i></b>
MAT 016B	Short Calculus	Students must choose courses in the Areas of Specialization that have not been taken in the Depth Subject Matter.
MAT 017B	Calculus for Biology & Medicine	
MAT 021B	Calculus	Choose one: 12-17
<b><i>Political Science</i></b>		City & Regional Planning (p. 219)
POL 001	American National Government	Climate Change Policy (p. 220)
<b><i>Statistics</i></b>		Conservation Management (p. 220)
STA 013 or STA 013Y	Elementary Statistics	Energy & Transportation Planning (p. 220)
or STA 032	Gateway to Statistical Data Science	Environmental Policy & Politics (p. 220)
Preparatory Subject Matter Subtotal	46-54	Integrative Policy (p. 221)
<b><i>Depth Subject Matter</i></b>		Water Management (p. 221)
Students must take these units on a letter grade basis, and must attain an overall grade point average of 2.000 or higher in the Depth Subject Matter courses.		Areas of Specialization Subtotal 12-17
<b><i>Environmental Science &amp; Policy</i></b>	29	Total Units 107-125
ESP 110	Principles of Environmental Science	
ESP 160	The Policy Process	
ESP 161	Environmental Law	
ESP 168A	Methods of Environmental Policy Analysis	<b><i>City &amp; Regional Planning Specialization</i></b>
ESP 168B	Methods of Environmental Policy Evaluation	Code Title Units
ESP 178	Applied Research Methods	<b><i>Environmental Science &amp; Policy</i></b>
ESP 179	Environmental Impact Assessment	ESP 171 Urban & Regional Planning 4
		ESP 172 Public Lands Management 4
		<b><i>Choose one</i></b>
		ECI 165 Transportation Policy
		ESP/ECI 163 Energy & Environmental Aspects of Transportation

<b>Choose one:</b>	2-5	<b>Choose one:</b>	4
AHI 168	Great Cities	AAS 176	The Politics of Resources
CRD 149	Community Development Perspectives on Environmental Justice	AAS 177	Politics of Life in Africa
CRD 152	Community Development	ARE/ECN 115A	Economic Development
CRD 156	Community Economic Development	ANT 103	Indigenous Peoples & Natural Resource Conservation
CRD 171	Housing & Social Policy	ASA 114	Asian Diasporas
ETX 110	Toxic Tragedies & Their Impact on Society	CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities
ESP 173	Land Use & Growth Controls	CRD 153A	International Community Development: Asia
POL 100	Local Government & Politics	CRD 153B	International Community Development: Europe

**Total Units** 10-13

## Climate Change Policy Specialization

Code	Title	Units
<b>Environmental Science &amp; Policy</b>		
ESP 165	Climate Policy	3
Choose one:		4
ARE 176	Environmental Economics	
ECN 125	Energy Economics	
ESP/ECI 163	Energy & Environmental Aspects of Transportation	
ESP 167	Energy Policy	
ESP 171	Urban & Regional Planning	
Choose two:		6-8
ATM 116	Modern Climate Change	
ATM 133	Biometeorology	
ATM 160	Introduction to Atmospheric Chemistry	
ESM 131	Air as a Resource	
ESP/GEL 116N	Oceanography	
SAS 025	Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences	
or SAS 025V	Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences	
<b>Total Units</b>		13-15

## Conservation Management Specialization

Code	Title	Units
Choose two:		
ESP 166	Ocean & Coastal Policy	6-8
ESP 169	Water Policy & Politics	
ESP 170	Conservation Biology Policy	
ESP 172	Public Lands Management	
Choose one:		3-5
ENH 160	Restoration Ecology	
ESM 141	Role of Fire in Natural Ecosystems	
ESP 100	General Ecology	
ESP 121	Population Ecology	
ESP 127	Plant Conservation Biology	
EVE 115	Marine Ecology	
EVE 138	Ecology of Tropical Latitudes	
WFC 154	Conservation Biology	
WFC 155	Wildlife Space Use & Habitat Conservation	

<b>Choose one:</b>	4
AAS 176	The Politics of Resources
AAS 177	Politics of Life in Africa
ARE/ECN 115A	Economic Development
ANT 103	Indigenous Peoples & Natural Resource Conservation
ASA 114	Asian Diasporas
CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities
CRD 153A	International Community Development: Asia
CRD 153B	International Community Development: Europe
CRD 153C	International Community Development: Africa
IRE/SOC 104	The Political Economy of International Migration
SOC 145A	Sociology of Third World Development
<b>Total Units</b>	13-17

## Energy & Transportation Planning Specialization

Code	Title	Units
Choose one:		3-4
ECN 125	Energy Economics	
ENG 106	Engineering Economics	
ESP/ARE 175	Natural Resource Economics	
Choose two:		7-8
ECI 165	Transportation Policy	
ESP/ECI 163	Energy & Environmental Aspects of Transportation	
ESP 167	Energy Policy	
ESP 172	Public Lands Management	
Choose one:		3-4
ATM 116	Modern Climate Change	
ECI 123	Urban Systems & Sustainability	
ENG/PHY 160	Environmental Physics & Society	
ESM 131	Air as a Resource	
GEL 130	Non-Renewable Natural Resources	
<b>Total Units</b>		13-16

## Environmental Policy & Politics Specialization

Code	Title	Units
Choose one:		4
POL 100	Local Government & Politics	
POL 104	California State Government & Politics	
POL 105	The Legislative Process	
POL 107	Environmental Politics & Administration	
POL 109	Public Policy & the Governmental Process	
Choose one:		4
POL 162	Elections & Voting Behavior	

POL 164	Public Opinion		
POL 165	Mass Media & Politics		
POL 170	Political Psychology		
Choose one:		3-4	
ECI 165	Transportation Policy		
ESP 165	Climate Policy		
ESP 166	Ocean & Coastal Policy		
ESP 167	Energy Policy		
ESP 169	Water Policy & Politics		
ESP 170	Conservation Biology Policy		
ESP 171	Urban & Regional Planning		
ESP 172	Public Lands Management		
Choose one:		4	
ARE 106	Econometric Theory & Applications		
ARE 176	Environmental Economics		
ECI 153	Deterministic Optimization & Design		
ECN 130	Public Microeconomics		
ESP/ARE 175	Natural Resource Economics		
Total Units		15-16	

## Integrative Policy Specialization

Students choosing this individualized track must consult with a faculty advisor to identify an area of emphasis within this track and to select four upper division courses with a common theme. Possible areas of emphasis are marine policy, pollutants in the environment, planning in the presence of environmental hazards, sustainable development, or environmental and natural resource economics. If you are considering this track, please contact the major advisor as soon as possible.

Total Units: 12-16

## Water Management Specialization

Code	Title	Units
Choose two:		6
ESP 166	Ocean & Coastal Policy	
ESP 169	Water Policy & Politics	
HYD 150	Water Law	
Choose two:		6-10
ESM 100	Principles of Hydrologic Science	
ESM 121	Water Science & Management	
ESP 151	Limnology	
ESP 155	Wetland Ecology	
GEL 134	Environmental Geology & Land Use Planning	
HYD 141	Physical Hydrology	
HYD 143	Ecohydrology	
SSC 118	Soils in Land Use & the Environment	
WFC 120	Biology & Conservation of Fishes	
BIS 124	Coastal Marine Research	
ESP/GEL 116N	Oceanography	
ESP 124	Marine & Coastal Field Ecology	
ESP/GEL 150C	Biological Oceanography	

ESP 152	Coastal Oceanography
Total Units	12-16

## Environmental Policy Analysis & Planning, Minor

### College of Agricultural & Environmental Sciences

The faculty for environmental policy analysis & planning offers the following minor. The Environmental Policy Analysis & Planning minor is for natural and social science students desiring basic training in policy analysis theory and methods.

### Minor Advisor

G. Arnold (Environmental Science & Policy)

Code	Title	Units
<b>Preparation</b>		
	Basic course in political science.	
ECN 001A	Principles of Microeconomics	4
or ECN 001AV	Principles of Microeconomics	
or ECN 001AY	Principles of Microeconomics	
Total Units		4

Code	Title	Units
<b>Environmental Policy Analysis &amp; Planning</b>		
ESP 001	Environmental Analysis	4
ESP 160	The Policy Process	4
ESP 161	Environmental Law	4
ESP 168A	Methods of Environmental Policy Analysis	5
Choose two:		6-8
ESP/ECI 163	Energy & Environmental Aspects of Transportation	
ESP 165	Climate Policy	
ESP 166	Ocean & Coastal Policy	
ESP 167	Energy Policy	
ESP 168B	Methods of Environmental Policy Evaluation	
ESP 169	Water Policy & Politics	
ESP 171	Urban & Regional Planning	
ESP 172	Public Lands Management	
ESP 179	Environmental Impact Assessment	
Total Units		23-25

## Environmental Science & Management, Bachelor of Science

### College of Agricultural & Environmental Sciences

The Environmental Science & Management (ESM) major is jointly coordinated by the Department of Environmental Science & Policy and the Department of Land, Air, & Water Resources.

## Environmental Science & Policy

Susan Harrison, Chairperson

# Land, Air, & Water Resources

William Horwath, Chairperson

## Department Office

Environmental Science & Policy: 2132 Wickson Hall; 530-752-3026;  
 Environmental Science & Policy (<http://desp.ucdavis.edu/>); Faculty (<http://desp.ucdavis.edu/faculty/>)

Land, Air & Water Resources: 1110 Plant and Environmental Sciences Building; 530-752-1130; Land, Air & Water Resources (<http://lawr.ucdavis.edu/>); Faculty (<http://www.lawr.ucdavis.edu/people/faculty/>)

## The Major Program

The Environmental Science & Management (ESM) major is designed for students who are interested in solving environmental problems from an interdisciplinary perspective linking the natural and social sciences. Students who choose this major will study the interaction of physical, biological, and social components of environmental problems. Students completing the program will understand the scientific basis for environmental decision making and the legal, economic, and political issues involved in management of the environment.

## The Program

Courses in biology, chemistry, physics, economics, geology, and calculus form the lower division preparatory foundation of the curriculum. These are then tied together with Environmental Science & Policy ESP 001, which provides an inter-disciplinary analysis of several environmental problems. The upper division core consists of foundation courses in physical, biological, and social sciences, as well as applied courses in environmental monitoring, GIS, impact reporting, and statistical analysis. In their junior year, students must choose a specialized track from the following six options:

- Climate Change & Air Quality
- Ecology, Biodiversity, & Conservation
- Environmental Data Science
- Natural Resource Management
- Soils & Biogeochemistry
- Watershed Science

A capstone course is required for all seniors and serves to integrate the science, policy/management and biology aspects of the ESM major. All students gain practical experience through field courses and a required internship. Selected students may also pursue an honors thesis in their senior year.

The ESM major is jointly administered by the Departments of Environmental Science & Policy (ESP) and Land, Air & Water Resources (LAWR). Any student in good standing is eligible to transfer to the major; to do so, please see the student affairs officers in 2134 Wickson Hall or in 1150 Plant & Environmental Sciences Building.

## Careers

Graduates from this program are prepared to pursue careers as practicing environmental scientists, resource analysts and planners working for public agencies and private firms specializing in environmental quality, natural resources or ecological research. The major is also excellent preparation for graduate or professional training in physical and/or biological environmental science graduate programs, as well as in environmental law, administration and environmental policy.

## Major Advisors

Marissa Baskett (Environmental Science & Policy); Terrence Nathan (Land, Air & Water Resources)

**Advising centers** for the major, including peer advising, are located in both the Environmental Science & Policy and Land, Air & Water Resources departments. Students whose last names begin with the letters:

- A-L, see Melissa Whaley in 2134 Wickson Hall.
- M-Z, see Lacole Brooks in 1150 Plant & Environmental Sciences.

Code	Title	Units
<b>English Composition &amp; Communication Requirement</b>		
Choose one:		0-4
UWP 101 Advanced Composition or UWP 101V Advanced Composition or UWP 101Y Advanced Composition		
*OR* any course from the UWP 102 or UWP 104 series. (p. 1370)		
UWP 102B, UWP 102G, or UWP 104E recommended Passing the Upper Division English Composition Exam.		
Communication; choose one:		4
CMN 001 Introduction to Public Speaking		
CMN 003 Interpersonal Communication Competence		
CMN 003V Interpersonal Communication Competence		
CMN 003Y Interpersonal Communication Competence		
DRA 010 Introduction to Acting		
English Composition & Communication Requirement Subtotal		4-8
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A Introduction to Biology: Essentials of Life on Earth		5
BIS 002B Introduction to Biology: Principles of Ecology & Evolution		5
BIS 002C Introduction to Biology: Biodiversity & the Tree of Life		5
<i>Geology</i>		
Choose one:		
GEL 050 Physical Geology (Recommended)		3-4
or GEL 001 The Earth		
<i>Chemistry</i>		
Choose a series:		10
CHE 002A General Chemistry		
& CHE 002B and General Chemistry		
CHE 002AH Honors General Chemistry		
& CHE 002BH and Honors General Chemistry		
Choose one; not required: <sup>1</sup>		
CHE 002C General Chemistry		
or CHE 002CH Honors General Chemistry		
<i>Physics</i>		
Choose a series:		6-12
PHY 001A Principles of Physics		
& PHY 001B and Principles of Physics		

PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics		<i>Internship</i> Choose one or more below in any combination for a total of 3 units: ESM 092 Internship ESP 092 Internship ESM 192 Internship ESP 192 Internship	3
<b>Economics</b>				
Choose one:				
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics Principles of Microeconomics Principles of Microeconomics	4		
<b>Mathematics</b>				
Choose one:		3-4		
MAT 016A MAT 017A MAT 021A	Short Calculus Calculus for Biology & Medicine (Recommended) Calculus			
Choose one:		3-4		
MAT 016B MAT 017B MAT 021B	Short Calculus Calculus for Biology & Medicine (Recommended) Calculus			
<b>Environmental Science &amp; Policy</b>				
ESP 001	Environmental Analysis	4		
Satisfaction of the General Education requirement.				
Preparatory Subject Matter Subtotal		48-57		
<b>Core Subject Matter</b>				
<i>Environmental Science &amp; Management</i>				
ESM 120	Global Environmental Interactions	4		
<i>Ecology</i>				
Choose one:		4		
ESP 100 or EVE 101	General Ecology Introduction to Ecology			
<i>Environmental Science &amp; Policy</i>				
ESP 162	Environmental Policy	4		
<i>Statistics</i>				
STA 100 or STA 013 or STA 013Y	Applied Statistics for Biological Sciences (Recommended) Elementary Statistics Elementary Statistics	4		
Students completing the Environmental Data Science track may also choose STA 032 and cannot choose STA 013 or STA 013Y.				
<i>Environmental Monitoring</i>				
Choose one:		3-4		
ATM 124 ESM 108 ESP 151L ESP 179	Meteorological Instruments & Observations Environmental Monitoring Limnology Laboratory Environmental Impact Assessment			
You need a unique course for each requirement and cannot double-count a class towards two requirements. For example, ESP 179 can be used for either the environmental monitoring requirement or towards the environmental policy course for your track, but not both.				
<i>Environmental Data Science</i>				
ABT/LDA 150 or ESP 106	Introduction to Geographic Information Systems Environmental Data Science	4		

ESM 141	Role of Fire in Natural Ecosystems	ESP 171	Urban & Regional Planning
ESM/PLS 144	Trees & Forests	ESP 172	Public Lands Management
ESP 124	Marine & Coastal Field Ecology	ESP 174	Environmental Justice Policy & Practice
ESP/GEL 150C	Biological Oceanography	ESP 179	Environmental Impact Assessment
ESP 151	Limnology	SOC 160	Sociology of the Environment
ESP 155	Wetland Ecology	<i>Evolution</i>	
EVE 115	Marine Ecology	EVE 100	Introduction to Evolution 4
EVE/PLB 117	Plant Ecology	<i>Conservation Biology</i>	
EVE 147	Biogeography	Choose one:	
EVE 149	Evolution of Ecological Systems	WFC 154	Conservation Biology
GEL 136	Ecogeomorphology of Rivers & Streams	or ESP 127	Plant Conservation Biology
PLS 101	Agriculture & the Environment	<i>Field Methods</i>	
PLS 130	Grassland Ecology	Choose one:	3-5
PLS 162	Urban Ecology	ESP 123	Introduction to Field & Laboratory Methods in Ecology
WFC 168	Climate Change Ecology	ESP 124	Marine & Coastal Field Ecology
<i>Environmental Policy</i>		ESP 151L	Limnology Laboratory
Choose two: 7-8		EVE/ENT 180A	Experimental Ecology & Evolution in the Field
ESP/ECI 163	Energy & Environmental Aspects of Transportation	WFC 100	Field Methods in Wildlife, Fish, & Conservation Biology
ESP 165	Climate Policy	WFC 126	Conservation in Working Landscapes
ESP 167	Energy Policy	ENH 160 & 160L	Restoration Ecology and Restoration Ecology Laboratory
ESP 171	Urban & Regional Planning	PLS 147 & 147L	California Plant Communities and California Plant Communities Field Study
ESP 172	Public Lands Management	<i>Population Ecology</i>	
ESP 174	Environmental Justice Policy & Practice	Choose one:	
ESP 179	Environmental Impact Assessment	ESP 121	Population Ecology 4
SOC 160	Sociology of the Environment	or WFC 122	Population Dynamics & Estimation
<b>Total Units</b>	<b>32-40</b>	<i>Community Ecology</i>	

## Ecology, Biodiversity & Conservation Track

Code	Title	Units
Courses appearing in more than one section can only be used to fulfill one section.		
<i>Physical Processes</i>		3-5
Choose one:		
ATM 060	Introduction to Atmospheric Science	
ATM 116	Modern Climate Change	
ATM 133	Biometeorology	
ESM 121	Water Science & Management	
ESM 131	Air as a Resource	
ESP 152	Coastal Oceanography	
GEL 134	Environmental Geology & Land Use Planning	
HYD 143	Ecohydrology	
SSC 100	Principles of Soil Science	
<i>Environmental Policy</i>		3-5
Choose one:		
ESP 161	Environmental Law	
ESP 166	Ocean & Coastal Policy	
ESP 168A	Methods of Environmental Policy Analysis	
ESP 169	Water Policy & Politics	
ESP 170	Conservation Biology Policy	
<i>Ecosystems</i>		3-4
Choose one:		
EVE 104	Community Ecology	
EVE 115	Marine Ecology	
EVE 181	Ecology & Evolution of Animal-Plant Interactions	
PLB/EVE 117	Plant Ecology	
WFC 155	Wildlife Space Use & Habitat Conservation	
<i>Cross-cutting Ecology</i>		3-5
Choose one cross-cutting ecology course		
ESM 141	Role of Fire in Natural Ecosystems	
ESM/PLS 144	Trees & Forests	
ESP 124	Marine & Coastal Field Ecology	
ESP/GEL 150C	Biological Oceanography	

ESP 151	Limnology		ABT 181N	Concepts & Methods in Geographic Information Systems
ESP 155	Wetland Ecology		ABT/HYD 182	Environmental Analysis Using GIS
ETX 150	Evolution in Human-Altered Environments		<i>Remote Sensing</i>	
EVE 109	Molecular Ecology		Choose one:	4-5
EVE 115	Marine Ecology		ESM 185	Aerial Photo Interpretation & Remote Sensing
EVE 138	Ecology of Tropical Latitudes		ESM 186	Environmental Remote Sensing
PLS 130	Grassland Ecology		<i>Environmental Policy</i>	
WFC 125	Tropical Ecology & Conservation		Choose one:	3-4
WFC 151	Wildlife Ecology		ESP/ECI 163	Energy & Environmental Aspects of Transportation
WFC 155	Wildlife Space Use & Habitat Conservation		ESP 165	Climate Policy
WFC 168	Climate Change Ecology		ESP 166	Ocean & Coastal Policy
<i>Choose one organismal biology course</i>		3-5	ESP 169	Water Policy & Politics
ENT 103	Insects Systematics		ESP 171	Urban & Regional Planning
ENT 116	(Discontinued)		ESP 172	Public Lands Management
EVE 112	Biology of Invertebrates		ESP 174	Environmental Justice Policy & Practice
EVE 114	Experimental Invertebrate Biology		ESP 179	Environmental Impact Assessment
PLB/PLS 102	California Floristics (fulfills both the organismal lecture and lab requirements, simultaneously)		SOC 160	Sociology of the Environment
PLB/PLS 116	Plant Morphology & Evolution (fulfills both the organismal lecture and lab requirements, simultaneously)		<i>Quantitative Environmental Science</i>	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds (fulfills both the organismal lecture and lab requirements, simultaneously)		Choose one:	3-4
WFC 110	Biology & Conservation of Wild Mammals		ATM 120	Atmospheric Thermodynamics & Cloud Physics
WFC 111	Biology & Conservation of Wild Birds		ESP 121	Population Ecology
WFC 120	Biology & Conservation of Fishes		HYD 143	Ecohydrology
WFC 134	Herpetology		PLS 123	Introduction to Plant & Crop Systems Modeling
<i>Complete one lab associated with either the cross-cutting ecology or organismal biology course:</i>		0-4	WFC 122	Population Dynamics & Estimation
ENT 116L	(Discontinued)		<i>Statistical Analysis</i>	
ESP 151L	Limnology Laboratory		Choose two:	8
ESP 155L	Wetland Ecology Laboratory		STA 104	Applied Statistical Methods: Nonparametric Statistics
EVE 112L	Biology of Invertebrates Laboratory		STA 106	Applied Statistical Methods: Analysis of Variance
EVE/ENT 180B	Experimental Ecology & Evolution in the Field		STA 108	Applied Statistical Methods: Regression Analysis
WFC 110L	Laboratory in Biology & Conservation of Wild Mammals		STA 130A	Mathematical Statistics: Brief Course
WFC 111L	Laboratory in Biology & Conservation of Wild Birds		STA 130B	Mathematical Statistics: Brief Course
WFC 120L	Laboratory in Biology & Conservation of Fishes		STA 135	Multivariate Data Analysis
WFC 134L	Herpetology Laboratory		STA 137	Applied Time Series Analysis
<b>Total Units</b>		<b>33-49</b>	STA 141A	Fundamentals of Statistical Data Science
			STA 141B	Data & Web Technologies for Data Analysis
			STA 142A	Statistical Learning I

## Environmental Data Science Track

Code	Title	Units
<i>Environmental Data Science</i>		4
ESP 106	Environmental Data Science	
<i>Programming</i>		4
ECS 032A	Introduction to Programming	
<i>Data Analysis</i>		4
Choose one:		

<i>Physical Processes</i>	
Choose one:	3-5
ATM 110	Weather Observation & Analysis
ATM 116	Modern Climate Change
ATM 133	Biometeorology
ESM 100	Principles of Hydrologic Science
ESM 121	Water Science & Management
ESM 131	Air as a Resource
SSC 100	Principles of Soil Science

<b><i>Biological Processes</i></b>		
Choose one:		3-5
ESP 124	Marine & Coastal Field Ecology	
ESP/GEL 150C	Biological Oceanography	
ESP 151	Limnology	
ESP 152	Coastal Oceanography	
ESP 155	Wetland Ecology	
EVE/PLB 117	Plant Ecology	
EVE 147	Biogeography	
GEL 136	Ecogeomorphology of Rivers & Streams	
PLS 101	Agriculture & the Environment	
PLS 130	Grassland Ecology	
PLS 163	Ecosystem & Landscape Ecology	
WFC 125	Tropical Ecology & Conservation	
WFC 168	Climate Change Ecology	
<b>Total Units</b>		<b>36-43</b>

## Natural Resource Management Track

Code	Title	Units
Courses appearing in more than one section can only be used to fulfill one section.		
<i>Environmental Policy</i>		
Choose three:		9-13
ESP 160	The Policy Process	
ESP 165	Climate Policy	
ESP 166	Ocean & Coastal Policy	
ESP 167	Energy Policy	
ESP 168A	Methods of Environmental Policy Analysis	
ESP 169	Water Policy & Politics	
ESP 170	Conservation Biology Policy	
ESP 171	Urban & Regional Planning	
ESP 172	Public Lands Management	
ESP 174	Environmental Justice Policy & Practice	
ESP 179	Environmental Impact Assessment	
HYD 150	Water Law	
SOC 160	Sociology of the Environment	
<i>Environmental Law</i>		
Choose one:		3-4
ESP 161	Environmental Law	
or HYD 150	Water Law	
<i>Statistics</i>		
Choose one:		4
ARE 106	Econometric Theory & Applications	
ECN 102	Analysis of Economic Data	
STA 101	Advanced Applied Statistics for the Biological Sciences	
STA 103	Applied Statistics for Business & Economics	
STA 106	Applied Statistical Methods: Analysis of Variance	
STA 108	Applied Statistical Methods: Regression Analysis	
STA 130A	Mathematical Statistics: Brief Course	
<i>Physical Processes</i>		
Choose two:		6-8
ENT 104	Behavioral Ecology of Insects	
ESM 141	Role of Fire in Natural Ecosystems	
ESM/PLS 144	Trees & Forests	
ESP 151	Limnology	
ESP 155	Wetland Ecology	
EVE 115	Marine Ecology	
PLB/EVE 117	Plant Ecology	
PLS 130	Grassland Ecology	
WFC 110	Biology & Conservation of Wild Mammals	
WFC 111	Biology & Conservation of Wild Birds	
WFC 120	Biology & Conservation of Fishes	
WFC 134	Herpetology	
<i>Remote Sensing</i>		
Choose one:		
ESM 185	Aerial Photo Interpretation & Remote Sensing	4-5
or ESM 186	Environmental Remote Sensing	
<b>Total Units</b>		<b>32-43</b>

## Soils & Biogeochemistry

Code	Title	Units
<i>Soil Science</i>		
SSC 100	Principles of Soil Science	5
<i>Additional Soil Science</i>		
Choose four:		16-21
ESM 100	Principles of Hydrologic Science	
HYD 134	Aqueous Geochemistry	
SSC 102	Environmental Soil Chemistry	
SSC 105	Field Studies of Soils in California Ecosystems	
SSC 107	Soil Physics	
SSC 109	Sustainable Nutrient Management	
SSC 111	Soil Microbiology	
SSC 112	Soil Ecology	
SSC 120	Soil Genesis, Morphology, & Classification	
<i>Environmental Science &amp; Policy</i>		
Choose two:		6-8
ESM 121	Water Science & Management	

ESP 165	Climate Policy	HYD 143	Ecohydrology
ESP 166	Ocean & Coastal Policy	HYD/EBS 144	Groundwater Hydrology
ESP 171	Urban & Regional Planning	HYD 145	Water Science & Design
ESP 172	Public Lands Management	<i>Geomorphology</i>	
ESP 174	Environmental Justice Policy & Practice	Choose one:	3-5
ESP 179	Environmental Impact Assessment	ESP 151L	Limnology Laboratory
SOC 160	Sociology of the Environment	GEL 035	Rivers
<i>Land Use Analysis</i>		GEL 109	Earth History: Sediments & Strata
Choose one:	3-4	GEL 136	Ecogeomorphology of Rivers & Streams
ESM 185	Aerial Photo Interpretation & Remote Sensing	GEL 139	Rivers: Form, Function & Management
GEL 134	Environmental Geology & Land Use Planning	GEL 140	Introduction to Process Geomorphology
HYD/EBS 147	Runoff, Erosion & Water Quality Management	<i>Spatial Data Analysis</i>	
SSC 118	Soils in Land Use & the Environment	Choose one:	4
<i>Physical &amp; Biological Processes</i>		ABT 181N	Concepts & Methods in Geographic Information Systems
Choose two:	6-8	ABT/HYD 182	Environmental Analysis Using GIS
ATM 160	Introduction to Atmospheric Chemistry	<i>Environmental Policy</i>	
ESM/PLS 144	Trees & Forests	Choose two:	6-11
ESP/GEL 116N	Oceanography	ESP 166	Ocean & Coastal Policy
ESP/GEL 150A	Physical & Chemical Oceanography	ESP 168A	Methods of Environmental Policy Analysis
ESP/GEL 150C	Biological Oceanography	ESP 169	Water Policy & Politics
ESP 151	Limnology	ESP 172	Public Lands Management
ESP 155	Wetland Ecology	ESP 174	Environmental Justice Policy & Practice
EVE/PLB 117	Plant Ecology	ESP 179	Environmental Impact Assessment
GEL 132	Introductory Inorganic Geochemistry	HYD 150	Water Law
PLS 130	Grassland Ecology	LDA 060	Landform & Grading Studio
<b>Total Units</b>	<b>36-46</b>	<i>Soil Science</i>	
		Choose one:	4-5
SSC 105	Field Studies of Soils in California Ecosystems		
SSC 118	Soils in Land Use & the Environment		
SSC 120	Soil Genesis, Morphology, & Classification		
<i>Aquatic Organisms &amp; Habitat</i>			
Choose one:	3-4		
ENT 116	(Discontinued)		
ESP 151	Limnology		
EVE 115	Marine Ecology		
WFC 120	Biology & Conservation of Fishes		
WFC 134	Herpetology		
<b>Total Units</b>	<b>43-53</b>		

## Watershed Science Track

Code	Title	Units
<i>Evapotranspiration</i>		
Choose one:	4	
ATM 133	Biometeorology	
HYD 118/ EBS 148/ESM 118	Evapotranspiration Principles, Measurement & Modeling	
HYD 124	Plant-Water-Soil Relationships	
<i>Water Science</i>		
Choose one:	3	
ESM 121	Water Science & Management	
HYD/SAS 010	Water, Power, Society	
<i>Soil &amp; Hydrologic Science</i>		
SSC 100	Principles of Soil Science	5
ESM 100	Principles of Hydrologic Science	4
<i>Additional Hydrologic Science</i>		
Choose two:	7-8	
ESM 108	Environmental Monitoring	
HYD/ESM/ABT 110	Irrigation Systems & Water Management	
HYD 118/ EBS 148/ESM 118	Evapotranspiration Principles, Measurement & Modeling	
HYD 141	Physical Hydrology	

## Environmental Toxicology

College of Agricultural & Environmental Sciences

Robert H. Rice, Ph.D., Chairperson of the Department; term ends June 30, 2024

## Department Office

4138 Meyer Hall; 530-752-1142; Environmental Toxicology (<http://etox.ucdavis.edu>); Faculty (<http://etox.ucdavis.edu/directory/faculty/>)

- Environmental Toxicology, Bachelor of Science (p. 228)
- Environmental Toxicology, Minor (p. 229)

# Environmental Toxicology, Bachelor of Science

College of Agricultural & Environmental Sciences

## The Major Program

Toxic agents in the environment include pesticides, food additives, industrial waste, and metals as well as chemicals produced by animals, plants, fungi and bacteria. Students in the Environmental Toxicology major learn how toxicants produce adverse effects by understanding their environmental fates and biological activities. They learn about monitoring concentrations and the distribution and persistence of agents found in water, soil, air and foods. Toxicity testing procedures and exposure assessments are used to help evaluate the potential for harm to humans and other species. By understanding the cellular targets and biochemical mechanisms of perturbation by toxicants, toxicologists can better estimate adverse effects. Overall, students learn mechanisms by which toxic agents act, their origin and fate and how toxicologists evaluate the risk of adverse effects and balance them against the benefits.

## The Program

Preparatory courses in biology, chemistry, mathematics, and physics are required to provide fundamental principles that underlie toxicology. Students in the major are expected to understand the environmental fates and biological activities of different classes of toxic substances, and the legislative issues that arise from chemical use. Opportunities are available to develop an in-depth understanding in areas of emphasis through a selection of electives.

## Emphases

Elective course work in many disciplines can complement the required core courses. Providing a framework for selecting restricted electives, the major offers specializations in (1) Ecotoxicology & Environmental Chemistry, (2) Forensic Science & Regulatory Toxicology, and (3) Molecular & Biomedical Toxicology. The first category includes topics in chemical fate, transport and degradation, as well as ecology, wildlife, and aquatic toxicology. The second category includes forensic science, environmental policy and management, and public health. The third category includes pharmacology, biotechnology, medicine, veterinary medicine, and food toxicology. Students are encouraged to select course work from these Emphases and beyond to match their interests.

## Internships & Career Alternatives

Occupations that use environmental toxicology include risk assessment, pharmaceutical development, food additive toxicity testing, managing regulatory compliance, residue or forensic analysis, pest control, monitoring and field sampling, industrial hygiene, and environmental health and safety. A substantial proportion of graduates elect to pursue advanced professional training in law, medical, pharmacy, or veterinary medical school, or in graduate programs in pharmacology, toxicology, agricultural and environmental chemistry, or public health. During undergraduate study, optional internships or research projects are recommended to provide training and work experience to help students pursue future goals.

## Lead Faculty Advisor

Andrew Whitehead

## Environmental Toxicology Major Advisor

Erica Cefalo

**Advising Center** for the major is located in 1086 Academic Surge. Contact the Environmental Toxicology major advisor at 530-754-9796.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
<i>Chemistry</i>		
Choose a series:		15
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
CHE 002AH & CHE 002BH & CHE 002CH	Honors General Chemistry and Honors General Chemistry and Honors General Chemistry	
CHE 003A & CHE 003B & CHE 003C	Chemistry for Life Sciences: Determining Structure & Predicting Properties and Chemistry for Life Sciences: Predicting & Characterizing Chemical Change and Chemistry for Life Sciences: Controlling Processes & Synthetic Pathways	
Choose CHE 118 series or CHE 128 series & CHE 129A or CHE 103 series:		10-12
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<b>OR</b>		
CHE 128A & CHE 128B & CHE 128C & CHE 129A	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory	
<b>OR</b>		
CHE 103A & CHE 103B	Chemistry for Life Sciences: Determining Organic Structures & Properties and Chemistry for Life Sciences: Predicting & Controlling Organic Pathways	
<i>Mathematics</i>		
Choose a series:		12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
<i>Physics</i>		
PHY 007A	General Physics	4

PHY 007B	General Physics	4	ETX 120	Perspectives in Aquatic Toxicology
PHY 007C	General Physics	4	ETX/FST 128	Food Toxicology
<i>Statistics</i>			ETX 130	Role & Applications of Toxicology in Modern Industry
Choose one:		4	ETX 131	Environmental Toxicology of Air Pollutants
STA 100	Applied Statistics for Biological Sciences		ETX 135	Health Risk Assessment of Toxicants
STA 103	Applied Statistics for Business & Economics		ETX 138	Legal Aspects of Environmental Toxicology
STA 104	Applied Statistical Methods: Nonparametric Statistics		ETX 146	Exposure & Dose Assessment
STA 106	Applied Statistical Methods: Analysis of Variance		<i>Restricted Electives</i>	
STA 108	Applied Statistical Methods: Regression Analysis		Choose three-four courses:	
<i>Upper Division Writing</i>			12-16	
Choose one: <sup>1</sup>		4	Electives selected for area of Emphasis with faculty advisor's approval with 6 unit combined maximum of 190, 192, 198, and 199; see department website for details.	
			Depth Subject Matter Subtotal	46-55
			<b>Total Units</b>	<b>118-129</b>
<sup>1</sup> Preferably, the course should be taken prior to enrollment in ETX 102B & ETX 103B.				
UWP 101 or UWP 101V or UWP 101Y	Advanced Composition			
UWP 104A	Writing in the Professions: Business Writing			
or UWP 104AY	Writing in the Professions: Business Writing			
UWP 104B	Writing in the Professions: Law			
UWP 104C	Writing in the Professions: Journalism			
UWP 104D	Writing in the Professions: Elementary & Secondary Education			
UWP 104E	Writing in the Professions: Science			
UWP 104F or UWP 104FY	Writing in the Professions: Health			
UWP 104I	Writing in the Professions: Internships			
Satisfaction of the General Education requirement to include courses selected with advisor's approval to complement the major; courses in agricultural economics, environmental studies, political science, psychology, and sociology are particularly recommended.				
Preparatory Subject Matter Subtotal		72-74		
<b>Depth Subject Matter</b>				
<i>Biological Science</i>				
BIS 102	Structure & Function of Biomolecules	3	<b>Code</b>	<b>Title</b>
BIS 101 or BIS 103	Genes & Gene Expression Bioenergetics & Metabolism	3-4	ETX 101	Principles of Environmental Toxicology
<i>Environmental Toxicology</i>				
ETX 101	Principles of Environmental Toxicology	4	ETX 102A	Environmental Fate of Toxicants
ETX 102A	Environmental Fate of Toxicants	4	ETX 103A	Biological Effects of Toxicants
ETX 102B	Quantitative Analysis of Environmental Toxicants	5	Choose two; 6 units minimum:	
ETX 103A	Biological Effects of Toxicants	4	ETX/NUT 104	Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants
ETX 103B	Biological Effects of Toxicants: Experimental Approaches	5	ETX 120	Perspectives in Aquatic Toxicology
Choose ETX 127 or two others:		6-10	ETX/NUT 127	Environmental Stress & Development in Marine Organisms
ETX/NUT 127	Environmental Stress & Development in Marine Organisms		ETX/FST 128	Food Toxicology
<b>OR</b>			ETX 130	Role & Applications of Toxicology in Modern Industry
ETX/NUT 104	Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants		ETX 131	Environmental Toxicology of Air Pollutants
			ETX 135	Health Risk Assessment of Toxicants
			ETX 138	Legal Aspects of Environmental Toxicology

ETX 146	Exposure & Dose Assessment		EPI/MPM 205	Principles of Epidemiology	4
<b>Total Units</b>		<b>18-26</b>	EPI/MPM 206	Epidemiologic Study Design	4
			EPI/SPH 207	Advanced Epidemiologic Methodology	4
			EPI 208	Analysis & Interpretation of Epidemiologic Data	3
			or PHR 266	Applied Analytic Epidemiology	
			EPI 290	Seminars in Epidemiology	0.5
			<b>Required Courses Subtotal</b>		<b>28.5</b>

## Epidemiology (Graduate Group)

### Graduate Studies

Jonathan Ducore, M.D., M.P.H., Chairperson of the Group

### Group Office

1022 SVM Administrative Building; 530-752-2657; Epidemiology Graduate Group (<https://gge.vetmed.ucdavis.edu/>); Faculty (<https://gge.vetmed.ucdavis.edu/faculty-and-staff/>)

- Epidemiology, Master of Science (p. 230)
- Epidemiology, Doctor of Philosophy (p. 230)

## Epidemiology, Master of Science

### Graduate Studies

### Graduate Study

The Graduate Group in Epidemiology offers programs of study and research leading to M.S. and Ph.D. degrees. Areas of interest include environmental/occupational epidemiology; infectious disease epidemiology; zoonotic & vector-borne diseases; epidemiologic methods & biostatistics; health services & health economics; nutritional epidemiology; reproductive, perinatal, developmental & pediatric epidemiology; wildlife epidemiology; social & behavioral epidemiology; and cancer epidemiology. For detailed information regarding the program, address the chairperson of the group or see the website.

### Graduate Advisors

Christopher Barker, (Population Health & Reproduction), Beatriz Martinez Lopez (Medicine & Epidemiology), Lihong Qi (Public Health Sciences)

## Required Courses

Code	Title	Units
<b>Prerequisite Courses</b>		
Prerequisites must be taken concurrently with required courses below.		
Choose a series:		6-8
MAT 016A & MAT 016B	Short Calculus and Short Calculus	
MAT 021A & MAT 021B	Calculus and Calculus	
<b>Statistics</b>		
STA 106	Applied Statistical Methods: Analysis of Variance	4
STA 108	Applied Statistical Methods: Regression Analysis	4
Prerequisite Courses Subtotal		14-16
<b>Required Courses</b>		
EPI 202	Quantitative Epidemiology I: Probability	5
EPI 203	Quantitative Epidemiology II: Statistical Inference	4
EPI 204	Quantitative Epidemiology III: Statistical Models	4

EPI/MPM 205	Principles of Epidemiology	4
EPI/MPM 206	Epidemiologic Study Design	4
EPI/SPH 207	Advanced Epidemiologic Methodology	4
EPI 208	Analysis & Interpretation of Epidemiologic Data	3
or PHR 266	Applied Analytic Epidemiology	
EPI 290	Seminars in Epidemiology	0.5
<b>Required Courses Subtotal</b>		<b>28.5</b>

### Related Courses

For additional course work in Epidemiology, see Medicine & Epidemiology (VME), Preventive Veterinary Medicine (MPM), Population Health & Reproduction (PHR), Public Health Sciences (SPH), and Statistics (STA).

<b>Total Units</b>	<b>42.5-44.5</b>
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## Epidemiology, Doctor of Philosophy

### Graduate Studies

### Graduate Study

The Graduate Group in Epidemiology offers programs of study and research leading to M.S. and Ph.D. degrees. Areas of interest include environmental/occupational epidemiology; infectious disease epidemiology; zoonotic & vector-borne diseases; epidemiologic methods & biostatistics; health services & health economics; nutritional epidemiology; reproductive, perinatal, developmental & pediatric epidemiology; wildlife epidemiology; social & behavioral epidemiology; and cancer epidemiology. For detailed information regarding the program, address the chairperson of the group or see the website.

### Graduate Advisors

Christopher Barker, (Population Health & Reproduction), Beatriz Martinez Lopez (Medicine & Epidemiology), Lihong Qi (Public Health Sciences)

## Required Courses

Code	Title	Units
<b>Prerequisite Courses</b>		
Prerequisites may be taken concurrently with required courses below.		
Choose a series:		6-8
MAT 016A & MAT 016B	Short Calculus and Short Calculus	
MAT 021A & MAT 021B	Calculus and Calculus	
<b>Statistics</b>		
STA 106	Applied Statistical Methods: Analysis of Variance	4
STA 108	Applied Statistical Methods: Regression Analysis	4
Prerequisite Courses Subtotal		14-16
<b>Required Courses</b>		
EPI 202	Quantitative Epidemiology I: Probability	5
EPI 203	Quantitative Epidemiology II: Statistical Inference	4
EPI 204	Quantitative Epidemiology III: Statistical Models	4

EPI/MPM 205	Principles of Epidemiology	4
EPI/MPM 206	Epidemiologic Study Design	4
EPI/SPH 207	Advanced Epidemiologic Methodology	4
EPI 208	Analysis & Interpretation of Epidemiologic Data	3
EPI 290	Seminars in Epidemiology	0.5
Required Courses Subtotal		28.5
<b>Related Courses</b>		
For additional course work in Epidemiology, see Medicine & Epidemiology (VME), Preventive Veterinary Medicine (MPM), Population Health & Reproduction (PHR), Public Health Sciences (SPH), and Statistics (STA).		
<b>Total Units</b>		<b>42.5-44.5</b>

## Evolution & Ecology

### College of Biological Sciences

John Stachowicz, Ph.D., Chairperson of the Department; term ends June 30, 2022.

Peter Wainwright, Ph.D., Chairperson of the Department; July 1, 2022-June 30, 2025.

### Department Office

2320 Storer Hall; 530-752-1272; Evolution & Ecology (<https://eve.ucdavis.edu/>); Faculty (<https://eve.ucdavis.edu/people/>)

The department of Evolution & Ecology offers the majors and minor in Evolution, Ecology & Biodiversity.

- Evolution, Ecology & Biodiversity, Bachelor of Arts (p. 231)
- Evolution, Ecology & Biodiversity, Bachelor of Science (p. 232)
- Evolution, Ecology & Biodiversity, Minor (p. 234)

## Evolution, Ecology & Biodiversity, Bachelor of Arts

### College of Biological Sciences

The major in Evolution, Ecology & Biodiversity offers the student a broad background in the theoretical and empirical basis of our understanding of the diversity and distribution of living organisms.

### The Program

The program of study for the major begins with a core of introductory courses in mathematics, physical sciences, and biology. These are followed by survey courses in biodiversity, evolution and ecology and various more specialized courses that focus the student on particular disciplines or organisms, with an emphasis on problem-solving and critical thinking. Evolution, Ecology & Biodiversity majors may earn either a Bachelor of Science or a Bachelor of Arts degree. The requirements for the B.S. degree program include more science courses, such as biochemistry, whereas those for the A.B. degree program allow room for more electives within the humanities and social sciences. The A.B. degree is especially appropriate for those students who wish to combine arts or languages with evolution and ecology for career preparation in such areas as scientific writing, translating or illustration.

### Career Alternatives

A degree in Evolution, Ecology & Biodiversity prepares the student for career opportunities in research, teaching, health professions, veterinary medicine, agriculture, environmental management, and industry. Many students gain some research experience while at UC Davis and choose to continue their training at the graduate level. This track offers careers in academics, government, environmental organizations, or business.

### Teaching Credential Subject Representative

Students planning for a teaching career should consult the School of Education in regards to preparation for certification; see the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

### Faculty Advisor

Laci M. Gerhart-Barley, Ph.D.

### Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	15
<i>Chemistry</i>		
Choose the 002 series or 004 series and 008 series:		16
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
<b>OR</b>		
CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<b>AND</b>		
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
<i>Mathematics</i>		
Choose the MAT 017 series, the MAT 021 series, or STA 100: <sup>1</sup>		4-8
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 017C	Calculus for Biology & Medicine (Recommended)	
<b>OR</b>		
MAT 021A & MAT 021B	Calculus and Calculus	
MAT 021C	Calculus (Recommended)	
<b>OR</b>		
STA 100	Applied Statistics for Biological Sciences	
<i>Physics</i>		
PHY 001A	Principles of Physics	3

PHY 001B	Principles of Physics	3	EVE 106	Mechanical Design in Organisms	3
Preparatory Subject Matter Subtotal		41-45	EVE 107	Animal Communication	4
<b>Depth Subject Matter</b>			EVE 110	Running, Swimming & Flying	3
<i>Biological Science</i>			EVE 115	Marine Ecology	4
BIS 101	Genes & Gene Expression	4	EVE/PLB 117	Plant Ecology	4
Choose one:		3-4	EVE/PLB 119	Population Biology of Invasive Plants & Weeds	3
EVE 100	Introduction to Evolution		EVE 120	Global Change Ecology	3
GEL 107	Earth History: Paleobiology		EVE 131	Human Genetic Variation & Evolution	3
ANT 151	Primate Evolution		EVE 138	Ecology of Tropical Latitudes	5
Choose one:		4	EVE 141	Principles of Systematics	3
EVE 101	Introduction to Ecology		EVE 147	Biogeography	4
ESP 100	General Ecology		EVE 149	Evolution of Ecological Systems	4
WFC 151	Wildlife Ecology		EVE 150	Evolution of Animal Development	3
<i>Areas of Study</i>			EVE 161	Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes	3
Choose additional upper division restricted electives in biological science relevant to the student's interest. Chosen in consultation with a BASC advisor to achieve a total of 36 or more units.		24-25	EVE 175	Computational Genetics	3
Include at least one course from each of the areas of study below.			Choose EVE 180A or ENT 180A & EVE 180B or ENT 180B:		8
(1) Biodiversity (p. 232)			EVE/ENT 180A	Experimental Ecology & Evolution in the Field	
(2) Advanced Evolution & Ecology (p. 232)			EVE/ENT 180B	Experimental Ecology & Evolution in the Field	
Depth Subject Matter Subtotal		35-37	EVE 181	Ecology & Evolution of Animal-Plant Interactions	4
<b>Total Units</b>		<b>76-82</b>			

<sup>1</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B or MAT 017A-MAT 021B

## (1) Biodiversity Area of Study

Code	Title	Units
ENT 107	California Insect Diversity	5
EVE 105	Phylogenetic Analysis of Vertebrate Structure	4
EVE/PLB 108	Systematics & Evolution of Angiosperms	5
EVE 112	Biology of Invertebrates	3
EVE 114	Experimental Invertebrate Biology	3
EVE 140	Paleobotany	4
MIC 105	Microbial Diversity	3
NEM 110	Introduction to Nematology	2
PLB/PLS 116	Plant Morphology & Evolution	5
PLB/PLP 148	Introductory Mycology	4
PLS 147	California Plant Communities	3
WFC 110	Biology & Conservation of Wild Mammals	3
WFC 111	Biology & Conservation of Wild Birds	3
WFC 120	Biology & Conservation of Fishes	3
WFC 134	Herpetology	3

## (2) Advanced Evolution & Ecology Area of Study

Code	Title	Units
EVE 102	Population & Quantitative Genetics	4
EVE 103	Phylogeny, Speciation & Macroevolution	4
EVE 104	Community Ecology	4

# Evolution, Ecology & Biodiversity, Bachelor of Science

## College of Biological Sciences

The major in Evolution, Ecology & Biodiversity offers the student a broad background in the theoretical and empirical basis of our understanding of the diversity and distribution of living organisms.

## The Program

The program of study for the major begins with a core of introductory courses in mathematics, physical sciences, and biology. These are followed by survey courses in biodiversity, evolution and ecology and various more specialized courses that focus the student on particular disciplines or organisms, with an emphasis on problem-solving and critical thinking. Evolution, Ecology & Biodiversity majors may earn either a Bachelor of Science or a Bachelor of Arts degree. The requirements for the B.S. degree program include more science courses, such as biochemistry, whereas those for the A.B. degree program allow room for more electives within the humanities and social sciences. The A.B. degree is especially appropriate for those students who wish to combine arts or languages with evolution and ecology for career preparation in such areas as scientific writing, translating or illustration.

## Career Alternatives

A degree in Evolution, Ecology & Biodiversity prepares the student for career opportunities in research, teaching, health professions, veterinary medicine, agriculture, environmental management, and industry. Many students gain some research experience while at UC Davis and choose to continue their training at the graduate level. This track offers careers in academics, government, environmental organizations, or business.

## Teaching Credential Subject Representative

Students planning for a teaching career should consult the School of Education in regards to preparation for certification; see the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>)

## Faculty Advisor

Laci M. Gerhart-Barley, Ph.D.

## Advising

Biology Academic Success Center (BASC) (<http://basc.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		15
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry</i>		
Choose CHE 002 series or CHE 004 series: <sup>1</sup>		15
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
Choose CHE 008 series or CHE 118 series: <sup>2</sup>		6-12
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
<b>OR</b>		
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<i>Mathematics</i>		
Choose MAT 017 series or MAT 021 series: <sup>3</sup>		8-12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B	Calculus and Calculus	
MAT 021C	Calculus (Recommended)	
<i>Physics</i>		
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
<b>Preparatory Subject Matter Subtotal</b>		56-66
<b>Depth Subject Matter</b>		
<i>Biological Science</i>		
BIS 101	Genes & Gene Expression	4
BIS 104	Cell Biology	3
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6
<i>Evolution &amp; Ecology</i>		
EVE 100	Introduction to Evolution	4
EVE 101	Introduction to Ecology	4
<i>Statistics</i>		
STA 100 or STA 130A & STA 130B	Applied Statistics for Biological Sciences Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course	4-8
<i>Areas of Study</i>		
Choose additional upper division restricted electives in biological science relevant to the student's interest chosen in consultation with a BASC advisor to achieve a total of 49 or more units, at least one of the courses taken to fulfill these requirements must include a 6 hour per week laboratory or field component or two courses with a 3 hour per week laboratory or field component.		20-27
Include at least one course from the Biodiversity area of study and two courses from the Advanced Evolution & Ecology areas of study below.		
(1) Biodiversity (p. 233) (2) Advanced Evolution & Ecology (p. 234)		
Note: A maximum of 4 units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective unit requirements, but not to the upper division laboratory requirement. Courses numbered 197T are not applicable to the upper division elective unit requirement.		
<b>Depth Subject Matter Subtotal</b>		42-56
<b>Total Units</b>		<b>98-122</b>

<sup>1</sup> With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A-CHE 002B-CHE 002C; OR CHE 004A-CHE 004B-CHE 002C

<sup>2</sup> With BASC advisor approval, this combination also satisfies the Organic Chemistry requirement: CHE 118A-CHE 008B.

<sup>3</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; OR MAT 017A-MAT 021B

## (1) Biodiversity Area of Study

Code	Title	Units
ENT 107	California Insect Diversity	5
EVE 105	Phylogenetic Analysis of Vertebrate Structure	4
EVE/PLB 108	Systematics & Evolution of Angiosperms	5
EVE 112	Biology of Invertebrates	3
EVE 114	Experimental Invertebrate Biology	3
EVE 140	Paleobotany	4
MIC 105	Microbial Diversity	3
NEM 110	Introduction to Nematology	2
PLB/PLS 116	Plant Morphology & Evolution	5

PLB/PLP 148	Introductory Mycology	4
PLS 147	California Plant Communities	3
WFC 110	Biology & Conservation of Wild Mammals	3
WFC 111	Biology & Conservation of Wild Birds	3
WFC 120	Biology & Conservation of Fishes	3
WFC 134	Herpetology	3

## Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Only one course used to satisfy a requirement for the minor may be applied toward a student's major.

## (2) Advanced Evolution & Ecology Area of Study

Code	Title	Units
EVE 102	Population & Quantitative Genetics	4
EVE 103	Phylogeny, Speciation & Macroevolution	4
EVE 104	Community Ecology	4
EVE 106	Mechanical Design in Organisms	3
EVE 107	Animal Communication	4
EVE 110	Running, Swimming & Flying	3
EVE 115	Marine Ecology	4
EVE/PLB 117	Plant Ecology	4
EVE/PLB 119	Population Biology of Invasive Plants & Weeds	3
EVE 120	Global Change Ecology	3
EVE 131	Human Genetic Variation & Evolution	3
EVE 138	Ecology of Tropical Latitudes	5
EVE 141	Principles of Systematics	3
EVE 147	Biogeography	4
EVE 149	Evolution of Ecological Systems	4
EVE 150	Evolution of Animal Development	3
EVE 161	Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes	3
EVE 175	Computational Genetics	3
Choose EVE 180A or ENT 180A & EVE 180B or ENT 180B:		8
EVE/ENT 180A	Experimental Ecology & Evolution in the Field	
EVE/ENT 180B	Experimental Ecology & Evolution in the Field	
EVE 181	Ecology & Evolution of Animal-Plant Interactions	4

Code	Title	Units
EVE 100	Introduction to Evolution	4
EVE 101	Introduction to Ecology	4
Courses selected for the Biodiversity and Advanced Ecology or Evolution sections must add up to at least 10 units.		10
<i>Biodiversity</i>		
Choose one:		
ENT 103	Insects Systematics	
EVE 105	Phylogenetic Analysis of Vertebrate Structure	
EVE/PLB 108	Systematics & Evolution of Angiosperms	
EVE 112	Biology of Invertebrates	
EVE 112L	Biology of Invertebrates Laboratory	
EVE 114	Experimental Invertebrate Biology	
EVE 140	Paleobotany	
PLB/PLS 116	Plant Morphology & Evolution	
PLB/PLP 148	Introductory Mycology	
PLS 147	California Plant Communities	
WFC 110	Biology & Conservation of Wild Mammals	
WFC 110L	Laboratory in Biology & Conservation of Wild Mammals	
WFC 111	Biology & Conservation of Wild Birds	
WFC 111L	Laboratory in Biology & Conservation of Wild Birds	
WFC 120	Biology & Conservation of Fishes	
WFC 120L	Laboratory in Biology & Conservation of Fishes	
WFC 134	Herpetology	
WFC 134L	Herpetology Laboratory	
MIC 105	Microbial Diversity	
MIC 105L	Microbial Diversity Laboratory	
NEM 110	Introduction to Nematology	

### Advanced Ecology or Evolution

Choose two:

EVE 102	Population & Quantitative Genetics
EVE 103	Phylogeny, Speciation & Macroevolution
EVE 107	Animal Communication
EVE 115	Marine Ecology
EVE/PLB 117	Plant Ecology
EVE/PLB 119	Population Biology of Invasive Plants & Weeds
EVE 120	Global Change Ecology
EVE 131	Human Genetic Variation & Evolution
EVE 138	Ecology of Tropical Latitudes
EVE 141	Principles of Systematics
EVE 147	Biogeography

## Evolution, Ecology & Biodiversity, Minor

### College of Biological Sciences

Learn about the diversity of life of Earth, including diversity in genes, physiology, shapes, sizes, and behaviors. You will learn about how this diversity emerged, as plants, animals, and microbes became adapted to the environment and to each other. You will learn to predict whether populations of interacting organisms will persist over time.

### Faculty Advisor

Laci M. Gerhart-Barley, Ph.D.

EVE 149	Evolution of Ecological Systems	
EVE 150	Evolution of Animal Development	
EVE 161	Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes	
Choose EVE 180A or ENT 180A & EVE 180B or ENT 180B:		
EVE/ENT 180A	Experimental Ecology & Evolution in the Field	
EVE/ENT 180B	Experimental Ecology & Evolution in the Field	
EVE 181	Ecology & Evolution of Animal-Plant Interactions	
Laboratory or field course: At least one of the courses taken to fulfill these requirements must include a 6-hour per week laboratory or field component or two courses with a 3-hour per week laboratory or field component.		
<b>Total Units</b>	<b>18</b>	

agricultural chemistry, biochemistry, microbiology, nutrition and health sciences.

**Advising Center** for the major is located in 1204 RMI South Building; 530-752-3250.

### Master Faculty Advisor

A.E. Mitchell (Food Science & Technology)

### Graduate Study

A program of study and research leading to M.S. and Ph.D. degrees in Food Science is available. For further information on graduate study, contact the graduate advisor.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
MAT 016A	Short Calculus	9
MAT 016B	Short Calculus	
MAT 016C	Short Calculus	
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
<i>Chemistry</i>		
CHE 002A	General Chemistry	21
CHE 002B	General Chemistry	
CHE 002C	General Chemistry	
CHE 008A	Organic Chemistry: Brief Course	
CHE 008B	Organic Chemistry: Brief Course	
OR a more advanced series.		
<i>Physics</i>		
PHY 007A	General Physics	12
PHY 007B	General Physics	
PHY 007C	General Physics	
<i>Food Science &amp; Technology</i>		
FST 050	Introduction to Food Preservation	3
<i>Statistics</i>		
STA 013 or STA 013Y	Elementary Statistics	4
<i>Nutrition</i>		
NUT 010 or NUT 010V or NUT 010Y	Discoveries & Concepts in Nutrition	3
Discoveries & Concepts in Nutrition		
Discoveries & Concepts in Nutrition		
Discoveries & Concepts in Nutrition		
OR approved substitute.		
<b>Preparatory Subject Matter Subtotal</b>		
<b>Depth Subject Matter</b>		
<i>Biological Science</i>		
BIS 102	Structure & Function of Biomolecules	6
BIS 103	Bioenergetics & Metabolism	
<i>Microbiology</i>		
MIC 102	Introductory Microbiology	3
<i>Food Science &amp; Technology</i>		
FST 100A	Food Chemistry	39
FST 100C	Food Physical Chemistry	
FST 101A	Food Chemistry Laboratory	

## Food Science & Technology

### College of Agricultural & Environmental Sciences

Christopher Simmons, Ph.D., Chairperson of the Department

### Advising Center

1204 RMI South Building; 530-752-3250; BFTV Advising Center ([bftvadvising@ucdavis.edu](mailto:bftvadvising@ucdavis.edu)); Food Science & Technology (<http://foodscience.ucdavis.edu>); Faculty (<https://foodscience.ucdavis.edu/person-type/101/>)

- Food Science, Bachelor of Science (p. 235)

## Food Science, Bachelor of Science

### College of Agricultural & Environmental Sciences

### The Major Program

Food Science is a discipline in which biological, physical, and sensory sciences are integrated for the study of foods to ensure their safety, quality, and healthful properties. The food science curriculum encompasses food chemistry and biochemistry, food safety and microbiology, food processing and preservation, and sensory and consumer sciences.

### The Program

Food Science is a multidisciplinary major that includes core competencies in food chemistry and analysis, food safety and microbiology, and food processing and engineering. After completing the preparatory course work, students focus on advanced subject courses in food chemistry and biochemistry, food processing, sensory evaluation, and food microbiology applied to improve the safety, stability, taste, nutrition, convenience, sustainability and value of foods.

### Career Alternatives

Opportunities for employment include positions in the food and allied industries, government agencies, and educational and research institutions. Graduate study for the food science student may lead to the M.S. or Ph.D. degree in food science, or in related fields such as

FST 101B	Food Properties Laboratory	
FST 103	Physical & Chemical Methods for Food Analysis	
FST 104	Food Microbiology	
FST 104L	Food Microbiology Laboratory	
FST 110	Food Processing	
FST 110L	Food Processing Laboratory	
FST 117	Design & Analysis for Sensory Food Science	
FST 127	Sensory Evaluation of Foods	
FST 190	Senior Seminar	
Depth Subject Matter Subtotal		48
<b>Restricted Electives</b>		<b>18</b>
See Major Advisor for approved course list.		
Restricted Electives Subtotal		18
<b>Total Units</b>		<b>123</b>

### Brewing Science Option

The Brewing Science option prepares Food Science students for careers in production or quality assurance within the brewing industry or other food fermentation industries. The option also prepares students for graduate study in food science or related programs, and exposes the students to diverse disciplines, including chemistry, biochemistry, microbiology, and processing.

Code	Title	Units
<b>Specific Course Requirements</b>		<b>11</b>
FST 102A	Malting & Brewing Science	
FST 102B	Practical Malting & Brewing	
FST 123	Introduction to Enzymology	
<b>Restricted Electives</b>		<b>7</b>
Choose 2-3 additional courses:		
FST 003	Introduction to Brewing & Beer	
FST 109	Principles of Quality Assurance in Food Processing	
FST/VEN 114	Fermented Foods	
FST 123L	Enzymology Laboratory	
FST 159	New Food Product Ideas	
FST 160	Food Product Development	
<b>Total Units</b>		<b>18</b>

## Food Science (Graduate Group)

### College of Agricultural & Environmental Sciences

Maria L. Marco, Ph.D., Chairperson of the Group

### Group Office

1204 RMI South Building; 530-752-3250; bftadvising@ucdavis.edu; Food Science Graduate Group (<https://foodscience.ucdavis.edu/academic-programs/graduate/>)

## Faculty

Includes members from nine departments in the Colleges of Agricultural & Environmental Sciences, Letters & Science, and Engineering, and the Schools of Medicine and Veterinary Medicine.

- Food Science, Master of Science (p. 236)
- Food Science, Doctor of Philosophy (p. 236)

## Food Science, Master of Science

### College of Agricultural & Environmental Sciences

### Graduate Study

The interdepartmental Graduate Group in Food Science offers programs of study leading to the M.S. degree. Graduate studies stress the application of the biological, chemical, physical, and behavioral sciences to processing, preservation, quality evaluation, public health aspects, and utilization of foods. Areas of specialization include chemistry-biochemistry, microbiology, engineering-technology, brewing, and sensory science. Detailed information regarding graduate study is available through the Group Chairperson or the Group office.

### Graduate Advisor

Contact the Food Science Graduate Group office at [bftadvising@ucdavis.edu](mailto:bftadvising@ucdavis.edu).

## Food Science, Doctor of Philosophy

### College of Agricultural & Environmental Sciences

### Graduate Study

The interdepartmental Graduate Group in Food Science offers programs of study leading to the Ph.D. degree. Graduate studies stress the application of the biological, chemical, physical, and behavioral sciences to processing, preservation, quality evaluation, public health aspects, and utilization of foods. Areas of specialization include chemistry-biochemistry, microbiology, engineering-technology, brewing, and sensory science. Detailed information regarding graduate study is available through the Group Chairperson or the Group office.

### Graduate Advisor

Contact the Food Science Graduate Group office at [bftadvising@ucdavis.edu](mailto:bftadvising@ucdavis.edu).

## Forensic Science (Graduate Group)

### Graduate Studies

Ashley Hall, Ph.D., Director  
Kent Pinkerton, Ph.D., Chairperson of the Group

### Group Office

1909 Galileo Ct., Suite B, Davis, CA 95618; 530-747-3913; Forensic Science Graduate Group (<http://forensicscience.ucdavis.edu/>); Faculty (<http://forensicscience.ucdavis.edu/graduate-group/>)

- Forensic Science, Master of Science (p. 237)

# Forensic Science, Master of Science

Graduate Studies

## Graduate Study

The Forensic Science Graduate Group offers the degree of MS in Forensic Science. This program, offering a Plan I-Thesis option and a Plan II-Capstone Option, has two tracks, DNA or Criminalistics, enabling the student to take core courses emphasizing the physical or biological sciences. Each track requires the student to take nine core courses, totaling 26-27 units, 3 units of seminar, and the appropriate number of elective/research units for total 54 units. Students can take courses outside their specializations, but they must complete the courses required for their own track. The FOR seminar courses in the fall and winter quarters are required for new students. The FOR spring seminar may be taken in any spring quarter or students may take one additional seminar course in another department or program before graduation.

## Preparation

Appropriate preparation is an undergraduate degree in physical or natural sciences, engineering or a closely related field with a GPA of 3.000 or higher. Examples include Biochemistry, Chemistry, Molecular Biology, Biology, Genetics, and Engineering. Applicants must have completed at least one year of general chemistry, two quarters of organic chemistry, one year of general physics, math through calculus and a class in statistics. Other recommended courses include general biology, biochemistry and genetics.

## Graduate Advisors

Ashley Hall (Forensic Science), You-Lo Hsieh (Division of Textiles & Clothing), Robert B. Kimsey (Entomology), Christyann Darwent (Anthropology), Robert Poppenga (California Animal Health & Food Safety Laboratory), Bahram Ravani (Mechanical & Aeronautical Engineering), Matt Wood (Environmental Toxicology), Glendon Parker (Environmental Toxicology), Gang Sun (Textiles & Clothing), Bart Weimar (Population Health & Reproduction), Allison Ehrlich (Environmental Toxicology), Wilson Rumbeiba (Molecular Biosciences), Ben Moeller (Veterinary Medicine), Ed Imwinkelried (School of Law-Deans Office)

# French & Italian

College of Letters & Science

Julia Simon, Ph.D., Chairperson

## Department Office

215 Sproul Hall; 530-752-1219; French & Italian (<https://frenchanditalian.ucdavis.edu/>); Faculty (<https://frenchanditalian.ucdavis.edu/directory/>)

- French & Francophone Studies, Doctor of Philosophy (p. 237)
- French & Francophone Studies, Master of Arts (p. 237)
- French, Bachelor of Arts (p. 238)
- French, Minor (p. 239)
- Italian, Bachelor of Arts (p. 240)
- Italian, Minor (p. 242)

# French & Francophone Studies, Master of Arts

College of Letters & Science

Julia Simon, Ph.D., Chairperson of the Department

## Department Office

207 Sproul Hall; 530-752-2115; French & Francophone Studies (<http://french.ucdavis.edu>); Faculty (<http://frenchanditalian.ucdavis.edu/people-french/>)

## Graduate Study

The department offers programs of study and research leading to M.A. and Ph.D. degrees in French. Candidates for the Ph.D. have the option of enriching their degree program by preparing a designated emphasis in African American & African Studies, Classics & Classical Receptions, Critical Theory, Feminist Theory & Research, Second Language Acquisition, and/or Studies in Performance & Practice. Detailed information may be obtained from the graduate advisor or the department chairperson.

## Graduate Advisor

J. Fort

## Prerequisite Credit

Credit will not normally be given for a course if it is the prerequisite of a course already successfully completed. Exceptions can be made by the department chairperson only.

# French & Francophone Studies, Doctor of Philosophy

College of Letters & Science

Julia Simon, Ph.D., Chairperson of the Department

## Department Office

207 Sproul Hall; 530-752-2115; French & Francophone Studies (<http://french.ucdavis.edu>); Faculty (<http://frenchanditalian.ucdavis.edu/people-french/>)

## Graduate Study

The department offers programs of study and research leading to M.A. and Ph.D. degrees in French. Candidates for the Ph.D. have the option of enriching their degree program by preparing a designated emphasis in African American & African Studies, Classics & Classical Receptions, Critical Theory, Feminist Theory & Research, Second Language Acquisition, and/or Studies in Performance & Practice. Detailed information may be obtained from the graduate advisor or the department chairperson.

## Graduate Advisor

J. Fort

## Prerequisite Credit

Credit will not normally be given for a course if it is the prerequisite of a course already successfully completed. Exceptions can be made by the department chairperson only.

# French, Bachelor of Arts

College of Letters & Science

## The Major Program

The major program assures proficiency in all four language skills—speaking, listening, reading, and writing—and acquaints students with the intellectual and cultural contributions of the French-speaking world through the study of its literatures, traditions, and institutions.

## The Program

The department encourages its students to work closely with the academic advisor in designing a major tailored to their needs and interests within the broad requirements prescribed by the program and to avail themselves of the guidance of an excellent teaching faculty. Each year, a substantial number of students with good preparation in French participate in the university's very popular Education Abroad Program, which maintains centers in Bordeaux, Lyon, and Paris.

## Career Alternatives

Foreign language teachers, a cardiologist, a veterinarian, a naval commander at the Pentagon, a professor of Political Science, lawyers, sales representatives, journalists, a speech pathologist, a law professor, translators, a senior applications programmer, travel agents, independent business owners, a senior museum curator, nurses, financial managers, stock brokers, and an industrial attaché for a French trade commission—all graduated with an A.B. in French from UC Davis. These represent only a small fraction of the career choices documented in a survey of department graduates.

## Major Advisor

Consult the department office.

## Honors Program

Candidates for high or highest honors in French must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in FRE 194H (4 units) and FRE 195H (4 units). Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of the junior year (135 units), have attained a cumulative grade-point average of 3.500 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in French are in addition to the regular requirements for the major in French.

## Education Abroad

The department of French and Italian encourages students to study abroad in the Global Learning Hub (<https://globallearning.ucdavis.edu/>). With the approval of a major advisor, applicable courses taken abroad may be accepted in the major or minor programs.

## Graduate Study

The department offers programs of study and research leading to the M.A. and Ph.D. degrees in French & Francophone Studies. Candidates for the Ph.D. have the option of enriching their degree program by preparing

a designated emphasis in African American & African Studies, Classics & Classical Receptions, Critical Theory, Feminist Theory and Research, Second Language Acquisition, or Studies in Performance & Practice. Detailed information may be obtained from the graduate advisor or the department chairperson.

## Graduate Advisor

Consult the department office.

## Prerequisite Credit

Credit will not normally be given for a course if it is the prerequisite of a course already successfully completed. Exceptions can be made by the department chairperson only.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Elementary French</i>		15
FRE 001	Elementary French	
FRE 002	Elementary French	
FRE 003	Elementary French	
<b>OR the equivalent.</b>		
<i>Intermediate French</i>		15
FRE 021	Intermediate French	
FRE 022	Intermediate French	
FRE 023	Intermediate French	
<b>OR the equivalent</b>		
<b>Preparatory Subject Matter Subtotal</b>		
<b>Depth Subject Matter</b>		
<i>French</i>		4
FRE 100	Composition in French	
<i>French Literature</i>		
Choose three:		12
FRE 101	Introduction to French Poetry	
FRE 102	Introduction to French Drama	
FRE 103	Introduction to French Prose	
FRE 119A	The Romantic Imaginary	
FRE 119B	Realism, History & the Novel	
FRE 119C	From Baudelaire to Surrealism	
FRE 120	Modern French Thought	
FRE 121	20th-Century French Novel	
FRE 122	French & Francophone Film	
FRE 124	Post-Colonial & Francophone Literature	
FRE 125	French Literature & Other Arts	
FRE 130	From Page to Stage: Theatre & Theatricality	
FRE 133	Gender & Politics in French Literature & Culture	
FRE 140	Study of a Major Writer	
FRE 141	Selected Topics in French Literature	
Choose at least one in French Literature prior to the French Revolution:		
FRE 115	Medieval French Literature & Society	
FRE 116	The French Renaissance	
FRE 117A	Baroque & Preclassicism	
FRE 117B	The Classical Moment	
FRE 118A	Age of Reason & Revolution	

FRE 118B	Private Lives & Public Secrets: The Early French Novel	FRE 161	Linguistic Study of French: Form & Meaning
<b>French Culture</b>		FRE 162	History of the French Language
Choose two:		Depth Subject Matter Subtotal	44
FRE 107A	Pre- & Early-Modern France	Total Units	44-74
FRE 107B	The Making of Modern France		
FRE 108	Modern French Culture		
FRE 127	Paris: Modernity & Metropolitan Culture		
FRE 128	Topics in French Culture		
<b>French Linguistics &amp; Language Science</b>			
Choose two:			
FRE 105	Advanced French Grammar		
FRE 109	French Phonetics		
FRE 160	Linguistic Study of French-Language in Context		
FRE 161	Linguistic Study of French: Form & Meaning		
FRE 162	History of the French Language		
Choose electives in French Literature, Language, or Culture, in consultation with an undergraduate advisor.			
FRE 101	Introduction to French Poetry		
FRE 102	Introduction to French Drama		
FRE 103	Introduction to French Prose		
FRE 105	Advanced French Grammar		
FRE 107A	Pre- & Early-Modern France		
FRE 107B	The Making of Modern France		
FRE 108	Modern French Culture		
FRE 109	French Phonetics		
FRE 110	Stylistics & Creative Composition		
FRE 115	Medieval French Literature & Society		
FRE 116	The French Renaissance		
FRE 117A	Baroque & Preclassicism		
FRE 117B	The Classical Moment		
FRE 118A	Age of Reason & Revolution		
FRE 118B	Private Lives & Public Secrets: The Early French Novel		
FRE 119A	The Romantic Imaginary		
FRE 119B	Realism, History & the Novel		
FRE 119C	From Baudelaire to Surrealism		
FRE 120	Modern French Thought		
FRE 121	20th-Century French Novel		
FRE 122	French & Francophone Film		
FRE 124	Post-Colonial & Francophone Literature		
FRE 125	French Literature & Other Arts		
FRE 127	Paris: Modernity & Metropolitan Culture		
FRE 128	Topics in French Culture		
FRE 130	From Page to Stage: Theatre & Theatricality		
FRE 133	Gender & Politics in French Literature & Culture		
FRE 140	Study of a Major Writer		
FRE 141	Selected Topics in French Literature		
FRE 160	Linguistic Study of French-Language in Context		

FRE 130	From Page to Stage: Theatre & Theatricality	FRE 141	Selected Topics in French Literature
FRE 133	Gender & Politics in French Literature & Culture	FRE 160	Linguistic Study of French-Language in Context
FRE 140	Study of a Major Writer	FRE 161	Linguistic Study of French: Form & Meaning
FRE 141	Selected Topics in French Literature	FRE 162	History of the French Language
<b>French Culture</b>		<b>Total Units</b>	<b>24</b>
Choose One:			
FRE 107A	Pre- & Early-Modern France		
FRE 107B	The Making of Modern France		
FRE 108	Modern French Culture		
FRE 127	Paris: Modernity & Metropolitan Culture		
FRE 128	Topics in French Culture		
<b>French Linguistics &amp; Language Science</b>			
Choose one:			
FRE 105	Advanced French Grammar		
FRE 109	French Phonetics		
FRE 160	Linguistic Study of French-Language in Context		
FRE 161	Linguistic Study of French: Form & Meaning		
FRE 162	History of the French Language		
<b>French Literature, Language, or Culture</b>			
Choose two electives:			
FRE 101	Introduction to French Poetry		
FRE 102	Introduction to French Drama		
FRE 103	Introduction to French Prose		
FRE 105	Advanced French Grammar		
FRE 107A	Pre- & Early-Modern France		
FRE 107B	The Making of Modern France		
FRE 108	Modern French Culture		
FRE 109	French Phonetics		
FRE 110	Stylistics & Creative Composition		
FRE 115	Medieval French Literature & Society		
FRE 116	The French Renaissance		
FRE 117A	Baroque & Preclassicism		
FRE 117B	The Classical Moment		
FRE 118A	Age of Reason & Revolution		
FRE 118B	Private Lives & Public Secrets: The Early French Novel		
FRE 119A	The Romantic Imaginary		
FRE 119B	Realism, History & the Novel		
FRE 119C	From Baudelaire to Surrealism		
FRE 120	Modern French Thought		
FRE 121	20th-Century French Novel		
FRE 122	French & Francophone Film		
FRE 124	Post-Colonial & Francophone Literature		
FRE 125	French Literature & Other Arts		
FRE 127	Paris: Modernity & Metropolitan Culture		
FRE 128	Topics in French Culture		
FRE 130	From Page to Stage: Theatre & Theatricality		
FRE 133	Gender & Politics in French Literature & Culture		
FRE 140	Study of a Major Writer		

## Italian, Bachelor of Arts

College of Letters & Science

### The Major Program

The major in Italian provides a solid language background that will enable the student to develop an appreciation for the numerous contributions Italians and Italophones have made to literature, the arts, political theory, science, and other expressions of human creativity. The major also emphasizes the influence Italian culture continues to have on our global world.

### The Program

The Italian program is geared to the specific needs and interests of the students, who enjoy the advantages of a small classroom setting and the individualized mentoring of dedicated professors. While the use of Italian is stressed in language and literature courses, the program is interdisciplinary in nature. Starting at the lower division level, students collaborate closely with academic advisors in order to design a major curriculum that includes culture, film, art history, history, food science, and other courses in related fields offered on campus or in Italy. The Italian program actively participates in the UC-wide Education Abroad Program, the Quarter Abroad Program (Florence), the International Internships Program, and the Summer Abroad Program (Rome), all of which offer opportunities for travel and study in Italy.

### Career Alternatives

The Italian Program provides a solid foundation for a variety of career paths by offering training in Italian language and culture and developing skills that are vital in any professional setting: critical analysis, interpersonal skills, effective written and oral communication, and cultural sensitivity. In addition to specific career paths in foreign service and education, knowledge of the Italian language and culture enhances professional opportunities in a variety of fields, such as viticulture and enology, food science, political science, medicine, architecture, and engineering.

### Honors & Honors Program

Candidates for high or highest honors in Italian must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in ITA 194H (3 units) and ITA 195H (3 units). Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of the junior year (135 units), have attained a cumulative grade-point average of 3.500 in courses required for the major will be eligible for the honors program.

### Education Abroad Program

The department strongly encourages students to study abroad in the Summer Abroad program (Rome), the Quarter Abroad Program (Florence),

or the Education Abroad Program. Applicable courses are accepted for credit in the major program.

### Prerequisite Credit

Credit will not normally be given for a course if it is a prerequisite of a course already successfully completed. Exceptions can be made only by the major advisor.

### Quarter Abroad Program

The UC Davis Quarter Abroad Program and the Italian Program offer an exciting Italian Language and Culture Program in Florence, Italy. While studying abroad in Florence, students will earn 16-24 UC Davis quarter units and will experience the richness and vitality of Italian and European culture.

Participants fulfill three-quarters-worth of Italian language study, enroll in culture and film courses, integrate into the Florentine community through meaningful internships (with transcript notation), and explore electives in areas such as art history, fashion, business, and food studies.

There is no language requirement, and all registered UC Davis students with 2.000 GPA and above, good academic standing, and good disciplinary standing are eligible to apply.

For more information, please contact Professor Margherita Heyer-Caput ([mheyercaput@ucdavis.edu](mailto:mheyercaput@ucdavis.edu)) or see Quarter Abroad Italy (<https://globallearning.ucdavis.edu/pathways/academics/studyabroad/qa/italy/>).

### Major Advisor

E. Russell

Code	Title	Units
<b>Preparatory Subject Matter</b>		<b>25-30</b>
ITA 001	Elementary Italian	
ITA 002	Elementary Italian	
ITA 003	Elementary Italian	
<b>OR</b>		
ITA 031 or ITA 031Y	Beginning Italian for Spanish Speakers	
ITA 032 or ITA 032Y	Beginning Italian for Spanish Speakers	
<b>AND</b>		
ITA 021	Intermediate Italian	
ITA 022	Intermediate Italian	
ITA 023	Intermediate Italian	
<b>OR the equivalent.</b>		
<b>Preparatory Subject Matter Subtotal</b>		<b>25-30</b>
<b>Depth Subject Matter</b>		
<i>Four Required Courses</i>		
ITA 101 or ITA 101S	Advanced Conversation, Composition & Grammar	4
ITA 105	Introduction to Italian Literature	4
Two Italian literature courses taught in Italian from two different areas among the following:		8
(a) Medieval Italian:		
ITA 112	Medieval & Renaissance Poetry: St. Francis to Petrarch	

ITA 113	Dante Alighieri, <i>Divina Commedia</i> ( <i>Inferno</i> , <i>Purgatorio</i> , <i>Paradiso</i> )
ITA 114	Boccaccio, <i>Decameron</i> , & the Renaissance Novella
ITA 145	Special Topics in Italian Literature <sup>1</sup>
(b) Renaissance Italian:	
ITA 115A	Studies in the Cinquecento
ITA 115B	Italian Literature of the Renaissance & the Baroque: From Cellini to Marino
ITA 115C	Italian Drama from Machiavelli to the Enlightenment
ITA 115D	Early Modern Italian Lyric
ITA 145	Special Topics in Italian Literature <sup>1</sup>
(c) Modern Italian:	
ITA 118	Italian Literature of the 18th Century
ITA 119	Italian Literature of the 19th Century
ITA 120A	Italian Literature of the 20th Century: The Novel
ITA 120B	Italian Literature of the 20th Century: Poetry & Drama
ITA 145	Special Topics in Italian Literature <sup>1</sup>
<i>Five Elective Courses in Italian Literature, Cinema, or Culture</i>	
To be chosen in consultation with the Italian faculty advisor, from among the following:	20
ITA 104	Italian Translation & Style
ITA 128	Topics in Italian Culture
ITA 131	Autobiography in Italy
ITA 150	Studies in Italian Cinema <sup>2</sup>
ITA 194H	Special Study for Honors Students
ITA 195H	Honors Thesis
Choose one:	
ITA 107	Survey of Italian Culture & Institutions <sup>2</sup>
ITA 107S	Survey of Italian Culture & Institutions <sup>2</sup>
Choose one:	
ITA 108	Contemporary Issues in Italian Culture & Society <sup>2</sup>
ITA 108S	Contemporary Issues in Italian Culture & Society <sup>2</sup>
Choose one:	
ITA 145	Special Topics in Italian Literature <sup>2</sup>
ITA 145S	Special Topics in Italian Literature <sup>2</sup>
Choose one:	
ITA/FMS 121 or FMS/ITA 121	New Italian Cinema <sup>2</sup> New Italian Cinema
Choose one:	
ITA/FMS 121S or FMS/ITA 121S	New Italian Cinema <sup>2</sup> New Italian Cinema
Choose one:	
ITA 141/COM 138 or COM 138/ ITA 141	Gender & Interpretation in the Renaissance <sup>2</sup> Gender & Interpretation in the Renaissance

Up to two of the five electives may be selected from courses in related fields offered in other departments. These must be chosen in consultation with the Italian faculty advisor. Sample courses include:

AHI 178B	Early Italian Renaissance Art & Architecture
AHI 178C	High & Late Italian Renaissance Art & Architecture
ANT 146N	Topics in the Anthropology of Europe
COM 158	The Detective Story as Literature
COM 164A	The European Middle Ages
COM 164B	The Renaissance
COM 167	Comparative Study of Major Authors
FMS 120	Italian-American Cinema
HIS 146A	Europe in the 20th Century
HIS 146B	Europe in the 20th Century

Please note: a maximum of 8 units of coursework in English is allowed for the Italian major.

All upper division courses are to be chosen in consultation with the Italian faculty advisor.

#### Recommended

Study abroad in Italy for a period of one year, one semester, or one quarter, and/or the study of Latin or another Romance Language.

Depth Subject Matter Subtotal	36
Total Units	61-66

<sup>1</sup> If applicable.

<sup>2</sup> Taught in English.

## Italian, Minor

### College of Letters & Science

For more information, please contact Professor Margherita Heyer-Caput ([mheyercaput@ucdavis.edu](mailto:mheyercaput@ucdavis.edu)) or see Quarter Abroad Italy (<https://globallearning.ucdavis.edu/pathways/academics/studyabroad/qa/italy/>).

### Minor Advisor

E. Russell

Code	Title	Units
Three required courses:		
ITA 105	Introduction to Italian Literature	4
ITA 101	Advanced Conversation, Composition & Grammar	4
or ITA 101S	Advanced Conversation, Composition & Grammar	
Choose one Italian literature course taught in Italian:		
ITA 112	Medieval & Renaissance Poetry: St. Francis to Petrarch	
ITA 113	Dante Alighieri, Divina Commedia (Inferno, Purgatorio, Paradiso)	
ITA 114	Boccaccio, Decameron, & the Renaissance Novella	
ITA 115A	Studies in the Cinquecento	
ITA 115B	Italian Literature of the Renaissance & the Baroque: From Cellini to Marino	

ITA 115C	Italian Drama from Machiavelli to the Enlightenment
ITA 115D	Early Modern Italian Lyric
ITA 118	Italian Literature of the 18th Century
ITA 119	Italian Literature of the 19th Century
ITA 120A	Italian Literature of the 20th Century: The Novel
ITA 120B	Italian Literature of the 20th Century: Poetry & Drama
ITA 145	Special Topics in Italian Literature (If applicable.)
Choose two Elective Courses in Italian literature, cinema, or culture in consultation with the Italian faculty advisor. In addition to the literature courses listed above, students may choose:	
ITA 104	Italian Translation & Style
ITA 128	Topics in Italian Culture
ITA 131	Autobiography in Italy
ITA 150	Studies in Italian Cinema <sup>1</sup>
Choose one:	
ITA 107	Survey of Italian Culture & Institutions <sup>1</sup>
ITA 107S	Survey of Italian Culture & Institutions <sup>1</sup>
Choose one:	
ITA 108	Contemporary Issues in Italian Culture & Society <sup>1</sup>
ITA 108S	Contemporary Issues in Italian Culture & Society <sup>1</sup>
Choose one:	
ITA/FMS 121	New Italian Cinema <sup>1</sup>
FMS/ITA 121	New Italian Cinema
ITA/FMS 121S	New Italian Cinema <sup>1</sup>
FMS/ITA 121S	New Italian Cinema
Choose one:	
ITA 141/COM 138	Gender & Interpretation in the Renaissance
COM 138/ITA 141	
Gender & Interpretation in the Renaissance	
Choose one:	
ITA 145	Special Topics in Italian Literature <sup>1</sup>
ITA 145S	Special Topics in Italian Literature <sup>1</sup>
Please note: a maximum of 4 units of coursework in English is allowed for the Italian Minor.	
Total Units	20

<sup>1</sup> Taught in English.

## Gender, Sexuality, & Women's Studies

### College of Letters & Science

Kathryn Olmsted, Ph.D., Interim Department Chair; term ends June 30, 2023

Rana M. Jaleel, M.F.A., J.D., Ph.D., Chair of the Department; term begins July 1, 2023

## Department Office

1200 Hart Hall; 530-752-6429; Gender, Sexuality, & Women's Studies (<http://gsws.ucdavis.edu/>); Faculty (<https://gsws.ucdavis.edu/people/>)

- Gender, Sexuality, & Women's Studies, Bachelor of Arts (p. 243)
- Gender, Sexuality, & Women's Studies, Minor (p. 245)
- Sexuality Studies, Minor (p. 245)

# Gender, Sexuality, & Women's Studies, Bachelor of Arts

College of Letters & Science

## The Major Program

Gender, Sexuality & Women's Studies is an interdisciplinary major founded on the understanding that the social production of gender is inseparable from that of race, sexuality, class, nationality, ability and other categories of difference. Our curriculum places feminist concerns within a transnational context, while respecting the need for geographic and historical specificity. These frameworks inform our teaching, our research, our institutional & community practices, and the principles we bring to our classrooms. Gender, Sexuality & Women's Studies offers a wide range of classes that use the lenses of gender & sexuality studies to examine colonialism and post colonialism, globalization, history, queer & trans experiences, science & technology, literature, popular culture, feminist video production, cinema & digital media, fashion, and food. The Department offers both an undergraduate major and minor. We also work collaboratively with other units on campus to sponsor two undergraduate minors, Sexuality Studies and Social, Ethnic & Gender Relations.

## The Department

One of the most exciting and challenging aspects of the Gender, Sexuality & Women's Studies Department is that students, in consultation with peer and faculty advisors, can pursue their particular academic interests and design their course of study accordingly. In devising their major plan, students will draw on courses offered in African American & African Studies, American Studies, Anthropology, Asian American Studies, Chicana/o Studies, Comparative Literature, English, French, German & Italian Studies, History, Linguistics, Native American Studies, Political Science, Psychology, Science & Technology Studies, Sociology, Spanish, and other related disciplines.

In addition to offering a broad array of courses that deal with gender, class, race, ethnicity, and sexuality, the Gender, Sexuality & Women's Studies Department affords interested students the opportunity to earn internship credit and conduct independent research as well as take advantage of the Honors Thesis option.

Students design a program of study in consultation with an advisor that is in accordance with their individual career goals. Many Gender, Sexuality & Women's Studies majors find it advantageous to pursue a double major, or to minor in another field of study. Upon successful completion of the degree requirements, students majoring in the program will graduate with a Bachelor of Arts in Gender, Sexuality & Women's Studies.

## Career Alternatives

A degree in Gender, Sexuality & Women's Studies opens many possibilities for future employment. The major introduces students to

relevant social issues, fosters critical thinking, develops strong verbal, writing and research skills and encourages social advocacy.

Pre-professional students will discover that a major in Gender, Sexuality & Women's Studies offers useful preparatory training for medical or law school. It is particularly suitable for those interested in specializing in social policy, international development, social justice or gender-related work in a wide range of institutions and contexts. Students who plan to do practical work in counseling, clinical psychology, social services, education, media or politics will also find a major in Gender, Sexuality & Women's Studies provides a strong foundation. Those who wish to pursue graduate level research in such fields as anthropology, comparative literature, cultural studies, economics, education, ethnic studies, English, cinema & digital media studies, history, languages & literatures, performance studies, philosophy, political science, and sociology will also benefit from a strong Gender, Sexuality & Women's Studies background in feminist theory, social analysis, history and a sound understanding of cultural representation and narratives of difference.

Increasingly, media & cultural institutions, corporations, and personnel firms seek to hire specialists in Gender, Sexuality, & Women Studies who are trained in institutional practices that support inclusive practices in recruitment & hiring and that foster diverse workplace environments. State & federal agencies need people who have special understanding of the workplace challenges faced by women, and by all groups who are under-represented in specific industries and professions. Educational institutions and non-profit organizations across the spectrum need specialists to develop and administer gender, sexuality & women's studies programs, multi-cultural community centers, LGBTQ organizations and other organizations designed specifically to deal with gender, social diversity and inequality, and a growing range of old and new social challenges arising in the context of globalization.

Some of our alumni have developed careers other than those described above. Gender, Sexuality & Women's Studies faculty and peer advisors can provide even more ideas about possible future careers. Doing internships related to coursework enables students to integrate theory with hands-on practice and service in the community.

## Graduate Study

The Gender, Sexuality & Women's Studies Department offers a designated emphasis in Feminist Theory & Research for students enrolled in the Ph.D. programs of fifteen other affiliated departments. For more information, see Designated Emphasis in Feminist Theory & Research (<https://gsws.ucdavis.edu/designated-emphasis/>).

## Major Advisor

Advising (<https://gsws.ucdavis.edu/advising/>) is located in 1200 Hart Hall; gsw-advising@ucdavis.edu; 530-752-6429.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Gender, Sexuality &amp; Women's Studies</i>		
GSW 050	Introduction to Critical Gender Studies	4
WMS 060	Feminist Critiques of Western Thought	4
GSW 070	Theory & History of Sexualities	4
One additional lower division GSW/WMS course:		4
Lower-division GSW/WMS courses used to meet this requirement may not duplicate those used to meet other GSW requirements.		

GSW 090X	First Year Seminar		In consultation with the Faculty Advisor & Major Advisor, choose four upper division Gender, Sexuality, & Women's Studies courses (WMS) and two elective courses that can be taken outside of the department (see options below) addressing a specific theme or topic; courses used to meet this requirement may not duplicate those used to meet other GSW Requirements.	24
GSW 098	Directed Group Study			
GSW 099	Special Study for Undergraduates			
WMS 025	Gender & Global Cinema			
Choose one:		4		
AAS 010	African-American Culture & Society		Choose two:	
AAS 017	Women in African Societies		AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America
AMS 021	Objects & Everyday Life		AAS 107C	African Descent Communities & Culture in Asia
AMS 030	Images of America & Americans in Popular Culture		AAS 123	Black Female Experience in Contemporary Society
ANT 002	Cultural Anthropology		AAS 133	The Black Family In America
ANT 020	Comparative Cultures		AAS 181	Hip Hop in Urban America
ANT 030	Sexualities		ANT 126B	Women & Development
ASA 001	Historical Experience of Asian Americans		ANT 128B	Self, Identity, & Family
ASA 002	Contemporary Issues of Asian Americans		ANT 130A	Cultural Dimensions of Globalization
CHI 010	Introduction to Chicana/o Studies		ANT 139AN	Race, Class, Gender Systems
CHI 021S	Chicana/o & Latina/o Health Care Issues		ANT 139BN	Gender & Sexuality
CHI 050	Chicana & Chicano Culture		ASA 112	Asian American Women
COM 012	Introduction to Women Writers		ASA 150	Filipino American Experience
DRA 001	Theatre, Performance & Culture		CHI 100	Chicana/o Theoretical Perspective
ENL 003	Introduction to Literature		CHI 111	Chicanas/Mexicanas in Contemporary Society
HIS 072A	Women & Gender in America, to 1865		CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities
HIS 072B	Women & Gender in America, 1865-Present		CHI 120	Chicana/o Psychology
HIS 085	Nature, Man, & the Machine in America		CHI 122	Psychology Perspectives Chicana/o & Latina/o Family
NAS 010	Native American Experience		CHI 130	United States-Mexican Border Relations
NAS 032	Native American Music & Dance		CHI 131	Chicanas in Politics & Public Policy
POL 007	Contemporary Issues in Law & Politics		CHI 131S	Chicanas in Politics & Public Policy
PSC 001 or PSC 001Y	General Psychology		CHI 150	The Chicana & Chicano Movement
	General Psychology		CHI 154	The Chicana/o Novel
STS 001	Introduction to Science, Technology & Medicine Studies		CHI 160	Mexican Film & Greater Mexican Identity
STS/HIS 002 or HIS/STS 002Y	Introduction to the History of Science & Technology		CHI 170	Contemporary Issues in Chicano Art
	Introduction to the History of Science & Technology		CHI/ART 171	Mexican & Chicano Mural Workshop
STS/ANT 032	Drugs, Science & Culture		CHI 182	Race & Juvenile Justice
SOC 002	Self & Society		COM 135	Women Writers
SOC 003	Social Problems		COM 138/ITA 141	Gender & Interpretation in the Renaissance
SOC 011	Sociology of Labor & Employment		COM 159	Women in Literature
WMS 020	Cultural Representations of Gender		DES 143	History of Fashion
WMS 080	(Discontinued)		ENL 155B	19th-Century British Novel
Preparatory Subject Matter Subtotal		20	ENL 166	Love & Desire in Contemporary American Poetry
<b>Depth Subject Matter</b>			ENL 185A	Literature by Women Before 1800
<i>Gender, Sexuality, &amp; Women's Studies</i>			ENL 185B	Literature by Women from 1800-1900
GSW 103	Introduction to Feminist Theory	4	ENL 186	Literature, Sexuality, & Gender
WMS 104	Feminist Research	4	FMS 120	Italian-American Cinema
WMS 137	Contemporary Debates in Western Feminist Theory	4	FMS/RUS 129	Russian Film
WMS 170	Queer Studies	4	FRE 124	Post-Colonial & Francophone Literature
WMS 190	Senior Seminar (Discontinued)	4	GER 114	From Marlene Dietrich to Run, Lola Run: German Women & Film
<i>Thematic Track</i>				

GER 168	Multiculturalism in German Literature
GER/FMS 176A	Classic Weimar Cinema
HIS 102M	Undergraduate Proseminar in History: United States Since 1896
HIS 148A	Women & Society in Europe: 1500-1789
HIS 148B	Women & Society in Europe: 1789-1920
HIS 159	Women & Gender in Latin American History
HIS 160	Spain & America in the 16th Century
HIS 184	History of Sexuality in America
HIS 193A	History of the Modern Middle East, 1750-1914
HIS 193B	History of the Modern Middle East, From 1914
HIS 193C	The Middle East Environment: Historical Change & Current Challenges
LIN 163	Language, Gender, & Society
NAS 134	Race, Culture, & Nation
NAS 135	Gender Construction in Native Societies
NAS 180	Native American Women
POL 166	Women in Politics
PSC 158	Sexual Orientation & Prejudice
PSC 159	Gender & Human Reproduction
RST 157	Hindu Women & Goddesses
RST 161	Modern Islam
SOC 131	The Family
SOC 133	Sexual Stratification & Politics
SOC 145B	Gender & Rural Development in the Third World
STS/ANT 129	Health & Medicine in a Global Context
STS 150	Gender & Science
Depth Subject Matter Subtotal	44
Total Units	64

## Gender, Sexuality, & Women's Studies, Minor

College of Letters & Science

### The Minor

The minor in Gender, Sexuality, & Women's Studies provides an interdisciplinary understanding that the social production of gender is inseparable from that of race, sexuality, class, nationality, ability and other categories of difference. Our curriculum places feminist concerns within a transnational context, while respecting the need for geographic and historical specificity. These frameworks inform our teaching, our research, our institutional & community practices, and the principles we bring to our classrooms. Gender, Sexuality, & Women's Studies offers a wide range of classes that use the lens of gender to examine colonialism and post colonialism, globalization, history, sexuality, queer theory, literature, popular culture, feminist video production, area studies, film fashion and food.

### Minor Advising

Gender, Sexuality & Women's Studies Advising (<https://gsws.ucdavis.edu/advising/>) is located at 1200 Hart Hall; gsw-advising@ucdavis.edu or 530-752-6429.

Code	Title	Units
Choose one:		4
GSW 050	Introduction to Critical Gender Studies (Required)	
Choose any five upper division Gender, Sexuality & Women's Studies (GSW) courses.		20
	Gender, Sexuality & Women's Studies (GSW) (p. 860)	
<b>Total Units</b>		<b>24</b>

## Sexuality Studies, Minor

College of Letters & Science

### The Minor

Sponsored by the Gender, Sexuality & Women's Studies Department (p. 242), the interdisciplinary minor in Sexuality Studies offers students a unique opportunity to study the concept of sexuality—including sexual identities, desires, and practices—by examining its changing meanings and effects across different political, historical, and cultural landscapes. At UC Davis, Sexuality Studies pays particular attention to how gender, race, class, nation, empire, colonialism, and globalization shape popular understandings of sexuality, and how these understandings of sexuality in turn affect social, political, and economic relations of power.

Sexuality Studies Minor (<https://gsws.ucdavis.edu/sexuality-studies-minor/>)

### Minor Advising

Gender, Sexuality & Women's Studies Advising (<https://gsws.ucdavis.edu/advising/>), 1200 Hart Hall; 530-752-6429.

Code	Title	Units
WMS 170	Queer Studies	4
<i>Electives</i>		
Choose two:		7-8
ANT 139BN	Gender & Sexuality	
ENL 186	Literature, Sexuality, & Gender	
HIS 184	History of Sexuality in America	
HDE 012	Human Sexuality	
PSC 158	Sexual Orientation & Prejudice	
GSW 070	Theory & History of Sexualities	
Choose two Field B courses (below) or seminars/individual study by petition to achieve a total of 18-20 units:		8
ASA 112	Asian American Women	
CHI 160	Mexican Film & Greater Mexican Identity	
ENL 166	Love & Desire in Contemporary American Poetry	
HIS 132	Crime & Punishment in Early Modern Europe	
POL 152	The Constitutional Politics of the Equality	
SOC 120	Deviance	
WMS 140	Gender & Law	

WMS 179	(Discontinued)
Total Units	19-20

## Restrictions

- A. Students may take no more than one lower division course to satisfy requirements for the minor.
- B. To satisfy the interdisciplinary component of the minor, students must either split their coursework roughly equally between two programs/departments or take coursework in at least three programs/departments.
- C. Students may petition the minor advisor to accept Special Topics courses and Capstone/Senior Seminars as additional courses, as long as their course of study follows the minor's lower-division restriction and interdisciplinary requirements.
- D. Students may petition the minor advisor to accept up to 4 units of registered individual study, group study or internship towards the minor program, as long as their course of study follows the minor's lower-division restriction and interdisciplinary requirements.

## Geography (Graduate Group)

College of Agricultural & Environmental Sciences

Diana Davis, D.V.M., Ph.D., Chairperson of the Group

### Group Office

Carrie Armstrong-Rupert ([caruport@ucdavis.edu](mailto:caruport@ucdavis.edu)), Student Affairs Officer; 129 Hunt Hall; 530-752-4119; Geography (<http://geography.ucdavis.edu>); Faculty (<http://geography.ucdavis.edu/people/faculty/>)

- Geography, Master of Arts (p. 246)
- Geography, Doctor of Philosophy (p. 246)

## Geography, Master of Arts

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Geography (GGG) offers programs of study and research leading to M.A. and Ph.D. degrees. Faculty and students share a common interest in spatial interaction between humans and the biophysical environment. The wide faculty interests attract a diverse set of students in such areas as biogeography, urban forestry and related natural science and engineering fields, as well as human geography and related social science fields. A number of faculty members use and teach geographic information systems, remote sensing, and related geographic techniques, and most have a strong field orientation. The strengths of the Davis campus and its faculty enable the program to focus on important issues including people, place and power, community and regional identity and change, people-environment interaction, agricultural sustainability, landscape architecture, environmental change, biogeography, natural resource management, and technological innovations in computing and the use of geographic information systems. Students are mentored by faculty across the many colleges of the university.

### Preparation

Most students considered for admission will have an undergraduate major in geography or in a closely related field. Generally, a student without an undergraduate degree in geography will be required to

complete the equivalent of a minor in geography, consisting of one course each in human geography, physical geography and geographic methods, plus any additional undergraduate coursework required as background for the student's research emphasis, as determined by the student's guidance committee.

### Graduate Advisors

Gwen Arnold (Environmental Science & Policy), Mary Cadenasso (Plant Sciences), Mark Cooper (Human Ecology), Ryan Galt (Human Ecology), Lynette Hart (VM Population Health & Reproduction), Erwan Monier (LAWR)

## Geography, Doctor of Philosophy

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Geography (GGG) offers programs of study and research leading to M.A. and Ph.D. degrees. Faculty and students share a common interest in spatial interaction between humans and the biophysical environment. The wide faculty interests attract a diverse set of students in such areas as biogeography, physical geography, political ecology, environmental policy and management, urban design, coupled human and natural systems, as well as human geography and related social science fields. A number of faculty members use and teach geographic information systems, remote sensing, and related geographic techniques, and most have a strong field orientation. The strengths of the Davis campus and its faculty enable the program to focus on important issues including people, place and power, community and regional identity and change, people-environment interaction, agricultural sustainability, landscape architecture, environmental change, biogeography, natural resource management, and technological innovations in computing and the use of geographic information systems. Students are mentored by faculty across the many colleges of the university.

### Preparation

Most students considered for admission will have an undergraduate major in geography or in a closely related field. Generally, a student without an undergraduate degree in geography will be required to complete the equivalent of a minor in geography, consisting of one course each in human geography, physical geography and geographic methods, plus any additional undergraduate coursework required as background for the student's research emphasis, as determined by the student's guidance committee.

### Graduate Advisors

Gwen Arnold (Environmental Science & Policy), Mary Cadenasso (Plant Sciences), Mark Cooper (Human Ecology & Animal Science), Ryan Galt (Human Ecology), Lynette Hart (VM Population Health & Reproduction), Erwan Monier (LAWR)

## German & Russian

College of Letters & Science

Jenny Kaminer, Ph.D., Chairperson

### Department Office

German & Russian; 215 Sproul Hall; 530-752-1219; German (<http://german.ucdavis.edu>); Faculty (<http://german.ucdavis.edu/>

faculty/) – Russian (<http://russian.ucdavis.edu>); Faculty (<https://russian.ucdavis.edu/faculty/>)

- German, Bachelor of Arts (p. 247)
- German, Minor (p. 248)
- German, Master of Arts (p. 248)
- German, Doctor of Philosophy (p. 248)
- Russian, Bachelor of Arts (p. 249)
- Russian, Minor (p. 249)

## German, Bachelor of Arts

College of Letters & Science

### The Major Program

The German major explores in depth the literature and language, the culture, history, politics, and commerce of the German-speaking world (primarily Germany, Austria and Switzerland). The key to the major lies in the careful balance between solid core requirements and the possibility to explore German subject areas through the lens of other disciplines, such as music, art, philosophy, history, and economics.

### The Program

The department offers courses that highlight literary figures, movements and themes. These courses form the core of upper division literature electives, but we also offer courses that discuss contemporary culture, history, politics, and commerce in German-speaking countries. Regardless of emphasis, students will find maximum practice in spoken and written German as well as in listening comprehension in all upper division courses offered in German.

### Career Alternatives

Completion of the major prepares students for graduate study in German or for career opportunities in international fields ranging from employment in business and government to careers in the fine arts and sciences. Also, it permits admission to professional schools such as law and medicine.

### Honors & Honors Program

The honors program consists of two quarters of research (194H) terminating in an honors thesis. For details consult the undergraduate major advisor. Graduation with high or highest honors requires participation in the honors program.

### Graduate Study

The Department offers programs of study and research leading to the M.A. degree and to the Ph.D. degree in German Literature. Additional degree options for a designated emphasis are available through departmental affiliations with the programs in Social Theory & Comparative History, Critical Theory, Feminist Theory & Research, and Second Language Acquisition. Detailed information may be obtained by writing to the Department Chairperson or the Graduate Advisor.

### Graduate Advisor

Jaimey Fisher

### Prerequisite Credit

Credit normally will not be given on the lower division level for a course that is the prerequisite of a course already successfully completed.

### Major Advisor

Elisabeth Krimmer

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Elementary German</i>		
Choose 0-15 units:		0-15
GER 001	Elementary German	
GER 002	Elementary German	
GER 003	Elementary German	
or the equivalent		
<i>Intermediate German</i>		
Choose 0-12 units:		0-12
GER 020	Intermediate German	
GER 021	Intermediate German	
GER 022	Intermediate German	
Preparatory Subject Matter Subtotal		
0-27		
<b>Depth Subject Matter</b>		
GER 101A	Survey of German Literature, 800-1800	4
GER 101B	Survey of German Literature, 1800-Present	4
GER 103	Writing Skills in German	4
GER 118E	Contemporary German Culture	4
or GER 120	Survey of German Culture	
Choose four courses from upper division offerings taught in German:		16
GER 104	Translation	
GER 105	The Modern German Language	
GER 109A	Business German	
GER 109B	Advanced Business German	
GER 121	The Medieval Period in German Literature	
GER 122	Reformation & Baroque	
GER 123	Literature of the Classical Age	
GER 124	Major Movements in German Literature	
GER 125	Short Fiction: 1880-1914	
GER 126	Modern German Literature	
GER 127	Major Writers in German	
GER 129	Postwar Women Writers	
GER 131	German Lyric Poetry	
GER 132	The German Novelle	
GER 133	The German Drama	
GER 134	Topics in German Intellectual History	
GER 143	Language Through Media	
GER 160	Love in the Middle Ages	
GER 168	Multiculturalism in German Literature	
GER 185	The Age of Bismarck	
Choose three additional upper division courses from:		12
GER 112	Topics in German Literature	
GER 113	Goethe's Faust	
GER 114	From Marlene Dietrich to Run, Lola Run: German Women & Film	
GER 115	German Literature Since 1945	
GER/JST 116	Readings in Jewish Writing & Thought in German Culture	

GER 117	After the Catastrophe: Jews & Jewish Life in Post-1945 Germany	Note: Many of the above electives from other disciplines have prerequisites. The total of 44 upper division units may include units earned in the Education Abroad Program.
GER 118A	Vienna at the Turn of the 20th Century (The End of the Habsburg Empire)	Depth Subject Matter Subtotal
GER 118B	Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism	44
GER 118C	Germany Under the Third Reich	Total Units
GER 119	From German Fiction to German Film	44-71
GER 141	The Holocaust & its Literary Representation	
GER/FMS 142	New German Cinema	
GER/HUM 144	Marx, Nietzsche, Freud	
GER 160	Love in the Middle Ages	
GER 168	Multiculturalism in German Literature	
GER/FMS 176A	Classic Weimar Cinema	
GER 185	The Age of Bismarck	
GER 192	Field Work in German	
GER 194HA	Honors Program	
GER 194HB	Honors Program	
GER 197T	Tutoring in German	
GER 198	Directed Group Study	
Courses in other disciplines that focus on German history, thought, and culture, upon approval of the major advisor.		
<b>Electives</b>		
Electives include, but are not limited to:		
AHI 176C	Art of the Middle Ages: Gothic	
COM 138/ITA 141	Gender & Interpretation in the Renaissance	
COM 140	Thematic & Structural Study of Literature	
COM 141/CRI 101	Introduction to Critical Theoretical Approaches to Literature & Culture	
COM 142	Critical Reading & Analysis	
COM 147	Modern Jewish Writers	
ECN 110B	World Economic History Since the Industrial Revolution	
ECN 116	Comparative Economic Systems	
ECN 160A	International Microeconomics	
ECN 160B	International Macroeconomics	
ECN 162	International Economic Relations	
FMS/GER 142	New German Cinema	
FMS/GER 176A	Classic Weimar Cinema	
FMS 176B	Postwar German Cinema	
HIS 142A & HIS 142B	History of the Holocaust and The Memory of the Holocaust	
HIS 144A & HIS 144B	History of Germany, 1450 to 1789 and History of Germany since 1789	
MUS 110A	The Musical World of Beethoven	
MUS 110C	The Musical World of J. S. Bach	
MUS 110E	The Musical World of an 18th-Century Composer	
PHI 170	Spinoza & Leibniz	
PHI 175	Kant	
POL 117	Topics in the History of Political Thought	
POL 118C	History of Political Theory: Late Modern	
POL 137	International Relations in Western Europe	

## German, Minor

### College of Letters & Science

The Department offers a German minor consisting of at least 20 upper division units of courses taught in German. Students wishing to minor in German should consult the undergraduate advisor.

### Prerequisite Credit

Credit normally will not be given on the lower division level for a course that is the prerequisite of a course already successfully completed.

Code	Title	Units
Choose at least 20 upper division units of courses taught in German.		20
German (GER) (p. 881)		
Total Units		20

## German, Master of Arts

### College of Letters & Science

### Department Office

German & Russian; 210 Sproul Hall; 530-752-2239; German (<http://german.ucdavis.edu>)

### Graduate Study

The Department offers programs of study and research leading to M.A. and Ph.D. degrees in German Literature. Additional degree options for a designated emphasis are available through departmental affiliations with the programs in Social Theory & Comparative History, Critical Theory, Feminist Theory & Research, and Second Language Acquisition. Detailed information may be obtained by writing to the Department Chairperson or the Graduate Advisor.

### Graduate Advisor

Sven-Erik Rose

## German, Doctor of Philosophy

### College of Letters & Science

### Department Office

German & Russian; 210 Sproul Hall; 530-752-2239; German (<http://german.ucdavis.edu>)

### Graduate Study

The Department offers programs of study and research leading to M.A. and Ph.D. degrees in German Literature. Additional degree options for a designated emphasis are available through departmental affiliations with the programs in Social Theory & Comparative History, Critical Theory, Feminist Theory & Research, and Second Language Acquisition. Detailed

information may be obtained by writing to the Department Chairperson or the Graduate Advisor.

## Graduate Advisor

Sven-Erik Rose

# Russian, Bachelor of Arts

College of Letters & Science

## The Major Program

The Russian major introduces students to a culture rich in art, music, theater, film, language, and literature. The major offers an opportunity to learn skills needed to enter the fields of foreign affairs, world politics, and international trade, or to begin graduate work in literature, history, cultural studies and international relations.

## The Program

The major program instructs students in speaking, understanding, reading, and writing the Russian language. The program also acquaints students with the intellectual and cultural contributions of the Russian world through the study of its literature, traditions, and institutions.

## Internships & Career Alternatives

Russian majors may participate in internships where they can serve as translators and interpreters for schools and business firms throughout Northern California. Upon graduation, many Russian majors enter the business world or enter graduate programs in Slavic studies and international relations. The program encourages students to supplement their Russian studies with courses in related fields such as international relations, political science, computer science, cultural studies, or economics in order to maximize their career possibilities.

## Honors & Honors Program

The honors program comprises at least one quarter of study under course 194H, which will include a research paper. For details, consult the major advisor.

## Study Abroad

Students who have completed one or two years of Russian language study can participate in the Education Abroad Program (EAP) in Moscow. Many of our students also participate in summer, semester, and yearlong programs sponsored by CIEE and ACTR in St. Petersburg and Moscow.

## Prerequisite Credit

Credit normally will not be given for a course if that course is the prerequisite for a course already completed.

## Course Placement

Students who have learned Russian at home must consult the department for placement instructions. Students with two years of Russian in high school normally continue in RUS 002; those with three years, RUS 003; those with four years, RUS 004.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose 0-27 units:		0-27
RUS 001	Elementary Russian	
RUS 002	Elementary Russian	
RUS 003	Elementary Russian	

RUS 004	Intermediate Russian	
RUS 005	Intermediate Russian	
RUS 006	Intermediate Russian	
<b>OR the equivalent.</b>		
<b>Preparatory Subject Matter Subtotal</b>		0-27
<b>Depth Subject Matter</b>		
RUS 101A	Advanced Russian	4
RUS 101B	Advanced Russian	4
RUS 101C	Advanced Russian	4
Choose one:		4
RUS 102	Russian Composition	
RUS 103	Literary Translation	
RUS 105	Advanced Russian Conversation	
Additional upper division units chosen in consultation with advisor from the following selection of Literature and Culture courses taught in Russian and English.		20
RUS 120	Topics in Russian Literature & Culture	
RUS 122	19th-Century Russian Literature	
RUS 124	20th-Century Russian Literature	
RUS 126	The Russian Theater	
RUS/FMS 129	Russian Film	
RUS 130	Contemporary Russian Culture	
RUS 133	Post-Soviet Literature	
RUS 139	Pushkin	
RUS 140	Dostoevsky (in English)	
RUS 141	Tolstoy (in English)	
RUS 142	Women in Russian Culture	
RUS 143	Chekhov (in English)	
RUS 150	Russian Culture	
The elective upper division courses in English can be satisfied in part by one or more courses in History, Political Science, Comparative Literature and other departments after consultation with, and prior approval of, the major advisor.		
The total of 36 upper division units may include units earned in the Education Abroad Program.		
<b>Depth Subject Matter Subtotal</b>		36
<b>Total Units</b>		<b>36-63</b>

# Russian, Minor

College of Letters & Science

Code	Title	Units
RUS 101A	Advanced Russian	4
RUS 101B	Advanced Russian	4
RUS 101C	Advanced Russian	4
Choose 8 units of other upper division Russian (RUS) courses.		8
Russian (RUS) courses. (p. 1305)		
<b>Total Units</b>		<b>20</b>

## Global Learning Hub

College of Letters & Science

Aliki Dragona, Ph.D., Faculty Director, Academic Programs

Zachary Frieders, Executive Director

Global Learning Hub  
International Center, Suite 1120  
530-752-5763; Fax 530-752-4151; [globallearning@ucdavis.edu](mailto:globallearning@ucdavis.edu); Global Learning Hub (<http://globallearning.ucdavis.edu/>)

Through the Global Learning Hub, each and every UC Davis student can find global learning opportunities available on campus, in the region, virtually and internationally. The Hub offers global learning programs, workshops, and resources that enhance all UC Davis students' academic and career pursuits through four broad areas of opportunities: Community Engagement, Global Skills & Leadership, Internships & Research, and Study Abroad. UC Davis is committed to preparing the next generation of global problem-solvers and change-makers. As such, we aim to prepare our undergraduate, graduate, and professional students to solve global challenges collaboratively, equitably and sustainably.

The Global Learning Hub helps students navigate global learning opportunities that fit their academic, personal, and professional interests, including fit with academic schedules and requirements. Additionally, the Hub provides students with programmatic and funding resources, including two online search tools and financial aid workshops. The Global Learning Hub also administers the Global Studies (GS) minor.

## Community Engagement

Through community-engaged global learning programs, students develop skills to work with communities in person or remotely to deepen their understanding of a local context, history, and complexities of local challenges that have a global impact. The communities and local leaders are the drivers of the projects. Students work with and learn from the local community and help develop long-term sustainable solutions. These programs stand-alone or can be found within study abroad, internship, and research opportunities.

## Global Skills & Leadership

Global skills and leadership programs provide students with the opportunity to develop professional skills and career readiness important for students' post-academic endeavors. Intercultural learning is also woven throughout these opportunities, offering students a chance to self-reflect on their own identities and individual experiences.

## Internships & Research

The internship and research programs offered through the Global Learning Hub provide students with the opportunity to apply global concepts learned through experience and help students develop career enhancement skills they can apply on a resume, LinkedIn profile, and during interviews. In addition to for-credit and funded internships and research, the Global Learning Hub provides resources and support for students to continue global engagement after graduation.

## Study Abroad

UC Davis Study Abroad integrates global opportunities into the academic experience, supporting 1,300 students each year in studying across 30 countries, exploring the world, and gaining valuable skills and competencies. In the quest for Global Education for All, Study Abroad goes beyond traditional programs to meet the academic, personal and professional needs of UC Davis' diverse and driven student body.

Financial aid and scholarships apply. Applicants must have a 2.000 GPA, be in good academic and disciplinary standing, and must fulfill any prerequisites specific to the program courses.

## Types of Study Abroad Programs

### UC Davis Quarter Abroad

#### Academic Focus

Students can earn 12-28 UC Davis quarter units through 3-6 courses taught abroad or away. Academic focus varies by program and may include subject area courses, language learning, lab work, internship/field work, and/or practical training experience. Programs range in length from 10 to 16 weeks. UC Davis faculty leaders teach one or more of the courses of the program, while other courses may be taught or co-taught by adjunct faculty of the host country, under supervision by UC Davis faculty. Students may be able to apply earned units towards their major, minor, language, or general education requirements.

### UC Davis Summer Abroad

#### Academic Focus

Students earn 8 UC Davis quarter units through two courses taught abroad or away. All courses are taught by UC Davis faculty, sometimes with select supplemental lectures provided by local experts, or by local faculty in Partnership programs. Planned group activities and field trips enhance classroom instruction. Students may be able to apply earned units towards their major, minor, or general education requirements. Programs allow students to complete coursework in English in a wide variety of non-English-speaking locations.

### UC Davis Internships Abroad

#### Academic Focus

Students earn 6 or more UC Davis units for internship hours and supplemental instruction. Internship programs are structured around thematic areas of study such as Global Health, Engineering, Business and Communication, and many others. Placements are a collaboration between international organizations, the Global Learning Hub, and the UC Davis Internship and Career Center to ensure the internships meet requirements for credit and relevance to the subject area. In addition to internship hours worked, students will take an online course taught by UC Davis faculty that places their internship in a broader social and cultural context. Planned group activities and field trips enhance the formal internship work. Students may be able to apply earned units towards their major, minor, or general education requirements. Most placements are in English-speaking environments; some programs require language proficiency.

### UC Davis Summer Virtual Internships

#### Academic Focus

Students earn 6 or more UC Davis units for internship hours and supplemental instruction. Virtual internship programs are structured around thematic areas of study such as Business and Communication, Engineering and Computer Science, Environment, Green Tech, and Sustainability, and many others. Virtual internships allow students to earn UC Davis internship credit while also gaining cross-cultural and professional work experience in diverse fields without the need to travel. In addition to internship hours worked, students will take an online course taught by UC Davis faculty that places their internship in a broader social and cultural context. Students may be able to apply earned units towards their major, minor, or general education requirements. Most placements are in English-speaking environments.

## **UC Davis Intensives Abroad**

### **Academic Focus**

Students earn 2-8 UC Davis units through one or more courses taught abroad or away. These short courses are taught by UC Davis faculty and may be offered as stand-alone programs or as an international component to a course taught during a regular term on campus. A heavy focus on field trips, onsite projects and group activities enhances classroom instruction. Students may be able to apply earned units toward their major, minor, or general education requirements. Programs are typically offered in the summer or during the winter break.

## **UC Davis Exchanges**

### **Academic Focus**

UC Davis Exchanges are department-based undergraduate exchanges that leverage new or preexisting working/research relationships among faculty to promote student mobility between institutions. UC Davis faculty and departments identify courses at the partner institution that are taught in English and can be converted into course equivalents at UC Davis. Students enroll in at least 12-15 units of advisor-approved course equivalents for each quarter they are on UC Davis Exchanges. Exchanges may be for 1, 2, or 3 academic quarters and are built around a specific thematic academic program.

## **UC Education Abroad Program (UCEAP)**

Aliki Dragona, Ph.D., Faculty Director

Global Learning Hub

International Center, Suite 1120; 530-752-5763; Fax 530-752-4151

The UC Education Abroad Program (UCEAP) is one of the premier study abroad programs in the nation. UCEAP offers international study programs in association with nearly 140 host universities and institutions in some 32 countries around the world. Participating students remain registered at UC while studying abroad and receive full academic credit for their work. UCEAP students maintain their financial aid and scholarship eligibility while abroad. UCEAP has study abroad opportunities for undergraduates at all class levels as well as for qualified graduate students who have completed at least one full year of graduate work and have the support of their graduate program and graduate dean.

UCEAP offers year, semester, quarter and summer programs for all majors. Over 50% of the programs are offered in English, while several programs allow students to learn a language while experiencing the culture first hand. Some programs include the possibility of internships or field research. In most cases, students attend courses taught by the faculty of the host institution.

UC faculty members serve as directors at most Study Centers abroad, providing in-country academic advising to students during their program. Full UC credit is granted for courses satisfactorily completed, and courses and grades are recorded on official UC transcripts. With careful planning, most UCEAP students make normal progress toward their UC degrees, even those students who study abroad for a full year. With approval of their major or college advisors, students may earn credit towards their major, minor and general education requirements.

**Graduation Requirements:** UCEAP prospective applicants, particularly students who intend to study abroad during their senior year, should carefully plan their course programs for Davis and abroad in order to satisfy university, college, and major/minor requirements for their degree.

Although units and grade points earned while studying abroad through UCEAP are incorporated into the University transcript and GPA,

departments and majors retain the right to determine which UCEAP courses will be accepted in satisfaction of major and minor requirements.

All degree candidates must meet the University residence requirement. Recognizing the special value of study abroad, the faculty have approved two exceptions to the usual residence requirement for students participating on UCEAP.

- Students planning to graduate immediately upon completion of their UCEAP program may satisfy the University residence requirement by completing at least 35 of their final 45 units on the Davis campus preceding entry into UCEAP,  
**or**
- Students should consult with their college Dean's office early during the UCEAP planning process for information on the university residence requirement.

Students may satisfy GE requirements while on UCEAP, but should consult with the Global Learning Hub and their college Dean's office prior to departure for information on the certification process.

Participants may only return to campus from UCEAP to complete any outstanding degree requirements. Participants who satisfy all degree requirements while abroad and expect to graduate upon completion of the term abroad should file for candidacy to receive their degree the term following program participation; candidacy filing dates are established by the Office of the University Registrar. In most cases, transcripts from abroad may not be received in time to be posted on the students' Davis transcript for UCEAP returnees to be included on the degree list for the term they are abroad. Such returning students may register to participate in the commencement ceremony; however, their graduation date will be listed as the following term.

- Global Studies, Minor (p. 251)

## **Global Studies, Minor**

### **College of Letters & Science**

The minor is overseen by the Global Studies Minor Committee. For more information, see Global Studies Minor (<https://globallearning.ucdavis.edu/resources/gs/>).

The interdisciplinary minor in Global Studies (20-24 units) will enable students across disciplinary areas to learn about global issues as well as to gain first-hand experience both locally and internationally through academic coursework and experiential learning. The minor can be completed with or without international travel. A combination of coursework and experiential learning will allow students to develop capacities in three areas: global awareness, global diversity, and global action. As they develop global awareness, students will examine actions and relationships that influence global systems from multiple perspectives, analyzing how complex systems impact self and others. To engage global diversity, they will explore complex dimensions of diversity, equity, and inclusion around the world, including language, culture, and identity. To translate knowledge into global action, they will learn to create strategies to apply knowledge, skills, and abilities to collaboratively and equitably foster global well-being and resilience.

Students will be expected to work closely with an academic advisor in developing an intellectually coherent global learning program. Each student's program must be approved by the student's advisor

and by the Faculty Director of the Global Learning Hub (<https://globallearning.ucdavis.edu/>).

Students must meet with a Global Studies Minor advisor and complete a Global Learning Cluster Worksheet to demonstrate subject interrelatedness. The advisor must approve all courses and credited experiential learning to be counted toward the minor. If it is not feasible for a student to complete the gateway course, the advisor can approve an appropriate substitution. Students will work with the advisor to create a digital portfolio that documents their global learning, which can be shared when pursuing postgraduate employment and/or education.

## Restrictions

No more than two courses from a single UC Davis Department may satisfy the minor requirements. This will guarantee an interdisciplinary program of study. All courses used towards the minor other than the Gateway Course, EAP 001, must be upper division.

## Foreign and/or Heritage Language Study

Students are strongly encouraged to study a foreign and/or heritage language. As specified above, only upper-division coursework in languages may be used to fulfill the minor.

Students will work with the advisor to create a digital portfolio that documents their global learning, which can be shared when pursuing postgraduate employment and/or education.

Code	Title	Units
<i>Gateway Course</i>		
EAP 001	Global Thinking	4
<i>Global Learning Cluster</i>		
Choose one:		12-16
Thematic (Global Theme)		
OR		
Regional (Area of the World)		
One of the above courses can be replaced by a course in the study of an upper-division foreign language and/or heritage language that relates to the chosen thematic or regional focus. Up to 8 units can be substituted by for-credit experiential learning and/or internship with a global dimension. One of the above courses can be replaced by a course in the study of an upper-division foreign language and/or heritage language that relates to the chosen thematic or regional focus.		
Up to 8 units can be substituted by for-credit experiential learning and/or internship with a global dimension.		
Note: A minimum of 8 units of classroom-based courses will satisfy Requirement 2 when combined with 4-8 units of experiential learning or internships. The variation in experiential or internship units intentionally accounts for variability in units when students pursue internships or other forms of experiential global learning. The Global Studies Minor advisor guides students and approves variable units. When no experiential learning option is pursued, a minimum of 12 classroom units will satisfy the Global Learning Cluster.		
<i>Capstone Experience</i>		
Choose an Option:		4
Option 1: 4 units of experiential or internship learning with a global dimension.		

Option 2: A globally-focused seminar from UC Davis offerings.

Total Units

20-24

## Health Informatics (Graduate Group)

### Graduate Studies

Nicholas Anderson, Ph.D., Chair

### Group Office

UC Davis Health Informatics Program; 2570 48th St., Suite 1200, Sacramento, CA 95817; 916-734-8710; Health Informatics Graduate Group ([healthinformatics@ucdavis.edu](mailto:healthinformatics@ucdavis.edu)); Faculty ([http://www.ucdmucdavis.edu/informatics/our\\_team/graduate\\_group\\_faculty/](http://www.ucdmucdavis.edu/informatics/our_team/graduate_group_faculty/))

For program inquiries, contact [healthinformatics@ucdavis.edu](mailto:healthinformatics@ucdavis.edu).

- Health Informatics, Master of Science (p. 252)

## Health Informatics, Master of Science

### Graduate Studies

### Graduate Study

The Master's degree program seeks to train the next generation of researchers, clinicians and leaders to advance the science of Health Informatics. Successful applicants have backgrounds in health, biology, technology, computer or information science, and are enthused to develop new knowledge, systems and models that can improve health and be translated into practice.

The program of study provides research-oriented applied and theoretical training that spans the use of computer systems and information organization in medicine today, including methods for clinical data acquisition, data modeling, and interoperability, to design and evaluation of representations of clinical and personal data in hospital and consumer environments. The program emphasizes the development and application of new methods that leverage the electronic medical record and advance computer-aided decision support. A research project and thesis are mandatory degree requirements.

### Preparation

The Group encourages applications from clinicians, healthcare IT professionals, recent graduates and researchers who have had experience and interest in the access, linkage and knowledge generation from healthcare data.

### Clinical Professionals

Demonstrated through a completed baccalaureate or higher-level coursework, work experience, or clinical focus:

- Successful completion of Clinical Education
- Working experience in digital health technology, ideally through computer or information science and programming.

### Healthcare Information Technology Professionals

Demonstrated through completed baccalaureate, or higher-level coursework, and aligned professional experience:

- A. Working experience in Healthcare IT, biotechnology, public health or similar experience.
- B. Knowledge and enthusiasm in the study of Human health, ideally with disease or system-specific expertise.
- C. Knowledge of clinical or medical systems or data representations

#### **Recent Graduates**

Demonstrated through a completed baccalaureate or higher-level coursework:

- A. Knowledge and expertise in biology, pre-health studies, socio-technology studies, information science and/or computer science.

#### **Researchers**

Demonstrated through completed coursework, baccalaureate or higher degrees, personal research experience:

- A. Applied background in computer science, information science, data science, biology or related field.
- B. Domain experience in health information or biology research.

#### **Graduate Advisor**

Mark Carroll (Public Health Sciences)

## **Hemispheric Institute of the Americas**

#### **College of Letters & Science**

Juan Diego Díaz, Ph.D., Program Director; July 1, 2023-June 30, 2025.

#### **Program Office**

Hemispheric Institute of the Americas, 1277 Social Sciences & Humanities Building; 530-752-3046; Hemispheric Institute of the Americas (<http://hia.ucdavis.edu>); Faculty (<http://hia.ucdavis.edu/people/>)

- Latin American & Hemispheric Studies, Minor (p. 253)

## **Latin American & Hemispheric Studies, Minor**

#### **College of Letters & Science**

The minor in Latin American and Hemispheric Studies offers students the opportunity to explore connection throughout the Western Hemisphere from an array of perspectives across multiple academic fields.

The minor is made up of six courses, arranged in three tiers: Basic (one lower division course on the history of Latin America); Core (two introductory upper division courses chosen from a designated list of fields other than History); and Elective (three additional upper division courses from a designated list of courses that focus primarily on Latin American and/or Hemispheric issues). Students are strongly encouraged to develop proficiency in Spanish or Portuguese, either through course work (such as completion of SPA 024 or SPA 033), or through life experience such as study abroad.

## **Minor Advisor**

Hemispheric Institute of the Americas Undergraduate Advisor ([eheadvisingcenter@ucdavis.edu](mailto:eheadvisingcenter@ucdavis.edu)); 2216 Social Sciences & Humanities Building; 530-752-9241.

<b>Code</b>	<b>Title</b>	<b>Units</b>
Choose one:		4
AAS 018	Introduction to Caribbean Studies	
HIS 007A	History of Latin America to 1700	
HIS 007B	History of Latin America, 1700-1900	
HIS 007C	History of Latin America 1900-present	
<i>Core Courses</i>		
Choose two:		8
AAS 180	Race & Ethnicity in Latin America	
ANT 144	Contemporary Societies & Cultures of Latin America	
ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors	
CHI 130	United States-Mexican Border Relations	
HIS 168	History of Inter-American Relations	
MUS 127/SPA 171 or MUS 127S/ SPA 171S	Music from Latin America	
NAS 115	Native Americans in the Contemporary World	
NAS 123	Native Foods & Farming of the Americas	
SPA 150N or SPA 151	Survey of Latin American Literature to 1900 Survey of Latin American Literature 1900 to Present	
SPA 170	Introduction to Latin American Culture	
POL 143A	Latin American Politics	
POL 143B	Mexican Politics	
Study Abroad in Latin America		
<i>Elective Courses</i>		
Choose 12 units:		12-14
AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America	
AAS/DRA 155A	African-American Dance & Culture in the United States, Brazil & the Caribbean	
AAS 163	African Religions in the Americas	
AAS 172	Diaspora & New Black Identities	
AAS 180	Race & Ethnicity in Latin America	
ANT 104N	Cultural Politics of the Environment (Latin American Topics only.)	
ANT 131	Ecology & Politics (Latin American Topics only.)	
ANT 141C	People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region	
ANT 144	Contemporary Societies & Cultures of Latin America	
ANT 172	New World Prehistory: The First Arrivals	
ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors	
ANT 176	California Archaeology	

AHI 151	Arts of the Ancient New World	MUS 198	Directed Group Study (Topic: Mariachi Ensemble only)
AHI 181	Latin American Art & Architecture	NAS 107	Learning Native American Languages
CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities	NAS 110A	Quechua Language & Society: Beginning Level 1
CHI 113	Latin American Women's Engagement in Social Movements	NAS 110B	Quechua Language & Society: Beginning Level 2
CHI 114	Women of Color Reproductive Health & Reproductive Politics in a Global Perspective (Latin American Topics only.)	NAS 110C	Quechua Language & Society: Intermediate Level 1
CHI 114S	Women of Color Reproductive Health & Gender Politics in Cuba & the U.S.	NAS 110D	Quechua Language & Society: Intermediate Level 2
CHI 130	United States-Mexican Border Relations	NAS 115	Native Americans in the Contemporary World
CHI 135S	Transnational Latina/o Political Economy	NAS 120	Ethnopolitics of South American Indians
CHI 146S	Public Health in Latin America	NAS 123	Native Foods & Farming of the Americas
CHI 147S	Indigenous Healing & Biodiversity in Latin America	NAS 125	Performance & Culture Among Native Americans
CHI 160	Mexican Film & Greater Mexican Identity	NAS 133	Ethnohistory of Native People of Mexico & Central America
CHI/ART 171	Mexican & Chicano Mural Workshop	NAS 133A	Ethnohistory of Native Peoples of Mexico & Central America to 1500
COM 151	Colonial & Postcolonial Experience in Literature (Latin American Topics only.)	NAS 133B	Ethnohistory of Native Peoples of Mexico & Central America 1500 to 2000
COM 152 or COM 152S	Literature of the Americas Literature of the Americas (Taught in Latin America)	NAS 181A	Native American Literature
COM 165 or COM 165S	Caribbean Literatures Caribbean Literatures	NAS 181B	Native American Literature
GSW 102	Colonialism	NAS 181C	Contemporary Native American Poetry
HIS 157	Business, Biomes & Knowledge: Latin American Environmental History	NAS 184	Contemporary Indigenous Literature of Mexico
HIS 158	Special Topics in Latin American History	POL 143A	Latin American Politics
HIS 159	Women & Gender in Latin American History	POL 143B	Mexican Politics
HIS 160	Spain & America in the 16th Century	POR 100	Principles of Luso-Brazilian Literature & Criticism
HIS/HMR 161	Human Rights in Latin America	POR 130	Survey of Luso-Brazilian Literature: 1500-1800
HIS 162	History of the Andean Region	POR 141	Introduction to Luso-Brazilian Culture
HIS 163A	History of Brazil	POR 159	Special Topics in Luso-Brazilian Literature & Culture
HIS 163B	History of Brazil	POR 161	Luso-Brazilian Literature & Culture
HIS 164	History of Chile	POR 162	Introduction to Brazilian Literature
HIS 165	Latin American Social Revolutions	POR 163	20th C Masters in Brazilian Literature
HIS 166A	History of Mexico to 1848	RST 130	Topics in Religious Studies (Latin American Topics only.)
HIS 166B	History of Mexico since 1848	SOC/IRE 104	The Political Economy of International Migration
HIS 167	Modern Latin American Cultural & Intellectual History	SPA 117	Teaching Spanish as a Native Tongue in the U.S.: Praxis & Theory
HIS 168	History of Inter-American Relations	SPA 149	Latin-American Literature in Translation
HIS 169A	Mexican-American History	SPA 150N	Survey of Latin American Literature to 1900
HIS 169B	Mexican-American History	SPA 151	Survey of Latin American Literature 1900 to Present
HMR 130	Special Topics in Human Rights (Latin American Topics Only)	SPA 153	Latin American Short Story
MUS 127/SPA 171 or MUS 127S/ SPA 171S	Music from Latin America (Latin American Topics Only) Music from Latin America	SPA 154	Latin American Novel
MUS 129A	Musics of the Americas	SPA 155	Mexican Novel
MUS 150	Brazilian Samba School	SPA 156	Latin American Literature of the Turn of the 20th Century
MUS 152	Afro-Cuban Ensemble		
MUS 153	Brazilian Capoeira Ensemble		

SPA 157	Great Works of Latin American Literature/ Culture	
SPA 158	Latin American Poetry: From Vanguardism to Surrealism & Beyond	
SPA 159	Special Topics in Latin American Literature & Culture	
or SPA 159S	Special Topics in Latin American Literature & Culture	
or SPA 159Y	Special Topics in Latin American Literature & Culture	
SPA 160	Latin American Women Writers in Translation	
SPA 170	Introduction to Latin American Culture	
or SPA 170S	Introduction to Latin American Culture	
SPA 171/MUS 127	Music from Latin America	
or SPA 171S/ MUS 127S	Music from Latin America	
SPA 172	Mexican Culture	
SPA 173	Cinema & Latin American Culture	
SPA 174	Chicano Culture	
SPA 175	Topics in Latin American Cultural Studies	
SPA 176	Literature in Spanish Written in the United States	
SPA 177	California & Latin America	
SPA 179	Science & Politics of the Human Body in the Spanish-Speaking World	
or SPA 179Y	Science & Politics of the Human Body in the Spanish-Speaking World	
<b>Total Units</b>		<b>24-26</b>

## The Program

A student electing a major in History will receive a broad education in histories of several geographic areas. Students preferring more active engagement in research and writing are encouraged to complete history seminars and/or the honors program.

## Career Alternatives

A degree in history is excellent preparation for a professional career such as teaching, law, journalism, public administration, or business management. Professional schools in these and related fields (including the health professions) are looking for students who can weigh conflicting evidence, evaluate alternative courses of action or divergent points of view, and express conclusions logically in everyday language. These analytical skills are stressed in history classes, and their mastery gives the history student a solid preparation for subsequent training in a specialized career.

## History of Science, Medicine, & Technology

Students can create a concentration in the History of Science, Medicine, & Technology upon consultation with a faculty advisor. They may draw upon the relevant History courses (History HIS 002, HIS 016, HIS 085, HIS 107, HIS 135A, HIS 135B, HIS 136, HIS 139A, HIS 139B, HIS 185A, and HIS 185B) as well as History & Philosophy of Science offerings.

## History & Philosophy of Science

Courses from the History & Philosophy of Science minor may count toward the History major. STS 130A, STS 130B, STS 150, and STS 180 fulfill upper division requirements in either the U.S. or Europe concentration.

For a more detailed description of course offerings, see History & Philosophy of Science (p. 428).

## Honors & Honors Program

A student becomes eligible for graduation with honors by meeting the minimum GPA (usually 3.500) and course requirements established by the College of Letters and Science. To qualify for high or highest honors, students must also complete the History Department honors program with a GPA of 3.500 or above and write a thesis that meets the criteria for high honors or highest honors. Students apply to participate in the department honors program during the latter part of their junior year. Admission to the program is based on GPA, a thesis proposal, examples of previous writing, and the recommendation of a faculty member who is willing to sponsor the student's project, interviews, and faculty recommendations. Students admitted into the program must complete the HIS 104A, HIS 104B, HIS 104C sequence of honors courses, which requires the completion of a senior honors thesis. Students who anticipate seeking admission to the honors program are urged to complete at least one HIS 102 course (undergraduate seminar) before the end of their junior year. Interested students are urged to consult with faculty in their field early in their junior year. Students may substitute HIS 104B and HIS 104C for any courses in their program other than HIS 102.

Students who anticipate pursuing graduate work in history or a teaching credential, and who do not wish to opt for the research emphasis embodied in the honors program, are encouraged to select Plan II of the major.

## History

### College of Letters & Science

Sally McKee, Ph.D., Chairperson of the Department; term ends June 30, 2023.

## Department Office

2216 Social Sciences & Humanities Building; 530-752-9241; History (<http://history.ucdavis.edu>); Faculty (<https://history.ucdavis.edu/people/faculty/>)

- History, Bachelor of Arts (p. 255)
- History, Minor (p. 259)
- History, Master of Arts (p. 260)
- History, Doctor of Philosophy (p. 260)
- Jewish Studies, Minor (p. 260)

## History, Bachelor of Arts

### College of Letters & Science

The History major develops critical intelligence and fosters an understanding of ourselves and our world through the study of the past—both the "deep past" and the more recent past.

## Study Abroad & the History Major

The department strongly encourages interested students to pursue their studies abroad. While there are no specific required courses or prerequisites, students are urged to take at least one history course that touches upon the geographic area where they plan to study abroad before departing. To receive a history degree from UC Davis, students must complete at least 18 upper division units in the history major at UC Davis (which can also include HIS 101, HIS 102, HIS 103). The remaining major requirements can be fulfilled abroad provided that (a) the course should be evaluated as at least four UC Davis units, (b) the course should be considered upper division by the standards set forth by the UC Davis Study Abroad Program, and (c) the course should be in the field of History. Students may present copies of the course work, syllabus, and writing assignments to the department's liaison person with the Global Learning Hub (<http://globallearning.ucdavis.edu/>) office for approval.

## Teaching Credential Subject Representative

See the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

Preparing for Careers in Teaching History majors can pursue rewarding careers in teaching. To ensure your undergraduate coursework prepares you for a subject matter competency test, please contact the History Project (<http://historyproject.ucdavis.edu/>).

## Major Advisors

History Undergraduate Advisor ([eheadvisingcenter@ucdavis.edu](mailto:eheadvisingcenter@ucdavis.edu)) or see History (<http://history.ucdavis.edu/>) for updated information.

## Graduate Study

The Department of History offers programs of study and research leading to M.A. and Ph.D. degrees in history. Detailed information may be obtained by contacting the Graduate Advisor ([historygradadmit@ucdavis.edu](mailto:historygradadmit@ucdavis.edu)).

## Graduate Advisor

See the department's website for updated information.

## American History & Institutions

This University requirement can be satisfied by passing any one of the following HIS courses:

Code	Title	Units
HIS 017A	History of the United States	4
HIS 017B	History of the United States	4
HIS 072A	Women & Gender in America, to 1865	4
HIS 072B	Women & Gender in America, 1865-Present	4
HIS 170A	Colonial America	4
HIS 170B	The American Revolution	4
HIS 170C	The Early National Period, 1789-1815	4
HIS 171A	Slavery, Society & Expansion in the Early U.S.	4
HIS 171B	Civil War Era	4
HIS 172	American Environmental History	4
HIS 173	Becoming an American: Immigration & American Culture	4
HIS 174A	The Gilded Age & Progressive Era: United States, 1876-1917	4

HIS 174B	War, Prosperity, & Depression: United States, 1917-1945	4
HIS 174C	The United States Since World War II, 1945 to the Present	4
HIS 174D	Selected Themes in 20th-Century American History	4
HIS 175	American Intellectual History	4
HIS 176A	Cultural & Social History of United States	4
HIS 176B	Cultural & Social History of United States	4
HIS 177A	History of Black People & American Race Relations: 1450-1860	4
HIS 177B	History of Black People & American Race Relations: 1860-Present	4
HIS 181	Religion in American History to 1890	4
HIS 183A	The Frontier Experience: Trans-Mississippi West	4
HIS 183B	The Frontier Experience: Trans-Mississippi West	4
HIS 184	History of Sexuality in America	4
HIS 189	California History	4

See University Requirements (p. 36).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose five lower division courses from the following seven concentrations, including at least one course in three different concentrations. Additional units to reach 20.		
(a) Africa		
HIS 015A	Africa to 1900	
HIS 015B	Africa Today	
(b) Asia		
HIS 008	History of Indian Civilization	
HIS 009A	History of East Asian Civilization	
HIS 009B	History of East Asian Civilization	
HIS 009C/EAS 088	Korean Culture & Society: From Ancient Three Kingdoms to the Global K-Pop	
(c) Europe		
HIS 004A	History of Western Civilization	
HIS 004B	History of Western Civilization	
HIS 004C	History of Western Civilization	
(d) Latin America		
HIS 007A	History of Latin America to 1700	
HIS 007B	History of Latin America, 1700-1900	
HIS 007C	History of Latin America 1900-present	
(e) Middle East		
HIS 006	Introduction to the Middle East	
(f) United States		
HIS 017A	History of the United States	
HIS 017B	History of the United States	
HIS 018A	Race in America to 1865	
HIS 018B	Race in the United States Since 1865	
HIS 072A	Women & Gender in America, to 1865	
HIS 072B	Women & Gender in America, 1865-Present	

HIS 080	The History of the United States in the Middle East	HIS 102N	Undergraduate Proseminar in History: Japan
HIS 080W	The History of the United States in the Middle East	HIS 102O	Undergraduate Proseminar in History: Africa
HIS 085 <i>(g) World</i>	Nature, Man, & the Machine in America	HIS 102P	Undergraduate Proseminar in History: Christianity & Culture in Europe, 50-1850
HIS 001	Introduction to History	HIS 102Q	Undergraduate Proseminar in History: India
HIS/STS 002 or HIS/STS 002Y	Introduction to the History of Science & Technology	HIS 102R	Undergraduate Proseminar in History: Muslim Societies
HIS 003	Cities: A Survey of World Cultures	HIS 102S	Undergraduate Proseminar in History: Education Abroad Program
HIS 005	Modernist Culture	HIS 102X	Undergraduate Proseminar in History: Comparative History
HIS 010A	World History to 1350	HIS 103	Topics in Historical Research
HIS 010B	World History, c. 1350-1850	Choose at least three courses in a single Concentration listed below. (p. 257)	
HIS 010C	World History III	Choose at least two courses in a second Concentration listed below. (p. 257)	
HIS 011	History of the Jewish People in the Modern World	Choose at least one course in a third Concentration listed below. (p. 257)	
HIS 012	Food & History	Additional units to reach 40.	
HIS 013	Global Sexualities	Depth Subject Matter Subtotal	
HIS 014	History of Global Capitalism	40-41	
HIS/STS 016	Sex, Science, & Society	Total Units	
HIS 019	Migration & Borders in Global History	60-61	
HIS 020	The Vietnam War		
HIS 090	Research in History		
Preparatory Subject Matter Subtotal			

**Depth Subject Matter***History Seminar*

Choose 4-5 units: 4-5

HIS 101 Introduction to Historical Thought &amp; Writing

HIS 102A Undergraduate Proseminar in History: Ancient

HIS 102B Undergraduate Proseminar in History: Medieval

HIS 102D Undergraduate Proseminar in History: Modern Europe to 1815

HIS 102E Undergraduate Proseminar in History: Europe Since 1815

HIS 102F Undergraduate Proseminar in History: Russia

HIS 102G Undergraduate Proseminar in History: China to 1800

HIS 102H Undergraduate Proseminar in History: China Since 1800

HIS 102I Undergraduate Proseminar in History: Britain

HIS 102J Undergraduate Proseminar in History: Latin America Since 1810

HIS 102K Undergraduate Proseminar in History: American History to 1787

HIS 102L Undergraduate Proseminar in History: United States, 1787-1896

HIS 102M Undergraduate Proseminar in History: United States Since 1896

**Fields of Concentration**

A course may only be used to fulfill one concentration.

**(a) Africa**

Code	Title	Units
HIS 102O	Undergraduate Proseminar in History: Africa	5
HIS 115A	History of West Africa	4
HIS 115B	History of East Africa & the Indian Ocean	4
HIS 115C	History of Southern Africa from Exploration to the Rainbow Nation	4
HIS 115D	Postcolonial Africa	4
HIS 115E	Slavery, Africa, & the Atlantic World	4
HIS 116	African History: Special Themes	4

**(b) Asia**

Code	Title	Units
HIS 102G	Undergraduate Proseminar in History: China to 1800	5
HIS 102H	Undergraduate Proseminar in History: China Since 1800	5
HIS 102N	Undergraduate Proseminar in History: Japan	5
HIS 102Q	Undergraduate Proseminar in History: India	5
HIS 111A	Ancient History	4
HIS 191A	Classical China	4
HIS 191B	High Imperial China	4
HIS 191C	Late Imperial China	4
HIS 191D	19th-Century China: The Empire Confronts the West	4
HIS 191E	The Chinese Revolution	4

HIS 191F	History of the People's Republic of China	4	HIS 136 or STS 136	Scientific Revolution	4
HIS 191G	Special Topics in Chinese History to 1800	4		Scientific Revolution	
HIS 191H	Special Topics in Chinese History after 1800	4	HIS 138A	The Rise of the Russian Empire, 1304-1825	4
HIS 191J	Sex & Society in Modern Chinese History	4	HIS 138B	Reform & Revolution in Tsarist Russia, 1825-1917	4
HIS 194A	Aristocratic & Feudal Japan	4	HIS 138C	Russian History: The Rise & Fall of the Soviet Union, 1917 to Present	4
HIS 194B	Early Modern Japan	4	HIS 139A	Medieval & Renaissance Medicine	4
HIS 194C	Modern Japan	4	HIS 139B	Medicine, Society, & Culture in Modern Europe	4
HIS 194D	Business & Labor in Modern Japan	4	HIS 140	The Rise of Capitalism in Europe	4
HIS 194E	Education & Technology in Modern Japan	4	HIS 141	France Since 1815	4
HIS 195B	History of Modern Korea	4	HIS 142A	History of the Holocaust	4
HIS 195C	A History of Vietnam	4	HIS 142B	The Memory of the Holocaust	4
HIS 196A	Medieval India	4	HIS 143	History of Eastern Europe & the Balkans	4
HIS 196B	Modern India	4	HIS 144A	History of Germany, 1450 to 1789	4
<b>(c) Europe</b>					
<b>Code</b>	<b>Title</b>	<b>Units</b>			
HIS 102A	Undergraduate Proseminar in History: Ancient	5	HIS 144B	History of Germany since 1789	4
HIS 102B	Undergraduate Proseminar in History: Medieval	5	HIS 145	War & Revolution in Europe: 1789-1918	4
HIS 102D	Undergraduate Proseminar in History: Modern Europe to 1815	5	HIS 146A	Europe in the 20th Century	4
HIS 102E	Undergraduate Proseminar in History: Europe Since 1815	5	HIS 146B	Europe in the 20th Century	4
HIS 102F	Undergraduate Proseminar in History: Russia	5	HIS 147A	European Intellectual History: 1800-1870	4
HIS 102I	Undergraduate Proseminar in History: Britain	5	HIS 147B	European Intellectual History: 1870-1920	4
HIS 102P	Undergraduate Proseminar in History: Christianity & Culture in Europe, 50-1850	5	HIS 147C	European Intellectual History: 1920-1970	4
HIS 111B	Ancient History	4	HIS 148A	Women & Society in Europe: 1500-1789	4
HIS 111C	Ancient History	4	HIS 148B	Women & Society in Europe: 1789-1920	4
HIS 121A	Medieval History	4	HIS 148C	Women in Society in Europe: 1914-Present	4
HIS 121B	Medieval History	4	HIS 149	Comparative Cultural History of Modern Britain & France, 1880-1914	4
HIS 121C	Medieval History	4	HIS 151A	England: The Middle Ages	4
HIS 122	Selected Themes in Medieval History	4	HIS 151B	England: The Early Modern Centuries	4
HIS 125	Topics in Early Modern European History	4	HIS 151C	18th-Century England	4
HIS 126Y/HMR 162Y	The History of Human Rights in Europe	4	HIS 151D	Industrial England	4
HIS 130A	Christianity & Culture in Europe: 50-1450	4	HIS 160	Spain & America in the 16th Century	4
HIS 130B	Christianity & Culture in Europe: 1450-1600	4			
HIS 130C	Christianity & Culture in Europe: 1600-1850	4			
HIS 131A	Early Modern European History	4			
HIS 131B	European History During the Renaissance & Reformation	4			
HIS 131C	The Old Regime: Absolution, Enlightenment & Revolution in Europe	4			
HIS 132	Crime & Punishment in Early Modern Europe	4			
HIS 133	European Thought & Culture from the Renaissance to the Enlightenment	4			
HIS 134A	The Age of Revolution	4			
HIS 135A	History of Science to the 18th Century	4			
HIS 135B	History of Science, 18th to 20th Centuries	4			
<b>(d) Latin America</b>					
<b>Code</b>	<b>Title</b>	<b>Units</b>			
HIS 102J	Undergraduate Proseminar in History: Latin America Since 1810	5			
HIS 156	Latin American Migration History	4			
HIS 157	Business, Biomes & Knowledge: Latin American Environmental History	4			
HIS 158	Special Topics in Latin American History	4			
HIS 160	Spain & America in the 16th Century	4			
HIS/HMR 161	Human Rights in Latin America	4			
HIS 162	History of the Andean Region	4			
HIS 163A	History of Brazil	4			
HIS 163B	History of Brazil	4			
HIS 164	History of Chile	4			
HIS 165	Latin American Social Revolutions	4			
HIS 166A	History of Mexico to 1848	4			
HIS 166B	History of Mexico since 1848	4			
HIS 167	Modern Latin American Cultural & Intellectual History	4			

HIS 168	History of Inter-American Relations	4	HIS 176B	Cultural & Social History of United States	4
HIS 169A	Mexican-American History	4	HIS 177A	History of Black People & American Race Relations: 1450-1860	4
HIS 169B	Mexican-American History	4	HIS 177B	History of Black People & American Race Relations: 1860-Present	4

**(e) Middle East**

Code	Title	Units			
HIS 190A	Middle Eastern History I: The Rise of Islam, 600-1000	4	HIS 178	Water in the West: Environment & Politics in America's Arid Lands	4
HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400	4	HIS 179	Asian American History, 1850-Present	4
HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730	4	HIS 180AN	American Political History, 1789-1896	4
HIS 190D	Middle Eastern History IV: Safavids Iran, 1300-1720	4	HIS 180BN	American Political History, 1896-present	4
HIS 193A	History of the Modern Middle East, 1750-1914	4	HIS 180C	The Fight for the Right to Vote	4
HIS 193B	History of the Modern Middle East, From 1914	4	HIS 181	Religion in American History to 1890	4
HIS 193C	The Middle East Environment: Historical Change & Current Challenges	4	HIS 182	Gender & Justice in American History	4
HIS 193D	History of Modern Iran, From 1850 to Present	4	HIS 183A	The Frontier Experience: Trans-Mississippi West	4
			HIS 183B	The Frontier Experience: Trans-Mississippi West	4
			HIS 184	History of Sexuality in America	4
			HIS 185A	History of Science in America	4
			HIS 185B	History of Technology in America	4
			HIS 187	History of US Foreign Relations in the 20th Century	4
			HIS 188	America in the 1960s	4
			HIS 189	California History	4

**(f) United States**

Code	Title	Units			
HIS 102K	Undergraduate Proseminar in History: American History to 1787	5			
HIS 102L	Undergraduate Proseminar in History: United States, 1787-1896	5	HIS 100	Selected Topics in History	4
HIS 102M	Undergraduate Proseminar in History: United States Since 1896	5	HIS 102R	Undergraduate Proseminar in History: Muslim Societies	5
HIS 169A	Mexican-American History	4	HIS 102X	Undergraduate Proseminar in History: Comparative History	5
HIS 169B	Mexican-American History	4	HIS 107	Medicine's Histories: Human & Veterinary Medicine from the Ancient World to One Health	4
HIS 170A	Colonial America	4	HIS 108	Global Environmental History	4
HIS 170B	The American Revolution	4	HIS/SAS 109	Environmental Change, Disease & Public Health	4
HIS 170C	The Early National Period, 1789-1815	4	HIS 110	Themes in World History	4
HIS 171A	Slavery, Society & Expansion in the Early U.S.	4	HIS 110A	Colonialism & the Making of the Modern World	4
HIS 171B	Civil War Era	4	HIS 112A	Topics in Pre-Modern Jewish History	4
HIS 171C	Reconstruction, America's Second Founding	4	HIS 112B	Topics in Modern Jewish History	4
HIS 171D	Selected Themes in 19th-Century American History	4	HIS 112C	History of Jews in the Muslim World	4
HIS 172	American Environmental History	4	HIS 113	History of Modern Israel	4
HIS 173	Becoming an American: Immigration & American Culture	4	HIS 114	Histories of 20th Century Partition	4
HIS 174A	The Gilded Age & Progressive Era: United States, 1876-1917	4	HIS 119	World War I	4
HIS 174B	War, Prosperity, & Depression: United States, 1917-1945	4	HIS 120	World War II	4
HIS 174C	The United States Since World War II, 1945 to the Present	4			
HIS 174D	Selected Themes in 20th-Century American History	4			
HIS 175	American Intellectual History	4			
HIS 176A	Cultural & Social History of United States	4			

**History, Minor****College of Letters & Science**

The minor in History consists of five upper division courses chosen so that at least three courses are in one field and at least one course is in another field. The two fields shall be chosen from among those defined

in the catalog for the major. However, students may also, in consultation with and with the authorization of a faculty advisor, define other thematic fields.

## Minor Advisor

For updated information, contact the History Undergraduate Advising Center (eheadvisingcenter@ucdavis.edu).

Code	Title	Units
	Three courses in one concentration.	12
	See major concentrations: Africa, Asia, Europe, Latin America, Middle East, United States, & World. (p. 256)	
	Additional units to reach 20.	8
<b>Total Units</b>		<b>20</b>

## History, Master of Arts

College of Letters & Science

### Graduate Study

The Department of History offers programs of study and research leading to M.A. and Ph.D. degrees in history. Detailed information may be obtained by contacting the Graduate Advisor (historygradadmit@ucdavis.edu).

The Master of Arts degree is offered only in route to the Ph.D.

### Graduate Advisor

For updated information, see Graduate Advisor.  
(historygradadmit@ucdavis.edu)

## History, Doctor of Philosophy

College of Letters & Science

### Graduate Study

The Department of History offers programs of study and research leading to M.A. and Ph.D. degrees in history. Detailed information may be obtained by contacting the Graduate Advisor (historygradadmit@ucdavis.edu). ([https://history.ucdavis.edu/directory-of-people/his-staff/#c4=all&b\\_start=0](https://history.ucdavis.edu/directory-of-people/his-staff/#c4=all&b_start=0))

### Graduate Advisor

For updated information, see Graduate Advisor.  
(historygradadmit@ucdavis.edu)

## Jewish Studies, Minor

College of Letters & Science

### Minor

Eva Mroczek, Ph.D., Program Director; term ends June 30, 2023.

### Department Office

2216 Social Sciences & Humanities Building; 530-752-9241; Jewish Studies (<http://jewishstudies.ucdavis.edu>); Faculty (<https://jewishstudies.ucdavis.edu/core-faculty/>)

The Program in Jewish Studies offers students the opportunity to explore Jewish history, communities, literature, religion, and culture in a

comparative perspective and multicultural framework. Courses include Hebrew language instruction as well as the study of classical and modern Jewish texts in translation.

The interdisciplinary minor in Jewish Studies provides an introduction to the study of Jewish culture, thought, history, and literature. Students learn a broad range of methodologies and critical concepts in these areas and gain insight into the relationship between Jewish identities, histories, and representations and those of the cultures in which Jews throughout the world have lived.

The Program in Jewish Studies will be of special interest to students in History, Religious Studies, Comparative Literature and Sociology as well as other fields in the Humanities & Social Sciences.

### Advising

Jewish Studies Advising Contact (eheadvisingcenter@ucdavis.edu)

Code	Title	Units
Choose one:		4
HIS 011	History of the Jewish People in the Modern World	
JST 010	Introduction to Jewish Cultures	
RST 012	Emergence of Judaism, Christianity & Islam	
RST 021	The Bible & Its Interpreters	
RST 023	Introduction to Judaism	
Choose four:		16
COM 147	Modern Jewish Writers	
ENL 171A	The Bible as Literature: The Old Testament	
GER/JST 116	Readings in Jewish Writing & Thought in German Culture	
GER 117	After the Catastrophe: Jews & Jewish Life in Post-1945 Germany	
GER 127	Major Writers in German (When course covers a Jewish writer)	
GER 141	The Holocaust & its Literary Representation	
HIS 011	History of the Jewish People in the Modern World	
HIS 110	Themes in World History (When topic is Antisemitism & Islamophobia)	
HIS 112A	Topics in Pre-Modern Jewish History	
HIS 112B	Topics in Modern Jewish History	
HIS 112C	History of Jews in the Muslim World	
HIS 113	History of Modern Israel	
HIS 142A	History of the Holocaust	
HIS 142B	The Memory of the Holocaust	
JST 101	Topics in Jewish Thought	
JST 110	Selected Topics in Jewish Literature	
JST 111	Israeli Writing Since 1960	
JST 112	Readings in Jewish Writing & Thought in German Culture	
JST 120	Cinema & the American Jewish Experience	
JST 121	Oral History & Jewish Life	
RST 012	Emergence of Judaism, Christianity & Islam	
RST 102	Christian Origins	
RST 123	Sex & Gender in the Bible	
RST 124	Topics in Judaism	

RST 125	Dead Sea Scrolls, Apocrypha, & Pseudepigrapha
RST 126	The Formation of the Rabbinic Tradition
RST 130	Topics in Religious Studies (When topic is Doom: The End of the World & After)
RST 135	The Bible & Film
RUS 120	Topics in Russian Literature & Culture (When topic is Jews in Russian Literature & Culture)
POL 135	International Politics of the Middle East
POL 136	The Arab-Israeli Conflict
POL 179	Special Studies in Comparative Politics (When topic is Israeli Politics)
SOC 174	American Jewish Identities & Communities
<b>Total Units</b>	<b>20</b>

## Horticulture & Agronomy (Graduate Group)

College of Agricultural & Environmental Sciences

Astrid Volder, Ph.D., Chairperson of the Group

### Group Office

1224 Plant & Environmental Sciences Building; 530-752-7738;  
Horticulture & Agronomy Graduate Group (<http://ggha.ucdavis.edu>);  
Faculty (<https://ggha.ucdavis.edu/faculty/>)

- Horticulture & Agronomy, Master of Science (p. 261)
- Horticulture & Agronomy, Doctor of Philosophy (p. 261)

## Horticulture & Agronomy, Master of Science

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Horticulture & Agronomy offers programs of study leading to M.S. and Ph.D. degrees for students interested in the science and management of agricultural crops, including their ecology, physiology, genetics, and post-harvest management, as well as the interaction of agricultural crops with the environment. The M.S. program is designed to focus on a cropping system, such as agronomy, environmental horticulture, pomology, vegetable crops, viticulture and weed science. Within that cropping system, the student can specialize in one of a number of areas, including agroecology, biotechnology, breeding and crop improvement, crop physiology, crop production, floriculture, landscape horticulture, mineral nutrition, modeling, nursery production, pest management, plant growth and development, postharvest physiology, revegetation/restoration, and water relations. Research may be conducted within these areas with an applied or basic focus, but in association with a cropping system.

### Preparation

For both M.S. and Ph.D. programs, a level of competence equivalent to that of a sound undergraduate program in Plant Science is required. This includes coursework in general biology, chemistry, organic chemistry, physics, statistics, genetics, plant physiology, and soil science. A few

limited deficiencies in any of these areas can be made up after admission to the graduate program. Specific requirements are outlined in detail on the group's website. The graduate advisor, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations.

### Graduate Advisors

Consult the Group office.

## Horticulture & Agronomy, Doctor of Philosophy

College of Agricultural & Environmental Sciences

### Graduate Study

The Graduate Group in Horticulture & Agronomy offers programs of study leading to M.S. and Ph.D. degrees for students interested in the science and management of agricultural crops, including their ecology, physiology, genetics, and post-harvest management, as well as the interaction of agricultural crops with the environment. In the Ph.D. program, students focus on one of five areas of emphasis: agroecology, crop improvement/plant breeding, crop production systems, plant physiology, and post-harvest biology/physiology. Research may be conducted within these areas with an applied or basic focus, but in association with a cropping system such as agronomy, environmental horticulture, pomology, vegetable crops, viticulture and weed science.

### Preparation

For both M.S. and Ph.D. programs, a level of competence equivalent to that of a sound undergraduate program in Plant Science is required. This includes coursework in general biology, chemistry, organic chemistry, physics, statistics, genetics, plant physiology, and soil science. A few limited deficiencies in any of these areas can be made up after admission to the graduate program. Specific requirements are outlined in detail on the group's website. The graduate advisor, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations.

### Graduate Advisors

Consult the Group office.

## Human Development (Graduate Group)

College of Agricultural & Environmental Sciences

### Group Office

1315 Hart Hall; 530-754-4109; Human Development Graduate Group (<http://humandevelopment.ucdavis.edu>); Faculty (<https://humandevelopment.ucdavis.edu/people/>)

- Human Development, Doctor of Philosophy (p. 261)

## Human Development, Doctor of Philosophy

College of Agricultural & Environmental Sciences

## Graduate Study

The interdisciplinary and interdepartmental Graduate Group in Human Development offers a program of study leading to the Ph.D. degree. The program provides education and training in lifespan study of human development, with a balance of emphasis on biological, cognitive, and socio-emotional development in context. Recipients of the degree will be prepared to teach, conduct research, and actively engage in public service in the field of human development.

Applicants seeking admissions and fellowships consideration must submit all materials by our priority deadline of December 15. The final admissions deadline is March 1. For more details, see Human Development Graduate Group (<http://humandevelopment.ucdavis.edu/>).

### Graduate Advisor

Contact the Group office. (<https://humandevelopment.ucdavis.edu/contact-us/>)

## Human Ecology

### College of Agricultural & Environmental Sciences

Formerly Human & Community Development

Leigh Ann Simmons, Ph.D., Chair Person of the Department  
M. Anne Visser, Ph.D., Community & Regional Development Program, CRD Program Director  
Leah Hibel, Ph.D., Human Development & Family Studies Program, HDE Program Director  
N. Claire Napawan, Landscape Architecture & Environmental Design Program Director

### Department Advising Center

1302 & 1303 Hart Hall; CRD, HDE, LDA & SED majors: 530-752-1805, 530-752-2244, 350-752-9322; 530-752-4113; Human Ecology (<https://humanecology.ucdavis.edu/>)

## Major Programs & Courses

See Community & Regional Development (p. 262) & Human Development (p. 265); Landscape Architecture (p. 268) & Sustainable Environmental Design

- Aging & Adult Development, Minor (p. 262)
- Community & Regional Development, Bachelor of Science (p. 262)
- Community Development, Minor (p. 264)
- Community Development, Master of Science (p. 264)
- Geographic Studies, Minor (p. 265)
- Human Development, Bachelor of Science (p. 265)
- Human Development, Minor (p. 267)
- Landscape Architecture, Bachelor of Science (p. 268)
- Sustainable Environmental Design, Bachelor of Science (p. 269)

## Aging & Adult Development, Minor

### College of Agricultural & Environmental Sciences

The Department of Human Ecology offers two minors: Aging & Adult Development & Human Development (p. 267).

## Minor Advisor

Lisa Miller; see academic advisor Galyna Erdman ([gerdman@ucdavis.edu](mailto:gerdman@ucdavis.edu)) in 1303 Hart Hall.

Code	Title	Units
Choose three:		12-14
HDE 100C	Adulthood & Aging	
HDE/ENT 117	Longevity	
HDE 143	Field Studies of the Elderly	
HDE 160	Social Aspects of Aging	
HDE 161	Technology Use, Health, & Aging	
HDE 163	Cognitive Neuropsychology in Adulthood & Aging	
Choose two:		6-8
HDE 110	Families in Communities	
or HDE 110V	Families in Communities	
HDE 111	Family Stress & Resilience	
HDE 112	Social Relationships Across the Lifespan	
HDE 131	Thriving Across the Lifespan	
HDE 133	Stress, Adversity & Resilience	
or HDE 133V	Stress, Adversity & Resilience	
HDE 134	Disparities & Inequalities in Health & Wellbeing	
HDE 135	Health Behaviors Across the Lifespan	
HDE 137	Contextual Determinants of Health	
EXB 117	Exercise & Aging in Health & Disease	
PSC 123/NPB 152	Hormones & Behavior	
PSC 126	Health Psychology	
Total Units		18-22

## Community & Regional Development, Bachelor of Science

### College of Agricultural & Environmental Sciences

## Department Office

Department of Human Ecology; 1303 Hart Hall; 530-752-1805; Community & Regional Development; (<https://humanecology.ucdavis.edu/community-and-regional-development/>) Faculty (<http://humanecology.ucdavis.edu/crd-faculty/>)

## The Major Program

The Community & Regional Development major aims to provide a broad comparative understanding of theories, methodologies, and issues relevant to the study of communities and the people in them. The program focuses on the ways that economic, political and socio-cultural forces are transforming the world, countries, regions, and local communities, and it considers how knowledge can be used to improve the quality of community life.

## The Program

Principal subjects of study within the major are community, regional, and organizational development; social change processes; community and regional research methodologies; the role of class, ethnicity, gender, and race in shaping social life; the impacts of innovation and technology on

communities, and the effects of social, economic and political systems on regions. The major is organized to allow students to develop fields of concentration that meet their career goals.

## Major Advisor

M. Anne Visser (mavisser@ucdavis.edu)

## Internships & Career Alternatives

Community & Regional Development students are required to complete an internship in their field before graduation. Internships have been arranged with local, county, and state planning units, health departments, schools, housing offices, businesses, and education programs, among others. Community and Regional Development graduates are prepared for occupations in community development, social research, program evaluation, organizational and educational consulting, city and regional planning, and for-profit organizations. The major also provides effective preparation for graduate or professional study in the social and behavioral sciences or for professional degrees.

## Honors Program

An Honors Program is available to Human & Community Development majors who have demonstrated excellence in their field of study. Entrance into the honors program requires that a student completes at least 135 units with a minimum grade point average of 3.500 in upper division courses counted toward the major. The program consists of a project whose specific nature is determined in consultation with the student's Honors Advisor. It may involve completing a research project, a scholarly paper, a senior thesis, or some comparable assignment. The project will have a minimum duration of two quarters and will be noted on the student's record by a variable unit course number or special honors course designation. Successful completion of the honors program requires that a minimum of 8 units of credit be earned in course work for the project. It is expected that a student participating in the Honors Program of the Community & Regional Development major will participate in the Undergraduate Research, Scholarship and Creative Activities Conference. Additionally, students participating in the Honors Program will be required to give a public presentation of their work in a departmental seminar program.

## Honors Program Advisor

M. Anne Visser (mavisser@ucdavis.edu)

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Community & Regional Development		4
CRD 001	The Community	
Computer Science		3
PLS 021	Application of Computers in Technology	
or PLS 021V	Application of Computers in Technology	
Economics; choose one:		
ECN 001A	Principles of Microeconomics	
or ECN 001AV	Principles of Microeconomics	
or ECN 001AY	Principles of Microeconomics	
ECN 001B	Principles of Macroeconomics	
or ECN 001BV	Principles of Macroeconomics	
Social Science Theory; choose one:		
ANT 002	Cultural Anthropology	
SOC 001	Introduction to Sociology	
Statistics		
		4

STA 013	Elementary Statistics	
or STA 013Y	Elementary Statistics	
<b>Preparatory Subject Matter Subtotal</b>		20
<b>Depth Subject Matter</b>		
Comparative Community Change; choose three:		12-13
CRD 142	Rural Change in the Industrialized World	
CRD 152	Community Development	
CRD 153A	International Community Development: Asia	
CRD 153B	International Community Development: Europe	
CRD 153C	International Community Development: Africa	
CRD 164	Theories of Organizations & Their Role in Community Change	
CRD 172	Social Inequality: Issues & Innovations	
CRD 176	Comparative Ethnicity	
CRD 180	Transnational Community Development	
<b>Economics of Community Change; choose two:</b>		8-9
CRD 118	Technology & Society	
CRD 140	Dynamics of Regional Development	
CRD 141	Organization of Economic Space	
CRD 162	People, Work & Technology	
<b>Political Processes &amp; Community Change; choose two:</b>		8
CRD 147	Community Youth Development	
CRD 149	Community Development Perspectives on Environmental Justice	
CRD 154	Social Theory & Community Change	
CRD 157	Politics & Community Development	
CRD 158	Community Governance	
CRD 171	Housing & Social Policy	
<b>Methods for Community Research; CRD 151 &amp; one additional course:</b>		9-10
CRD 150	Quantitative Methods in Community Research	
CRD 151	Community Field Research: Theory & Analysis	
CRD 156	Community Economic Development	
LDA/ABT 150	Introduction to Geographic Information Systems	
<b>Internship</b>		4
CRD 192	Internship	
<b>Depth Subject Matter Subtotal</b>		41-44
<b>Areas of Specialization</b>		
Choose one area of specialization from three options listed below for 24 units, including at least one CRD course from the option. These courses cannot overlap with the depth subject. Students may consult with a faculty advisor to identify an emphasis within the option and to select suitable courses.		
Students may consult with a faculty advisor to identify an emphasis within the option and to select suitable courses which is on the approved form but listed for each track.		
Global Communities Option ( <a href="https://humanecology.ucdavis.edu/sites/g/files/dgvnsk161/files/inline-files/CRD Global Community Revised Fall 2016.pdf">https://humanecology.ucdavis.edu/sites/g/files/dgvnsk161/files/inline-files/CRD Global Community Revised Fall 2016.pdf</a> )		

Organization & Management Option ( <a href="https://humanecology.ucdavis.edu/sites/g/files/dgvnsk161/files/inline-files/CRD_Organization_Management_Revised_Fall_2016.pdf">https://humanecology.ucdavis.edu/sites/g/files/dgvnsk161/files/inline-files/CRD_Organization_Management_Revised_Fall_2016.pdf</a> )	UWP 104I Writing in the Professions: Internships The Upper Division Composition Exam does not satisfy the requirement	
Policy, Planning, & Social Services Option ( <a href="https://humanecology.ucdavis.edu/sites/g/files/dgvnsk161/files/inline-files/CRD_Policy%2C_Planning_Social_Service_Revised_Fall_2016.pdf">https://humanecology.ucdavis.edu/sites/g/files/dgvnsk161/files/inline-files/CRD_Policy%2C_Planning_Social_Service_Revised_Fall_2016.pdf</a> )	Advanced Placement English score of 4 or 5 which satisfies ENL 003 and/or UWP 001 will satisfy one of the three required courses.	
<b>Community &amp; Regional Development English Coursework Requirement</b>	<b>Total Units</b> 97-100	
Choose three courses in English Composition; at least one must be upper division:		
ENL 003 Introduction to Literature		
CMN 001 Introduction to Public Speaking		
COM 001 Major Works of the Ancient World		
COM 002 Major Works of the Medieval & Early Modern World		
COM 003 Major Works of the Modern World		
COM 004 Major Works of the Contemporary World		
NAS 005 Introduction to Native American Literature		
UWP 001 Introduction to Academic Literacies		
or UWP 001V Introduction to Academic Literacies: Online		
or UWP 001Y Introduction to Academic Literacies		
Choose at least one:		
UWP 101 Advanced Composition		
or UWP 101V Advanced Composition		
or UWP 101Y Advanced Composition		
UWP 102A Writing in the Disciplines: Special Topics		
UWP 102B Writing in the Disciplines: Biology		
UWP 102C Writing in the Disciplines: History		
UWP 102D Writing in the Disciplines: International Relations		
UWP 102E Writing in the Disciplines: Engineering		
UWP 102F Writing in the Disciplines: Food Science & Technology		
UWP 102G Writing in the Disciplines: Environmental Writing		
UWP 102H Writing in the Disciplines: Human Development & Psychology		
UWP 102J Writing in the Disciplines: Fine Arts		
UWP 102K Writing in the Disciplines: Sociology		
UWP 102L Writing in the Disciplines: Film Studies		
UWP 102M Writing in the Disciplines: Community & Regional Development		
UWP 102N Writing in the Disciplines: Anthropology		
UWP 104A Writing in the Professions: Business Writing		
or UWP 104AY Writing in the Professions: Business Writing		
UWP 104B Writing in the Professions: Law		
UWP 104C Writing in the Professions: Journalism		
UWP 104D Writing in the Professions: Elementary & Secondary Education		
UWP 104E Writing in the Professions: Science		
UWP 104F Writing in the Professions: Health		
or UWP 104FY Writing in the Professions: Health		
<b>Community Development, Minor</b>		
<b>College of Agricultural &amp; Environmental Sciences</b>		
The Community & Regional Development Program (Department of Human Ecology) offers a minor in Community Development.		
<b>Minor Advisor</b>		
M. Anne Visser; see academic advisor Galyyna Erdman ( <a href="mailto:gerdman@ucdavis.edu">gerdman@ucdavis.edu</a> ) in 1303 Hart Hall.		
Code	Title	Units
CRD 001	The Community	4
Choose five:		20-24
CRD 118	Technology & Society	
CRD 140	Dynamics of Regional Development	
CRD 141	Organization of Economic Space	
CRD 142	Rural Change in the Industrialized World	
CRD 147	Community Youth Development	
CRD 149	Community Development Perspectives on Environmental Justice	
CRD 151	Community Field Research: Theory & Analysis	
CRD 152	Community Development	
CRD 153A	International Community Development: Asia	
CRD 153B	International Community Development: Europe	
CRD 153C	International Community Development: Africa	
CRD 154	Social Theory & Community Change	
CRD 156	Community Economic Development	
CRD 157	Politics & Community Development	
CRD 158	Community Governance	
CRD 162	People, Work & Technology	
CRD 164	Theories of Organizations & Their Role in Community Change	
CRD 171	Housing & Social Policy	
CRD 172	Social Inequality: Issues & Innovations	
CRD 176	Comparative Ethnicity	
CRD 180	Transnational Community Development	
<b>Total Units</b>	<b>24-28</b>	
<b>Community Development, Master of Science</b>		
<b>College of Agricultural &amp; Environmental Sciences</b>		

Stephen Wheeler, Ph.D., Chairperson of the Group  
(smwheeler@ucdavis.edu)

## Group Office

129 Hunt (Community Development Graduate Group);  
530-752-4119; Carrie Armstrong-Ruport (caruport@ucdavis.edu),  
Student Affairs Officer; Community Development Graduate Group (<http://communitydevelopment.ucdavis.edu>).

## Faculty

The Group contains more than 40 faculty from 15 departments on campus; see Community Development Graduate Group People (<http://communitydevelopment.ucdavis.edu/people/faculty.php>)

## Graduate Study

The Community Development Graduate Group (CDGG) offers an interdisciplinary program of study which leads to the M.S. degree. The program emphasizes interdisciplinary, collaborative, and project-based learning, as well as community-engaged scholarship. The CDGG challenges students to integrate theory and practice, to develop constructive solutions to contemporary problems, and to lead in building a healthy, sustainable, and equitable society. Graduate study in the CDGG prepares individuals to work within government, for-profit and non-profit community development organizations in the realm of social and economic change, or to prepare them for further doctoral studies in related programs. Particular strengths of the program include: community economic development; community organizing and organizations in under-served communities; environmental justice and planning; education; ethnic studies; local impacts of globalization and trans-nationalism; rural and urban political development and change; sustainable agriculture and food systems; and women and gender studies.

## Preparation

Applicants to this program can prepare themselves by enrolling for upper division courses in the social or behavioral sciences, e.g., anthropology, economics, sociology, psychology, geography, urban studies or political science, and courses in community studies.

## Graduate Advisors

Amanda Crump (acrump@ucdavis.edu), Jonathan London (jklondon@ucdavis.edu), N. Claire Napawan (ncnapawan@ucdavis.edu), Stephen Wheeler (smwheeler@ucdavis.edu)

## Geographic Studies, Minor

College of Agricultural & Environmental Sciences

### Minor

The minor in Geographic Studies is defined by its concern with place. Geographers strive to answer spatial questions regarding the Earth's surface; to describe and explain the character of regions; to ascertain the ways in which historical and contemporary humans have used and shaped the Earth's surface; and to understand the interactions of physical, biotic, and human systems within our global environment. The minor is compatible with a variety of environmental majors in the college.

The minor is sponsored by the Department of Human Ecology, Landscape Architecture & Environmental Design Program (p. 268).

### Minor Advisor

N. Claire Napawan; see academic advisor Galyna Erdman (gerdman@ucdavis.edu) in 1303 Hart Hall.

Code	Title	Units
LDA 010	World Regional Geography	3
Choose at least one course from three areas:		17
<i>Human Geography</i>		
CRD 140	Dynamics of Regional Development	
CRD 141	Organization of Economic Space	
CRD 142	Rural Change in the Industrialized World	
NUT 120BN	Nutritional Geography	
AAS 100	Survey of Ethnicity in the US	
AAS 107C	African Descent Communities & Culture in Asia	
AAS/DRA 155A	African-American Dance & Culture in the United States, Brazil & the Caribbean	
AAS 172	Diaspora & New Black Identities	
AAS 176	The Politics of Resources	
AAS 180	Race & Ethnicity in Latin America	
AAS 182	Hip Hop Culture & Globalization	
<b>OR</b> other upper division courses approved by the advisor		
<i>Physical Geography</i>		
ESM 120	Global Environmental Interactions	
ESM/PLS 144	Trees & Forests	
EVE 147	Biogeography	
WFC 110	Biology & Conservation of Wild Mammals	
WFC 111	Biology & Conservation of Wild Birds	
WFC 120	Biology & Conservation of Fishes	
WFC 156	Plant Geography	
WFC 157	Coastal Ecosystems	
<b>OR</b> other upper division courses approved by the advisor		
<i>Methods in Geography</i>		
LDA/ABT 150	Introduction to Geographic Information Systems	
ESM 185	Aerial Photo Interpretation & Remote Sensing	
ESM 186	Environmental Remote Sensing	
ABT 181N	Concepts & Methods in Geographic Information Systems	
ABT/HYD 182	Environmental Analysis Using GIS	
Other upper division courses approved by the advisor.		
<i>Individual Study</i>		
Select a maximum of 4 units of 192 (Internship) or 199 (Research) in any appropriate department.		

Total Units

20

## Human Development, Bachelor of Science

College of Agricultural & Environmental Sciences

## Department Office

Department of Human Ecology; 1303 Hart Hall; 530-752-1805; Human Development (<https://humanecology.sfs.ucdavis.edu/academic-planning-resources/>), Faculty (<http://humanecology.ucdavis.edu/hdfs-faculty/>)

## The Major Program

Human development explores the developmental process in humans throughout the life cycle. Biological, psychological, social, and contextual processes on development are studied. Students can choose emphases in Health and Well being across the Lifespan, or Children and Families across the Lifespan.

### The Program

Human development majors complete a group of preparatory courses in anthropology, biology, philosophy, psychology, and statistics. Upper division students can design their programs to specialize in one of two track areas. For instance, students can study either Health and Well being, or Children and Families, both of these tracks emphasize a lifespan developmental approach. Students can also pursue the general Human Development track which broadly exposes students to multiple influences on individual development and family processes.

### Internships & Career Alternatives

At least one practicum course is required. A second practicum or supervised internship can be used to fulfill the restricted elective requirement for the major. In addition, students can intern in schools, early childhood education or senior centers, hospitals, rehabilitation centers, probation offices, group foster homes, mental health clinics, or as tutors for handicapped or bilingual students. Human development graduates fill a wide variety of positions in preschools, elementary and special educational settings, programs designed for parents, families, and the elderly, as well as governmental jobs related to social services for people of all ages. Students who choose the Health & Well being track can apply to medical school or pursue training for positions in the health sciences. Human development prepares students to pursue advanced degrees in behavioral and social sciences, education, social work, family law, or health sciences.

### Preparatory Requirements

UC Davis students who wish to change their major to Human Development must be in good academic standing. Students must complete the following courses with a combined grade point average of at least 2.500. All of the following courses must be taken for a letter grade:

Code	Title	Units
PSC 001	General Psychology	4
Choose one:		4
STA 013	Elementary Statistics	
PSC 041	Research Methods in Psychology	
Choose one:		4-5
ANT 001	Human Evolutionary Biology	
ANT 002	Cultural Anthropology	
ANT 015	From Birth to Death: The Evolution of the Human Life Cycle	
Choose one:		5-3
BIS 002A	Introduction to Biology: Essentials of Life on Earth	

BIS 010	Everyday Biology
MIC 010	Natural History of Infectious Diseases
MCB 010	Introduction to Human Heredity
NPB 010	Elementary Human Physiology
NPB 012	The Human Brain & Disease
NPB 101	Systemic Physiology
PSC 101	Introduction to Biological Psychology

Students must have achieved a 2.000 GPA in any required upper division courses taken prior to declaring the major.

All courses satisfying the Preparatory Subject Matter, Depth Subject Matter, Restricted Electives and Human Development Major English Coursework Requirement must be taken for a letter grade.

### Major Advisor

Johnna Swartz

### Graduate Study

Graduate study is available through a Master of Science degree in child development, and a Ph.D. degree in human development. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Anthropology</i>		
Choose one:		4-5
ANT 001	Human Evolutionary Biology	
or ANT 001Y	Human Evolutionary Biology (Hybrid Version)	
ANT 002	Cultural Anthropology	
ANT 015	From Birth to Death: The Evolution of the Human Life Cycle	
<i>Biology</i>		
Choose two:		6-10
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 010	Everyday Biology	
BIS 101	Genes & Gene Expression	
MIC 010	Natural History of Infectious Diseases	
MCB 010	Introduction to Human Heredity	
NPB 010	Elementary Human Physiology	
NPB 012	The Human Brain & Disease	
NPB 101	Systemic Physiology	
PSC 101	Introduction to Biological Psychology	
<i>Philosophy</i>		
Choose two:		8
PHI 005	Critical Reasoning	
PHI 015	Introduction to Bioethics	
PHI 030	Introduction to Philosophy of Science	
PHI 031	Appraising Scientific Reasoning	
PHI 032	Understanding Scientific Change	
PHI 038	Introduction to Philosophy of Biology	
<i>Psychology</i>		
PSC 001	General Psychology	4
or PSC 001Y	General Psychology	

<b>Statistics</b>		or UWP 101Y Advanced Composition	
Choose one:	4	Any of UWP 102 Series (p. 1370)	
PSC 041	Research Methods in Psychology		Any of UWP 104 Series (p. 1370)
STA 013	Elementary Statistics		The Upper Division Composition Exam does not satisfy the requirement.
or STA 013Y	Elementary Statistics		
Preparatory Subject Matter Subtotal	26-31	Human Development English Coursework Requirement Subtotal	12
<b>Depth Subject Matter</b>		<b>Total Units</b>	<b>90-98</b>
<i>Life Span</i>			
HDE 100A	Infancy & Early Childhood	4	
or HDE 100AV	Infancy & Early Childhood		<sup>1</sup> Advanced Placement English score of 4 or 5 which satisfies ENL 003 and/or UWP 001 will satisfy one of the three required courses.
HDE 100B	Middle Childhood & Adolescence	4	
HDE 100C	Adulthood & Aging	4	
<i>Research Methods</i>			
HDE 120	Research Methods in Human Development	5	
<i>Practicum</i>			
Choose one:	4-6	Choose three:	
HDE 140L	Laboratory in Early Childhood (May only be taken for 4 units.)		HDE 131 Thriving Across the Lifespan
HDE 141	Field Study With Children & Adolescents		HDE 133 Stress, Adversity & Resilience
HDE 142	Field Study with Emotionally Distressed Children & Adolescents		HDE 135 Health Behaviors Across the Lifespan
HDE 143	Field Studies of the Elderly		HDE 137 Contextual Determinants of Health
<i>Area of Specialization (Tracks)</i>			HDE 180 Special Topics in Human Development
Choose one track, and take three courses within that track; see track options below:	12		
Health & Wellbeing (p. 267)			
Children & Families Across the Lifespan (p. 267)			
General HDE; choose any three upper division HDE courses. These courses cannot overlap with the depth subject.			
<i>Restricted Electives</i>			
Choose additional upper division courses for 19-20 units from a list of restricted electives related to your track in consultation with faculty advisor.	19-20		
Depth Subject Matter Subtotal	52-55		
<b>Human Development English Coursework Requirement</b>			
Choose three courses in English Composition; at least one must be upper division: <sup>1</sup>	12		
CMN 001	Introduction to Public Speaking		
COM 001	Major Works of the Ancient World		
COM 002	Major Works of the Medieval & Early Modern World		
COM 003	Major Works of the Modern World		
COM 004	Major Works of the Contemporary World		
ENL 003	Introduction to Literature		
NAS 005	Introduction to Native American Literature		
UWP 001	Introduction to Academic Literacies		
or UWP 001V	Introduction to Academic Literacies: Online		
or UWP 001Y	Introduction to Academic Literacies		
UWP 048	Style in the Essay		
UWP 049	Writing Research Papers		
Choose at least one:			
UWP 101	Advanced Composition		
or UWP 101V	Advanced Composition		
<b>Health &amp; Wellbeing Area of Specialization</b>			
<b>Code</b>	<b>Title</b>		<b>Units</b>
HDE 131	Thriving Across the Lifespan		
HDE 133	Stress, Adversity & Resilience		
HDE 135	Health Behaviors Across the Lifespan		
HDE 137	Contextual Determinants of Health		
HDE 180	Special Topics in Human Development		
<b>Children &amp; Families Across the Lifespan Area of Specialization</b>			
<b>Code</b>	<b>Title</b>		<b>Units</b>
HDE 104	Children in Families, Schools, Communities		
HDE 110	Families in Communities		
or HDE 110V	Families in Communities		
HDE 111	Family Stress & Resilience		
HDE 112	Social Relationships Across the Lifespan		
HDE 180	Special Topics in Human Development		
<b>Human Development, Minor</b>			
<b>College of Agricultural &amp; Environmental Sciences</b>			
The Department of Human Ecology offers two minors: Aging & Adult Development (p. 262) and Human Development.			
<b>Minor Advisor</b>			
Jennifer Falbe; see academic advisor Galyna Erdman (gerdman@ucdavis.edu) in 1303 Hart Hall.			
<b>Code</b>	<b>Title</b>		<b>Units</b>
HDE 100A	Infancy & Early Childhood		4
or HDE 100AV	Infancy & Early Childhood		
HDE 100B	Middle Childhood & Adolescence		4
Choose one:			
HDE 100C	Adulthood & Aging		
HDE 110	Families in Communities		
or HDE 110V	Families in Communities		
Choose two:			
HDE 101	Cognitive Development		8
HDE 102	Social & Personality Development		
HDE 104	Children in Families, Schools, Communities		

HDE 111	Family Stress & Resilience
HDE 112	Social Relationships Across the Lifespan
HDE/ENT 117	Longevity
HDE 130	Developmental Psychopathology
HDE 131	Thriving Across the Lifespan
HDE 133 or HDE 133V	Stress, Adversity & Resilience
HDE 134	Disparities & Inequalities in Health & Wellbeing
HDE 135	Health Behaviors Across the Lifespan
HDE 137	Contextual Determinants of Health
HDE 160	Social Aspects of Aging
HDE 161	Technology Use, Health, & Aging
HDE 163	Cognitive Neuropsychology in Adulthood & Aging
<b>Total Units</b>	<b>20</b>

## Career Alternatives

Graduates may find jobs in private landscape architectural firms or public agencies, non-profit organizations, and corporations employing landscape architects. The landscape architecture major provides the student with excellent preparation for graduate school or career development in a wide range of environmental and design-related fields.

## Graduate Study

Graduate-level landscape architecture courses are available to students pursuing graduate programs compatible with or directed toward landscape management, planning, and design issues. A Graduate Academic Certificate in Landscape Architecture & Environmental Design is an option for any graduate student; see Graduate Academic Certificates (<https://gradstudies.ucdavis.edu/programs/graduate-academic-certificates/>). Program faculty are active members of various graduate groups: Community Development, Geography, Transportation Technology & Policy, and Ecology. Faculty members have expertise in many areas, including landscape history, social theory, practice of public space design, historic landscape preservation, city and regional planning, community participation in urban landscape design, landscape ecology, conservation planning, resource management, bioregionalism, and regenerative landscape systems. Graduate students pursue more focused interests, expanding their professional expertise and/or conducting advanced research in landscape architecture correlated disciplines.

## Advising Center

Jana Krezo ([skrezo@ucdavis.edu](mailto:skrezo@ucdavis.edu)) (Snjezana J Krezo); 530-752-9322;  
Galyna Erdman ([gerzman@ucdavis.edu](mailto:gerzman@ucdavis.edu)) (Galyna Erdman); 530-752-2244;  
Jenniie Nguyen ([jengu@ucdavis.edu](mailto:jengu@ucdavis.edu)) (Jennifer Nguyen); 530-752-4113;

**Lead Faculty Advisor.** N. Claire Napawan

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>English Writing</i>		
Choose one:		4
	Also counts toward English Composition Requirement	
ENL 003	Introduction to Literature	
UWP 001 or UWP 001V or UWP 001Y	Introduction to Academic Literacies Introduction to Academic Literacies: Online Introduction to Academic Literacies	
UWP 101 or UWP 101V or UWP 101Y	Advanced Composition Advanced Composition Advanced Composition	
UWP 102A	Writing in the Disciplines: Special Topics	
UWP 102B	Writing in the Disciplines: Biology	
UWP 102C	Writing in the Disciplines: History	
UWP 102D	Writing in the Disciplines: International Relations	
UWP 102E	Writing in the Disciplines: Engineering	
UWP 102F	Writing in the Disciplines: Food Science & Technology	
UWP 102G	Writing in the Disciplines: Environmental Writing	
UWP 102H	Writing in the Disciplines: Human Development & Psychology	
UWP 102I	Writing in the Disciplines: Ethnic Studies	

# Landscape Architecture, Bachelor of Science

College of Agricultural & Environmental Sciences

## Department Office

Department of Human Ecology; 1303 Hart Hall; 530-752-1805;  
[Landscape Architecture](https://humanecology.ucdavis.edu/landscape-architecture-major/) (<https://humanecology.ucdavis.edu/landscape-architecture-major/>); Faculty ([https://humanecology.ucdavis.edu/people/?first=&last=&title=&unit=Landscape%20Architecture%20%2B%20Environmental%20Design&field\\_sf\\_person\\_type\\_target\\_id%5B0%5D=26](https://humanecology.ucdavis.edu/people/?first=&last=&title=&unit=Landscape%20Architecture%20%2B%20Environmental%20Design&field_sf_person_type_target_id%5B0%5D=26))

Landscape architecture is the planning and design of land areas where human use requires adaptation or conservation of the environment. Students who study landscape architecture are concerned about the welfare of the environment and the people who use and shape it. They are capable of solving physical problems and are able to visualize and think in terms of spaces and three-dimensional concepts. The program is fully accredited by the Landscape Architecture Accreditation Board (LAAB) which is the only organization professionally sanctioned to grant landscape architectural accreditations in the United States. The program was last reviewed in 2018.

## The Program

The curriculum balances creativity and visual and spatial skills with technological expertise and a thorough background in physical, natural, and social sciences. Students develop proficiency at problem solving relating to design of parks, public spaces, energy-efficient neighborhoods, land reclamation projects, city and regional planning, and landscape planning for wilderness and scenic regions, coastal and riparian environments, and other sensitive land areas. The program stresses a process-oriented approach to design and emphasizes environmental and community values.

## Preparatory Requirements

Students are admitted to the landscape architecture major only after submitting an application for review and selection by the faculty; see Application Process (<https://humanecology.ucdavis.edu/portfolio-application-process/>).

UWP 102J	Writing in the Disciplines: Fine Arts	LDA 160	Design & Build Studio	6
UWP 102K	Writing in the Disciplines: Sociology	LDA 161	Professional Practice & Construction Documents	6
UWP 102L	Writing in the Disciplines: Film Studies	LDA 170	Site Planning & Design Studio	6
UWP 104A	Writing in the Professions: Business Writing	LDA 171	Urban Design & Planning Studio	6
or UWP 104AY	Writing in the Professions: Business Writing	LDA 182	Advanced Landscape Architecture Studio I	6
UWP 104B	Writing in the Professions: Law	LDA 183	Advanced Landscape Architecture Studio II	6
UWP 104C	Writing in the Professions: Journalism	LDA 184	Capstone Landscape Architecture Studio	6
UWP 104D	Writing in the Professions: Elementary & Secondary Education	LDA 190	Proseminar in Landscape Architecture (Two quarters for 2 units total.)	2
UWP 104E	Writing in the Professions: Science	<i>Environmental Horticulture</i>		
UWP 104F	Writing in the Professions: Health	ENH 105	Taxonomy & Ecology of Environmental Plant Families	4
or UWP 104FY	Writing in the Professions: Health	Depth Subject Matter Subtotal		
UWP 104I	Writing in the Professions: Internships	56		
UWP 104J	Writing in the Professions: Writing for Social Justice	<b>Restricted Electives</b>		
UWP 104T	Writing in the Professions: Technical Writing	Choose 16 units of upper division courses in consultation with advisor.		
CMN 001	Introduction to Public Speaking (Also counts toward English Composition Requirement)	4	Total Units	145-148
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5		
ENH 006	Introduction to Environmental Plants	4		
MAT 016A	Short Calculus	3-4		
or STA 013	Elementary Statistics			
or STA 013Y	Elementary Statistics			
Choose one:		3-5		
CHE 002A	General Chemistry			
CHE 010	Concept of Chemistry			
PHY 001A	Principles of Physics			
PHY 010	Topics in Physics for Nonscientists			
GEL 001	The Earth			
SSC 010	Soils in Our Environment			
Choose two courses satisfying Social Sciences General Education requirement; may count toward both GE and the major.		8		
Choose two courses satisfying Arts & Humanities General Education requirement; may count toward both GE and the major.		8		
<i>Landscape Architecture</i>				
LDA 001	Introduction to Environmental Design	4		
LDA 002	Place, Culture & Community	4		
LDA 003	Sustainable Development: Theory & Practice	4		
LDA 021	Landscape Representation I	4		
LDA 030	History of Environmental Design	4		
LDA 050	Site Ecology	4		
LDA 060	Landform & Grading Studio	6		
LDA 070	Introduction to Spacemaking	4		
Preparatory Subject Matter Subtotal		73-76		
<b>Depth Subject Matter</b>				
<i>Landscape Architecture</i>				
LDA 119	(Pending Approval)	4		
LDA 120	Landscape Representation III	4		
or LDA 150	Introduction to Geographic Information Systems			

## Sustainable Environmental Design, Bachelor of Science

College of Agricultural & Environmental Sciences

### Program Office

Department of Human Ecology; 1303 Hart Hall;  
530-752-1805; Sustainable Environmental Design ([http://humanecology.ucdavis.edu/lda/academic\\_programs/](http://humanecology.ucdavis.edu/lda/academic_programs/))  
sed/); Faculty ([https://humanecology.ucdavis.edu/people/?first=&last=&title=&unit=Landscape%20Architecture%20%2B%20Environmental%20Design&field\\_sf\\_person\\_type\\_target\\_id%5B0%5D=26](https://humanecology.ucdavis.edu/people/?first=&last=&title=&unit=Landscape%20Architecture%20%2B%20Environmental%20Design&field_sf_person_type_target_id%5B0%5D=26))

### The Major Program

The Sustainable Environmental Design major is intended to build student understanding and skills related to creation of sustainable communities and landscapes. Coursework emphasizes urban and environmental design, sustainable development theory & practice, green building, local government planning & decision-making, community dynamics & organizations, and written, graphic, and oral presentation of sustainability strategies.

### The Program

The Sustainable Environmental Design major is particularly suited for students who are interested in the physical form & design of communities and related public & private processes. It is focused on the physical environment of communities and the process of designing, planning for, and regulating the built landscape and the place-making considerations involved in creating sustainable communities.

### Advising Center

See Jana Krezo ([skrezo@ucdavis.edu](mailto:skrezo@ucdavis.edu)) (Snjezana J Krezo);  
530-752-9322; Galyna Erdman ([gerzman@ucdavis.edu](mailto:gerzman@ucdavis.edu)) (Galyna Erdman);  
530-752-2244; Jennie Nguyen ([jengu@ucdavis.edu](mailto:jengu@ucdavis.edu)) (Jennifer Nguyen);  
530-752-4113;

## Lead Faculty Advisor

N. Claire Napawan ([ncnapawan@ucdavis.edu](mailto:ncnapawan@ucdavis.edu))

## Career Alternatives

Graduates will choose to pursue work in government, community organizations, education, or the private sector. They will also be well-positioned to pursue graduate education in city & regional planning, landscape architecture, architecture, public policy, public administration, law, real estate, and related fields.

## Courses in Sustainable Environmental Design

See course listing under Landscape Architecture (<https://humanecology.ucdavis.edu/lda-course-descriptions/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
	English Writing/Oral Communication—Also counts toward English Composition Requirement ( <a href="https://caes.ucdavis.edu/students/advising/academic-planning/bachelors-degree-requirements/">https://caes.ucdavis.edu/students/advising/academic-planning/bachelors-degree-requirements/</a> )	8
	One course from ENL 003; UWP 001, UWP 001Y, UWP 001V, UWP 048, UWP 049, UWP 101, UWP 101Y, UWP 101V, UWP 102 series, or UWP 104 series; AND one course selected from the courses not selected above, or from CMN 001; COM 001, COM 002, COM 003, COM 004, or NAS 005.	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
Choose one 4-unit course from each area below:		
<i>Statistics</i>		
Statistics (STA) (p. 1350)		
<i>Economics</i>		
Economics (ECN) (p. 739)		
<i>Political Science</i>		
Political Science (POL) (p. 1245)		
<i>Sociology</i>		
Sociology (SOC) (p. 1323)		
<i>Physical Sciences</i>		
Astronomy (AST) (p. 558)		
Chemistry (CHE) (p. 608)		
Geology (GEL) (p. 868)		
Physics (PHY) (p. 1217)		
Soil Science (SSC) (p. 1333)		
LDA 001	Introduction to Environmental Design	4
LDA 002	Place, Culture & Community	4
LDA 003	Sustainable Development: Theory & Practice	4
LDA 021	Landscape Representation I	4
LDA 030	History of Environmental Design	4
LDA 050	Site Ecology	4
LDA 070	Introduction to Spacemaking	4
Preparatory Subject Matter Subtotal		
<b>Depth Subject Matter</b>		
LDA 140	Green Building, Design, & Materials	4
LDA 141	Community Participation & Design	4
LDA 142	Applying Sustainable Strategies	6
ESP 171	Urban & Regional Planning	4

LDA 190	Proseminar in Landscape Architecture (Two quarters for 2 units total.)	2
Depth Subject Matter Subtotal		20
<b>Restricted Electives</b>		
Choose 20 units of upper division courses chosen from courses related to Community Sustainability.		20
Internship; recommended		0-5
Restricted Electives Subtotal		20-25
<b>Total Units</b>		<b>101-106</b>

## Human Rights Studies

### College of Letters & Science

Keith Watenpaugh, Ph.D., Program Director

## Program Office

213 Sproul Hall; 530-752-0835; Human Rights Studies (<http://human-rights.ucdavis.edu>); Faculty (<https://human-rights.ucdavis.edu/faculty/>)

Human Rights Studies is the newest interdisciplinary program at UC Davis and the first of its kind in the University of California system. Our new century has brought with it a host of complex, unprecedented, and daunting challenges to basic human rights; courage, creativity, and a commitment to sustained and innovative interdisciplinary collaboration are necessary to understand, address and solve these challenges. Human Rights Studies is a place for incubating, supporting, coordinating, and promoting faculty and student research, teaching, learning, service, and engagement across the campus on Human Rights and its attendant fields: humanitarianism, environmental justice, genocide, mass sexual and gender-based violence, refugee studies, memory studies, and post-conflict transitional justice. Undergraduate Human Rights students go on to join the Peace Corps, attend graduate school in the humanities and social sciences, and pursue professional programs and careers in public policy, law, education, nursing, and medicine.

- Human Right Studies, Minor (p. 270)

## Human Right Studies, Minor

### College of Letters & Science

Human Rights Minor (<https://human-rights.ucdavis.edu/human-rights-minor/>)

The Human Rights Minor provides students with an opportunity to explore human rights as a critical element of our contemporary world.

Courses in the minor approach human rights as a problem for humanity, policy, advocacy and humanitarian action, as well as a subject for historical, ethical, social scientific and cultural study. Students will examine moments of terrible human rights abuse: genocide, slavery, colonialism, Apartheid, and sexual and gender-based violence. They will also learn about movements to protect and promote human rights, including the elaboration of the contemporary human rights régime, efforts by international and local non-governmental human rights organizations, and artistic and literary responses to human rights challenges.

The minor is administered by the Human Rights Studies Program (<https://human-rights.ucdavis.edu/>).

## Program Objectives

In addition to completing HMR 134, students must take three additional Core Courses and one course from the Elective Course list.

## Advising

Consult the Department office (<http://human-rights.ucdavis.edu/>).

Code	Title	Units
HMR 134	Human Rights	4
<i>Core Courses (12 Units)</i>		
Choose three from the following:		12
HMR/AHI 120A	Art, Architecture, & Human Rights	
HMR 130	Special Topics in Human Rights	
HMR 131	Genocide	
HMR 136	Human Rights in the Middle East	
HMR 138	Human Rights, Gender, & Sexuality	
HMR 140A	Human Rights & the Popular Imagination	
HMR 140B	Art & Politics of Memory: Truth, Justice, Reconciliation & Human Rights	
HMR/HIS 161	Human Rights in Latin America	
HMR 162Y/ HIS 126Y	The History of Human Rights in Europe	
HMR 190	Seminar	
In addition to the courses listed above, any HMR course between 100-199 will count towards the core course requirement.		
See HMR 100-199 courses. (p. 930)		
Human Rights Studies Subtotal		16
<b>Elective Courses (4 Units)</b>		
Choose one from the following or seek the approval of the program advisor for an unlisted course that treats a human rights related topic:		4
<i>Suggested Electives</i>		
AAS 180	Race & Ethnicity in Latin America	
AMS 156	Race, Culture & Society in the United States	
ANT 126A	Anthropology of Development	
HIS 115E	Slavery, Africa, & the Atlantic World	
HIS 142A	History of the Holocaust	
HIS 142B	The Memory of the Holocaust	
HIS 159	Women & Gender in Latin American History	
HIS 165	Latin American Social Revolutions	
HIS 184	History of Sexuality in America	
NAS 120	Ethnopolitics of South American Indians	
POL 124	The Politics of Global Inequality	
SOC/IRE 104	The Political Economy of International Migration	
<i>Other Electives</i>		
ANT 126B	Women & Development	
ANT 130A	Cultural Dimensions of Globalization	
CHI 130	United States-Mexican Border Relations	
HIS 115D	Postcolonial Africa	
HIS 172	American Environmental History	
HIS 177B	History of Black People & American Race Relations: 1860-Present	

MSA 150/ WMS 185 (DISCONTINUED)	Women & Islamic Discourses
NAS 180	Native American Women
POL 126	Ethnic Self-Determination & International Conflict
POL 142B	Comparative Development: Politics & Inequality
POL 146B	Politics of Africa: Development in Africa
POL 152	The Constitutional Politics of the Equality
POL 166	Women in Politics
POL 168	Chicano Politics
POL 176	Racial Politics
SOC 130	Race Relations
SOC 160	Sociology of the Environment
WMS 140	Gender & Law
WMS 145	Women's Movements in Transnational Perspective
WMS 148	(Discontinued)
WMS 170	Queer Studies
WMS 175	Gender & Experience of Race
WMS 182	Globalization, Gender & Culture
WMS 184	Gender in the Arab World
Elective Courses Subtotal	
	4

<b>Total Units</b>	<b>20</b>
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## Humanities

College of Letters & Science

### Program Director

Jenny Kaminer, Ph.D. (Russian)

### Program Office

211 Sproul; 530-752-4999; Humanities (<http://humanities.ucdavis.edu>); Faculty (<http://humanities.ucdavis.edu/people/>)

### The Program of Study

The Humanities program is an undergraduate and graduate curriculum emphasizing innovative approaches to ideas that matter. Courses offered through the program are interdisciplinary in scope and aim to develop critical thinking and writing skills in three principal areas: major figures, works, and ideas in world cultures; major themes in world literatures and societies; and relationships between history, society, language, and culture.

## Hydrologic Sciences (Graduate Group)

College of Agricultural & Environmental Sciences

Thomas Harter, Ph.D., Chairperson of the Group

## Group Office

1152 Plant & Environmental Sciences Building; 530-752-1669; Hydrologic Sciences Graduate Group (<http://hsgg.ucdavis.edu/>); Faculty (<https://www.hsgg.ucdavis.edu/faculty/>)

- Hydrologic Sciences, Master of Science (p. 272)
- Hydrologic Sciences, Doctor of Philosophy (p. 272)

## Hydrologic Sciences, Master of Science

College of Agricultural & Environmental Sciences

### Graduate Study

The Hydrologic Sciences Graduate Group offers M.S. and Ph.D. degrees. Hydrologic Sciences integrates numerous and diverse fields of sciences to deepen the understanding of the physical and biogeochemical dynamics of water and water resources below, on, and above the land surface. It considers the interactions between water, the natural environment, agriculture, urban areas, ecosystems, climate, and societal systems. And it investigates water management, regulations, water law, and societal conflicts around water. Students have the ability to take advantage of the breadth of earth, environmental, agricultural, and social sciences and engineering resources on campus that are related to water in the natural and built environment. Students deepen their understanding, advance their critical thinking and analysis skills, and gain in-depth knowledge of innovative, leading hydrologic science tools and techniques to employ for problem-solving.

### Specialization

To accommodate the diversity of preparation and interests among students, the program offers five specializations from which the student selects one for their M.S.: physical hydrology, water policy and management, hydrochemistry, hydrobiology, and earth surface processes. Two options—Plan I, a thesis option and Plan II, a comprehensive exam option—are available for obtaining the Master of Science.

### Preparation

Applicants to the program are expected to have completed or to be completing an undergraduate degree in environmental, physical, chemical, or biological sciences, mathematics, engineering, or related degrees. Undergraduate study must include one year of calculus and one course each in probability/statistics, computer programming, physical geology, and introductory hydrology. Additional undergraduate preparation, expected to be completed before entering the program, depend on the choice of specialization: physical hydrology and earth surface processes require one course each in linear algebra, differential equations, and fluid mechanics, one year of general physics, and two courses of general chemistry. Water policy and management requires one course each in microeconomics and in public policy. Hydrochemistry requires one year each in general biology and general chemistry, and one course in aqueous chemistry. Hydrobiology requires one year each in general biology and general chemistry, and one course in introductory ecology.

### Graduate Advisors

Helen Dahlke, Ph.D., Yufang Jin, Ph.D., Isaya Kisekka, Ph.D.

### Graduate Admissions Advisor

Samuel Sandoval-Solis, Ph.D.

## Hydrologic Sciences, Doctor of Philosophy

College of Agricultural & Environmental Sciences

### Graduate Study

The Hydrologic Sciences Graduate Group offers M.S. and Ph.D. degrees. Hydrologic Sciences integrates numerous and diverse fields of sciences to deepen the understanding of the physical and biogeochemical dynamics of water and water resources below, on, and above the land surface. It considers the interactions between water, the natural environment, agriculture, urban areas, ecosystems, climate, and societal systems. And it investigates water management, regulations, water law, and societal conflicts around water. Students have the ability to take advantage of the breadth of earth, environmental, agricultural, and social sciences and engineering resources on campus that are related to water in the natural and built environment. Students deepen their understanding, advance their critical thinking and analysis skills, and gain in-depth knowledge of innovative, leading hydrologic science tools and techniques to employ for problem-solving.

### Specialization

To accommodate the diversity of preparation and interests among students, the program offers five specializations, from which students select one for their Ph.D.: physical hydrology, water policy and management, hydrochemistry, hydrobiology, and earth surface processes.

### Preparation

Applicants to the program are expected to have completed or to be completing an undergraduate degree in environmental, physical, chemical, or biological sciences, mathematics, engineering, or related degrees. Undergraduate study must include one year of calculus and one course each in probability/statistics, computer programming, physical geology, and introductory hydrology. Additional undergraduate preparation, expected to be completed before entering the program, depend on the choice of specialization: physical hydrology and earth surface processes require one course each in linear algebra, differential equations, and fluid mechanics, one year of general physics, and two courses of general chemistry. Water policy and management requires one course each in microeconomics and in public policy. Hydrochemistry requires one year each in general biology and general chemistry, and one course in aqueous chemistry. Hydrobiology requires one year each in general biology and general chemistry, and one course in introductory ecology.

### Graduate Advisors

Helen Dahlke, Ph.D., Yufang Jin, Ph.D., Isaya Kisekka, Ph.D.

### Graduate Admissions Advisor

Samuel Sandoval-Solis, Ph.D.

## Immunology (Graduate Group)

Graduate Studies

Charles Bevins, M.D., Ph.D., Chairperson of the Group; term ends Jun 30, 2023

## Group Office

1026 Vet Med Administration Building; 530-754-0103; Immunology Graduate Group (<https://immunology.ucdavis.edu/>); Faculty (<https://immunology.ucdavis.edu/people/faculty/>)

- Immunology, Master of Science (p. 273)
- Immunology, Doctor of Philosophy (p. 273)

## Immunology, Master of Science

Graduate Studies

### Graduate Study

The Graduate Group in Immunology offers an interdisciplinary program of study in an exciting field of biology and medicine leading to the M.S. and Ph.D. degrees. Participating faculty from various UC Davis Schools and Departments provide research opportunities in diverse areas of applied immunology. Areas of focus include infection and immunity (including host response regulation to parasites, viruses and bacteria), nutrition and immunity, autoimmunity, immune regulation, neuroimmunology, cancer therapy and immune mediators and their uses for diagnosis and treatment.

### Preparation

Applicants for candidacy to these programs should have completed undergraduate preparation in mathematics, physics, chemistry, biochemistry, molecular and cellular biology or related biological and medical sciences.

For work leading to the Ph.D. degree, the requirements include cell biology, chemical immunology, cellular immunology, immunohematology, and advanced immunology. In addition to these general requirements, more specialized preparation in at least one of the following is required: (a) microbiological specialties (bacteriology, virology, parasitology, medical microbiology); (b) zoological specialties (cell biology, endocrinology, embryology, proto-zoology, histology, cytology, physiology); (c) medical specialties (pathology, anatomy, pharmacology, clinical pathology, reproduction, hematology, epidemiology); (d) biochemistry/biophysics specialties (biologically active molecules, control mechanisms); (e) genetic specialties (developmental genetics, population genetics, cytogenetics, molecular genetics).

### Graduate Advisor

See the Graduate Program (<https://immunology.ucdavis.edu/directory/>).

## Immunology, Doctor of Philosophy

Graduate Studies

### Graduate Study

The Graduate Group in Immunology offers an interdisciplinary program of study in an exciting field of biology and medicine leading to the M.S. and Ph.D. degrees. Participating faculty from various UC Davis Schools and Departments provide research opportunities in diverse areas of applied immunology. Areas of focus include infection and immunity (including host response regulation to parasites, viruses and bacteria), nutrition and immunity, autoimmunity, immune regulation, neuroimmunology,

cancer therapy and immune mediators and their uses for diagnosis and treatment.

### Preparation

Applicants for candidacy to these programs should have completed undergraduate preparation in mathematics, physics, chemistry, biochemistry, molecular and cellular biology or related biological and medical sciences.

For work leading to the Ph.D. degree, the requirements include cell biology, chemical immunology, cellular immunology, immunohematology, and advanced immunology. In addition to these general requirements, more specialized preparation in at least one of the following is required: (a) microbiological specialties (bacteriology, virology, parasitology, medical microbiology); (b) zoological specialties (cell biology, endocrinology, embryology, proto-zoology, histology, cytology, physiology); (c) medical specialties (pathology, anatomy, pharmacology, clinical pathology, reproduction, hematology, epidemiology); (d) biochemistry/biophysics specialties (biologically active molecules, control mechanisms); (e) genetic specialties (developmental genetics, population genetics, cytogenetics, molecular genetics).

### Graduate Advisor

See the Graduate Program (<https://immunology.ucdavis.edu/directory/>).

## Individual Major

**College of Agricultural & Environmental Sciences**

Each college has differing rules and requirements for their Individual Majors; see:

- A&ES, Bachelor of Science, Individual (p. 273)
- Biological Sciences, Bachelor of Arts, Individual (p. 274)
- Biological Sciences, Bachelor of Science, Individual (p. 274)
- L&S, Bachelor of Arts, Individual (p. 275)
- L&S, Bachelor of Science, Individual (p. 275)

## Agricultural & Environmental Sciences, Bachelor of Science, Individual

**College of Agricultural & Environmental Sciences**

The Individual Major in this College has been suspended indefinitely.

### Program Office

150 Mrak Hall; 530-752-0108; Advising (<http://www.caes.ucdavis.edu/students/current/advising/>)

### Student Proposal

An Individual Major may be organized by a student having a specific academic interest not represented by an established major. Each student wishing an Individual Major should submit a proposal to the Dean's Office, prior to reaching 120 units, for review by the Student Actions & Individual Major Subcommittee. This proposal must include: (1) an essay describing the special educational aims of the student, including a statement indicating why the educational objectives cannot be met by existing majors; (2) a list of planned courses; and (3) faculty advisor

recommendations. It is critical that students contact a college counselor in the Dean's Office for consultation and development of the proposal.

## **Biological Sciences, Bachelor of Arts, Individual**

**College of Biological Sciences**

### **Program Office**

Biology Academic Success Center (<https://basc.biology.ucdavis.edu/>);  
1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

### **The Major Program**

The Individual Major, an integrated program composed of courses from two or more disciplines. It is designed by the student and is subject to approval by an advisor and appropriate college committees. This major enables a student to pursue a specific interest that cannot be accommodated within the framework of an existing major. It must clearly and specifically meet the student's educational goals as well as meet university and college academic standards.

### **Student Proposal**

A student who wishes to propose an individual major must submit the proposal to the Committee on Undergraduate Curriculum & Educational Policy (CUCEP) prior to reaching 120 units. It is important for the student to make arrangements to speak with an advisor in the Biology Academic Success Center early in the development of their major as no individual major will be approved after a student has completed 120 units.

### **Faculty Advisor (Selected By Student)**

A faculty member in a department or program in the College of Biological Sciences.

### **Advising**

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements as determined by the Committee on Undergraduate Student Petitions.		
Preparatory Subject Matter Subtotal		0
<b>Depth Subject Matter</b>		
Upper division course work must include:	28-42	
(a) Choose at least 30 units from courses offered by departments in the College of Biological Sciences.		
(b) Additional requirements as determined by the Committee on Undergraduate Student Petitions; see the Biology Academic Success Center for details.		
(c) For the B.A. degree, a maximum of 80 units toward the major.		

**All University, General Education, and College of Biological Sciences Bachelor's degree requirements; variable units.**

Depth Subject Matter Subtotal	28-42
<b>Total Units</b>	<b>28-42</b>

Total: 180

## **Biological Sciences, Bachelor of Science, Individual**

**College of Biological Sciences**

### **Program Office**

Biology Academic Success Center (<https://basc.biology.ucdavis.edu/>);  
1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

### **The Major Program**

The Individual Major, an integrated program composed of courses from two or more disciplines. It is designed by the student and is subject to approval by an advisor and appropriate college committees. This major enables a student to pursue a specific interest that cannot be accommodated within the framework of an existing major. It must clearly and specifically meet the student's educational goals as well as meet university and college academic standards.

### **Student Proposal**

A student who wishes to propose an individual major must submit the proposal to the Committee on Undergraduate Curriculum & Educational Policy (CUCEP) prior to reaching 120 units. It is important for the student to make arrangements to speak with an advisor in the Biology Academic Success Center early in the development of their major as no individual major will be approved after a student has completed 120 units.

### **Faculty Advisor (Selected By Student)**

A faculty member in a department or program in the College of Biological Sciences.

### **Advising**

Biology Academic Success Center; (<https://basc.biology.ucdavis.edu/>)  
1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements as determined by the Committee on Undergraduate Student Petitions.		
Preparatory Subject Matter Subtotal		0
<b>Depth Subject Matter</b>		
Upper division course work must include:	28-42	
(a) Choose at least 30 units from courses offered by departments in the College of Biological Sciences.		
(b) Additional requirements as determined by the Committee on Undergraduate Student Petitions; see the Biology Academic Success Center for details.		
(c) For the B.S. degree, a maximum of 110 units toward the major.		

**All University, General Education, and College of Biological Sciences Bachelor's degree requirements; variable units.**

Depth Subject Matter Subtotal	40-68
<b>Total Units</b>	<b>40-68</b>
Total: 180	

## Letters & Science, Bachelor of Arts, Individual

College of Letters & Science

### Program Office

1207 Social Sciences & Humanities Building (Undergraduate Education & Advising office); Advising (<https://lettersandscience.ucdavis.edu/advising/>)

### The Major Program

The Individual Major, an integrated program composed of courses from two or more disciplines, is designed by the student and is subject to approval by the faculty advisor and appropriate college committees. This major enables a student to pursue a specific interest that cannot be accommodated within the framework of an existing major. It must clearly and specifically meet the student's educational goals as well as meet university and college academic standards.

### Student Proposal

**Prior to submission of proposal, student must meet the following criteria: minimum overall GPA or 3.0 as well as a minimum GPA of 3.0 in all preparatory courses for the selected major.** A student who wishes to propose an individual major must submit the proposal to the Faculty Committee on Individual Majors in the College of Letters & Science prior to reaching 120 units. The proposal must be submitted by the end of the fourth week of the quarter. This proposal will consist of (1) an essay, identifying the specific educational and professional objectives, including an indication of why the objectives cannot be met within existing majors, (2) a list of courses planned to complete the major, and (3) faculty advisor recommendations. The proposal will be reviewed and a decision provided the quarter of submittal. It is important that you carefully review the information in the Individual Major Handbook ([https://lettersandscience.ucdavis.edu/sites/g/files/dgvnsk10716/files/files/page/individual-major-handbook\\_0.pdf](https://lettersandscience.ucdavis.edu/sites/g/files/dgvnsk10716/files/files/page/individual-major-handbook_0.pdf)).

### Honors Program

By the fourth week of the last quarter of the junior year, students potentially eligible for high or highest honors at graduation (see Dean's Honors List & Graduation with Honors (<https://lettersandscience.ucdavis.edu/deans-honors-list-and-graduation-honors/>)), may petition the Individual Majors Committee for tentative acceptance into an honors program.

Final admission will depend upon the Committee's approval of a senior thesis prospectus that has been agreed upon by the student and faculty advisor. The prospectus must be presented to the Committee by the end of the fourth full week of instruction of the first quarter of the senior year. Graduation with high or highest honors will be conditional upon both the maintenance of the required grade point average and the satisfactory completion of the senior thesis project. Students who anticipate doing a senior honors thesis should allow up to 3 units of independent study in the program during each of two quarters in the senior year as course options.

### Major Advisor (Selected By Student)

**Principal Advisor.** A faculty member in a teaching department or program in the College of Letters & Science in the major field of emphasis.

**Secondary Advisor.** A faculty member from a secondary area of interest.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
	Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.	0
<b>Preparatory Subject Matter Subtotal</b>		
		0
<b>Depth Subject Matter</b>		
	Upper division units must include:	45-54
	(a) Interrelated and complementary courses from two or more departments which provide a unified pattern and focus.	
	(b) At least 30 units from Letters & Science teaching departments or programs.	
	(c) No more than 10 units in courses numbered 194H, 198 & 199.	
	(d) For the A.B. degree, a maximum of 80 units toward the major.	
	<b>Depth Subject Matter Subtotal</b>	<b>45-54</b>
<b>Total Units</b>		
		<b>45-54</b>

## Letters & Science, Bachelor of Science, Individual

College of Letters & Science

### Program Office

1207 Social Sciences & Humanities Building (Undergraduate Education & Advising office); Advising (<https://lettersandscience.ucdavis.edu/advising/>)

### The Major Program

The Individual Major, an integrated program composed of courses from two or more disciplines, is designed by the student and is subject to approval by the faculty advisor and appropriate college committees. This major enables a student to pursue a specific interest that cannot be accommodated within the framework of an existing major. It must clearly and specifically meet the student's educational goals as well as meet university and college academic standards.

### Student Proposal

**Prior to submission of proposal, student must meet the following criteria: minimum overall GPA or 3.0 as well as a minimum GPA of 3.0 in all preparatory courses for the selected major.** A student who wishes to propose an individual major must submit the proposal to the Faculty Committee on Individual Majors in the College of Letters & Science prior to reaching 120 units. The proposal must be submitted by the end of the fourth week of the quarter. This proposal will consist of (1) an essay, identifying the specific educational and professional objectives, including an indication of why the objectives cannot be met within existing majors, (2) a list of courses planned to complete the major, and (3) faculty advisor recommendations. The proposal will be reviewed and a decision provided the quarter of submittal. It is important that you carefully review the information in the Individual Major Handbook ([https://lettersandscience.ucdavis.edu/sites/g/files/dgvnsk10716/files/files/page/individual-major-handbook\\_0.pdf](https://lettersandscience.ucdavis.edu/sites/g/files/dgvnsk10716/files/files/page/individual-major-handbook_0.pdf)).

([https://lettersandscience.ucdavis.edu/sites/g/files/dgynsk10716/files/files/page/individual-major-handbook\\_0.pdf](https://lettersandscience.ucdavis.edu/sites/g/files/dgynsk10716/files/files/page/individual-major-handbook_0.pdf)).

## Honors Program

By the fourth week of the last quarter of the junior year, students potentially eligible for high or highest honors at graduation (see Dean's Honors List & Graduation with Honors (<https://lettersandscience.ucdavis.edu/deans-honors-list-and-graduation-honors/>)), may petition the Individual Majors Committee for tentative acceptance into an honors program.

Final admission will depend upon the Committee's approval of a senior thesis prospectus that has been agreed upon by the student and faculty advisor. The prospectus must be presented to the Committee by the end of the fourth full week of instruction of the first quarter of the senior year. Graduation with high or highest honors will be conditional upon both the maintenance of the required grade point average and the satisfactory completion of the senior thesis project. Students who anticipate doing a senior honors thesis should allow up to 3 units of independent study in the program during each of two quarters in the senior year as course options.

## Major Advisor (Selected By Student)

**Principal Advisor.** A faculty member in a teaching department or program in the College of Letters & Science in the major field of emphasis.

**Secondary Advisor.** A faculty member from a secondary area of interest.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
	Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.	0
Preparatory Subject Matter Subtotal		
<b>Depth Subject Matter</b>		
	Upper division units must include:	45-54
	(a) Interrelated and complementary courses from two or more departments which provide a unified pattern and focus.	
	(b) At least 30 units from Letters & Science teaching departments or programs.	
	(c) No more than 10 units in courses numbered 194H, 198 & 199.	
	(d) For the B.S. degree, a maximum of 110 units toward the major.	
Depth Subject Matter Subtotal		45-54
<b>Total Units</b>		<b>45-54</b>

## Integrative Genetics & Genomics (Graduate Group)

College of Biological Sciences

Sean Burgess, Ph.D., Co-Chairperson of the Group  
David J. Segal, Ph.D., Co-Chairperson of the Group

## Group Office

227B Life Sciences; 530-752-4863; Integrative Genetics & Genomics Graduate Group (<http://igg.ucdavis.edu/>); Faculty (<http://igg.ucdavis.edu/faculty/>)

- Integrative Genetics & Genomics, Master of Science (p. 276)
- Integrative Genetics & Genomics, Doctor of Philosophy (p. 276)

## Integrative Genetics & Genomics, Master of Science

College of Biological Sciences

## Graduate Study

The Graduate Group in Integrative Genetics & Genomics (IGG) offers programs of study and research leading to M.S. and Ph.D. degrees. Students in the IGG graduate program have the opportunity to apply genomic, molecular, computational, and classical genetic approaches to study model organisms, a broad range of native and agricultural species, humans, and companion animals. The group integrates genetic research across campus and unites over 100 faculty members from more than 25 departments spanning the College of Biological Sciences, the College of Letters & Science, the College of Agricultural & Environmental Sciences, the School of Medicine, and the School of Veterinary Medicine. Students experience an unsurpassed breadth of research and instructional opportunities from the most fundamental to applied aspects of genetics. For additional information regarding the program, contact the group coordinator at 530-752-4863.

## Integrative Genetics & Genomics, Doctor of Philosophy

College of Biological Sciences

## Graduate Study

The Graduate Group in Integrative Genetics & Genomics (IGG) offers programs of study and research leading to M.S. and Ph.D. degrees. Students in the IGG graduate program have the opportunity to apply genomic, molecular, computational, and classical genetic approaches to study model organisms, a broad range of native and agricultural species, humans, and companion animals. The group integrates genetic research across campus and unites over 100 faculty members from more than 25 departments spanning the College of Biological Sciences, the College of Letters & Science, the College of Agricultural & Environmental Sciences, the School of Medicine, and the School of Veterinary Medicine. Students experience an unsurpassed breadth of research and instructional opportunities from the most fundamental to applied aspects of genetics. For additional information regarding the program, contact the group coordinator at 530-752-4863.

## Integrative Pathobiology (Graduate Group)

School of Veterinary Medicine

Damian Genetos, Ph.D., DACVO, Co-chairperson of the Group  
Sara Thomasy, D.V.M., Ph.D., DACVO, Co-chairperson of the Group

## Group Office

1024 Veterinary Medicine Student Services & Administrative Center; 530-752-3737; Integrative Pathobiology Graduate Group (<https://integrativepath.vetmed.ucdavis.edu/>); Faculty (<https://integrativepath.vetmed.ucdavis.edu/all-faculty/>)

- Integrative Pathobiology, Master of Science (p. 277)
- Integrative Pathobiology, Doctor of Philosophy (p. 277)

## Integrative Pathobiology, Master of Science

School of Veterinary Medicine

### Graduate Study

The Graduate Group in Integrative Pathobiology (GGIP) is the core UC Davis graduate program for students interested in disease processes and biomedical research. The diverse faculty members in the group come from the School of Veterinary Medicine, the School of Medicine, the College of Agricultural and Environmental Sciences, the College of Engineering, and the College of Biological Sciences. This diversity of faculty offers students a wide range of opportunities and expertise from the UC Davis biomedical research community.

GGIP is designed for students interested in gaining advanced knowledge of the causes and nature of disease processes in animals and humans at the global, organismal, cellular, or molecular level.

### Preparation

This program is primarily for applicants with a strong background in basic biomedical sciences. Admission requires an undergraduate degree (B.S. or B.A.) in a biological science, which should include prerequisite coursework in statistics, physics, general chemistry, organic chemistry, and cellular biology. Upper division courses in molecular biology, biochemistry, and genetics are encouraged.

### Graduate Advisors

Jeffrey Stott (Pathology, Microbiology, & Immunology), Su Hao Lo (Biochemistry & Molecular Medicine), Nam Tran (Pathology & Laboratory Medicine), Renée Tsolis (Medical Microbiology & Immunology), Lark Coffey (Pathology, Microbiology, & Immunology), Woutrina Smith (Medicine & Epidemiology), Kevin Keel (Pathology, Microbiology, & Immunology), Lisa Miller (Anatomy, Physiology, & Cell Biology), Natalia Vapniarsky-Arzi (Pathology, Microbiology, & Immunology), Kevin Woolard (Pathology, Microbiology, & Immunology), Carrie Finno (Population, Health & Reproduction), Xinbin Chen (Surgical & Radiological Sciences), Joshua Stern (Medicine & Epidemiology), Paramita Ghosh (Urologic Surgery), Nicholas Kenyon (Med Pulmonary), Patricia Pesavento (Pathology, Microbiology, & Immunology)

## Integrative Pathobiology, Doctor of Philosophy

School of Veterinary Medicine

### Graduate Study

The Graduate Group in Integrative Pathobiology (GGIP) is the core UC Davis graduate program for students interested in disease processes and biomedical research. The diverse faculty members in the group come from the School of Veterinary Medicine, the School of Medicine, the College of Agricultural and Environmental Sciences, the College of Engineering, and the College of Biological Sciences. This diversity of faculty offers students a wide range of opportunities and expertise from the UC Davis biomedical research community.

GGIP is designed for students interested in gaining advanced knowledge of the causes and nature of disease processes in animals and humans at the global, organismal, cellular, or molecular level.

### Preparation

Students applying to this program have varied backgrounds. Some hold professional degrees (e.g., D.V.M., M.D., or D.D.S.) while others apply after completion of an undergraduate degree. Students without a professional degree are admitted if they have exceptionally strong interests and backgrounds in basic biomedical sciences.

### Graduate Advisors

Jeffrey Stott (Pathology, Microbiology, & Immunology), Su Hao Lo (Biochemistry & Molecular Medicine), Nam Tran (Pathology & Laboratory Medicine), Renée Tsolis (Medical Microbiology & Immunology), Lark Coffey (Pathology, Microbiology, & Immunology), Woutrina Smith (Medicine & Epidemiology), Kevin Keel (Pathology, Microbiology, & Immunology), Lisa Miller (Anatomy, Physiology, & Cell Biology), Natalia Vapniarsky-Arzi (Pathology, Microbiology, & Immunology), Kevin Woolard (Pathology, Microbiology, & Immunology), Carrie Finno (Population, Health & Reproduction), Xinbin Chen (Surgical & Radiological Sciences), Joshua Stern (Medicine & Epidemiology), Paramita Ghosh (Urologic Surgery), Nicholas Kenyon (Med Pulmonary), Patricia Pesavento (Pathology, Microbiology, & Immunology)

## International Agricultural Development (Graduate Group)

Graduate Studies

### Program

International Agricultural Development Graduate Group (<http://iad.ucdavis.edu>); Faculty ([https://iad.sf.ucdavis.edu/people/?first=&last=&title=&unit=&field\\_sf\\_person\\_type\\_target\\_id%5B0%5D=26](https://iad.sf.ucdavis.edu/people/?first=&last=&title=&unit=&field_sf_person_type_target_id%5B0%5D=26))

### Contact

Contact (<https://iad.ucdavis.edu/contact-us/>) the Group office.

- International Agricultural Development, Master of Science (p. 277)

## International Agricultural Development, Master of Science

Graduate Studies

### Graduate Study

The International Agricultural Development M.S. degree program prepares students for careers in global agricultural and rural development. This is an interdisciplinary program designed to provide students with knowledge and skills that will enable them to implement, facilitate, and manage programs that enhance agricultural development, resource management, and rural life. Coursework and research is especially, but not exclusively, focused on issues facing developing countries and less-industrialized regions.

Students are prepared to realize biological and technological improvement in agricultural and natural systems to facilitate social innovation. Training in International Agricultural Development includes both breadth and depth components. Breadth components, required

of all M.S. students, aim to establish an understanding of the issues in international development as they relate to agriculture and the environment. These include the history and philosophy of development, leadership and management techniques, fundamentals of farming systems, and agricultural economics.

Through coursework and an independent research or capstone project, students acquire depth in their own area of specialization within the agricultural and social sciences. The areas are flexible and could include agricultural and resource economics, agricultural engineering, agronomy, animal science, anthropology, aquaculture, avian science, community development, ecology, economics, entomology, environmental design, environmental toxicology, food science, gender, geography, horticulture, nutrition, plant pathology, plant biology, plant protection and pest management, political science, preventive veterinary medicine, range science, sociology, soil science, sustainable agriculture, vegetable crops, viticulture, and water science.

Practical and on-site experience with development issues is encouraged through an independent research or capstone project. Students obtain guidance from partner organizations and the group's faculty members, who possess a wide range of academic experience in international development.

### **Graduate Advisor**

Contact (<https://iad.ucdavis.edu/contact-us/>) the Group office.

## **Land, Air, & Water Resources**

### **College of Agricultural & Environmental Sciences**

William Horwath, Ph.D., Chairperson

### **Department Office**

1110 Plant & Environmental Sciences Building; 530-752-1130; Land, Air, & Water Resources (<http://lawr.ucdavis.edu>)

Land, Air & Water Resources is a multidisciplinary department with faculty who specialize in atmospheric science, plant science, soils and biogeochemistry, hydrology, and water engineering. Teaching, research, and outreach efforts focus on agricultural and environmental aspects of these disciplines. The faculty also contributes to numerous other undergraduate and graduate programs in the Colleges of Agricultural & Environmental Sciences, Letters & Science, and Engineering.

### **Major Programs**

Undergraduate programs in Atmospheric Science (p. 278), Hydrology (p. 280), Environmental Science & Management (p. 221), and Sustainable Agriculture & Food Systems (p. 283) are centered in the department; see Undergrad Programs (<https://lawr.ucdavis.edu/students/undergrad-programs/>).

**Undergraduate Advising Center** is located in 1150 Plant & Environmental Sciences Building; 530-752-1603.

### **Courses**

See courses listed under Atmospheric Science (ATM) (p. 472), Hydrologic Sciences (HYD) (p. 472), Hydrology (HYD) (p. 472), Environmental Science & Management (ESM) (p. 472), and Soil Science (SSC) (p. 472). See also the websites listed above.

## **Graduate Study**

Graduate programs, offering both M.S. and Ph.D. degrees, in Atmospheric Science (p. 278), Soils & Biogeochemistry (p. 441), and Hydrologic Sciences (p. 271) are administered in the department; see Grad Programs ([http://lawr.ucdavis.edu/academic\\_programs.htm](http://lawr.ucdavis.edu/academic_programs.htm)).

**Graduate Advising Center** is located in 1152 Plant & Environmental Sciences Building; 530-752-1669.

- Atmospheric Science, Bachelor of Science (p. 278)
- Atmospheric Science, Minor (p. 280)
- Hydrology, Bachelor of Science (p. 280)
- Hydrology, Minor (p. 281)
- International Science Studies, Minor (p. 282)
- Soil Science, Minor (p. 283)
- Sustainable Agriculture & Food Systems, Bachelor of Science (p. 283)
- Watershed Science, Minor (p. 287)

## **Atmospheric Science, Bachelor of Science**

### **College of Agricultural & Environmental Sciences**

Faculty (<http://lawr.ucdavis.edu/people/faculty/atmospheric-science/>)

### **The Major Program**

Atmospheric science is the study of the air that surrounds the planet. It includes all weather phenomena and climate including global and regional climate change, the chemistry of trace constituents and cloud and particle formation, interactions between ecosystems and the atmosphere, as well as quantitative studies of climate extremes and severe weather, including droughts, floods, hurricanes and tornadoes. The study of the impacts of human and other biotic activity on the quality of the air we breathe are important topics in the major.

### **The Program**

Modern atmospheric science is a quantitative science that is reflected in the major's curriculum. In addition to the study of daily weather events, the program deals with fundamental dynamical and physical processes that involve the general circulation of the atmosphere; turbulent mass and energy transfer at the planetary surface as well as within the free atmosphere; the transfer of solar and terrestrial radiation throughout the atmosphere; atmospheric interaction with the biosphere; climate variations; and developments in remote sensing using satellites with modern meteorological instrumentation. In addition, the program has significant expertise in the areas of air quality and its related atmospheric chemistry. As well as providing a broad background in meteorology, the major includes an informal minor area to be chosen from mathematics, computer science, environmental studies, resource management or a physical or biological science. For more information, see Atmospheric Science (<http://atm.ucdavis.edu>).

### **Internships & Career Opportunities**

Atmospheric science students have participated in internships with the California Air Resources Board, various county Air Pollution Control Districts, the National Weather Service, and performing research. Job opportunities include: national weather services, weather forecasting for broadcast media or private forecasting firms, environmental

consulting firms (such as environmental impact reports, wind farm siting), government agencies at all levels from local (air quality districts, planning departments, etc.) to state (Air Resources Board) to national (NOAA), and companies whose operations are impacted by weather (such as airlines, futures markets). About half of our graduates continue their education by seeking an M.S. or Ph.D. degree in atmospheric science or related areas.

## Note

Alternative options for students who are interested in atmospheric science are to minor in ATM, to major in ESM and choose the climate change and air quality track, or to major in applied physics with a concentration in atmospheric physics. However, the ATM minor, the ESM climate change and air quality track, and the applied physics major do not meet the Federal civil service requirements for meteorologists.

## Graduate Study

You can specialize in particular areas of atmospheric science through graduate study and research leading to M.S. and Ph.D. degrees. For details, see Atmospheric Science (Graduate Group) (p. 95) & Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Lead Faculty Advisor

Kyaw Tha Paw U

## Atmospheric Science Major Advisor

Lacole Brooks ([lawradvising@ucdavis.edu](mailto:lawradvising@ucdavis.edu))

**Advising Center** for the major, is located in 1150 Plant & Environmental Sciences Building in Land, Air & Water Resources Teaching Center; 530-752-1603.

Code	Title	Units
<b>Written Expression. Also Counts Toward College English Composition Requirement</b>		
UWP 101	Advanced Composition	4
or UWP 101V	Advanced Composition	
or UWP 101Y	Advanced Composition	

### OR

Choose one:		
UWP 102A	Writing in the Disciplines: Special Topics	
UWP 102B	Writing in the Disciplines: Biology	
UWP 102C	Writing in the Disciplines: History	
UWP 102D	Writing in the Disciplines: International Relations	
UWP 102E	Writing in the Disciplines: Engineering	
UWP 102F	Writing in the Disciplines: Food Science & Technology	
UWP 102G	Writing in the Disciplines: Environmental Writing	
UWP 102H	Writing in the Disciplines: Human Development & Psychology	
UWP 102I	Writing in the Disciplines: Ethnic Studies	
UWP 102J	Writing in the Disciplines: Fine Arts	
UWP 102L	Writing in the Disciplines: Film Studies	
UWP 102M	Writing in the Disciplines: Community & Regional Development	
UWP 102N	Writing in the Disciplines: Anthropology	

UWP 104A or UWP 104AY	Writing in the Professions: Business Writing	
UWP 104B	Writing in the Professions: Law	
UWP 104C	Writing in the Professions: Journalism	
UWP 104D	Writing in the Professions: Elementary & Secondary Education	
UWP 104E	Writing in the Professions: Science	
UWP 104F or UWP 104FY	Writing in the Professions: Health (UWP 104F Pending Approval)	
UWP 104J	Writing in the Professions: Writing for Social Justice	
UWP 104T	Writing in the Professions: Technical Writing (or Course selected with advisor's approval.)	
<b>Written Expression Subtotal</b>		4
<b>Preparatory Subject Matter</b>		
PLS 002	Botany & Physiology of Cultivated Plants	4
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
Choose one:		4
ECS 032A or Course selected with advisor's approval.	Introduction to Programming	
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A or MAT 027A or BIS 027A	Linear Algebra Linear Algebra with Applications to Biology	3
MAT 022B or MAT 027B or BIS 027B	Differential Equations Differential Equations with Applications to Biology	3
ATM 060	Introduction to Atmospheric Science	4
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	4
<b>Preparatory Subject Matter Subtotal</b>		63
<b>Depth Subject Matter</b>		
ATM 110	Weather Observation & Analysis	4
ATM 111	Weather Analysis & Prediction	3
ATM 111LY	Weather Analysis & Prediction Laboratory	2
ATM 120	Atmospheric Thermodynamics & Cloud Physics	4
ATM 121A	Atmospheric Dynamics	4
ATM 121B	Atmospheric Dynamics	4
ATM 124	Meteorological Instruments & Observations	3
ATM 128	Radiation & Satellite Meteorology	4
<i>Internship</i>		

2 units from:

ATM 192	Atmospheric Science Internship	
or ATM 199	Special Study for Advanced Undergraduates	
Choose two upper division Atmospheric Science (ATM) courses selected with advisor's approval; excluding 192 & 199.		7
Choose one computer numerical programming class:		4
ENG 006	Engineering Problem Solving	
ATM 150	Introduction to Computer Methods in Physical Sciences	
Course selected with advisor's approval.		
Depth Subject Matter Subtotal		41
<b>Restricted Electives</b>		
Coordinated group of courses (informal minor area) to be chosen with advisor's approval from mathematics, computer science, environmental studies, communication, resource management, or a physical or biological science (at least 10 upper division units)		15
Restricted Electives Subtotal		15
<b>Total Units</b>		<b>123</b>

## Atmospheric Science, Minor

College of Agricultural &amp; Environmental Sciences

Faculty (<http://lawr.ucdavis.edu/people/faculty/atmospheric-science/>)

### Minor Program

The minor in Atmospheric Science provides a broad treatment of weather and climate, with the option to focus on such topics as climate change, meteorological instrumentation, and satellite remote sensing. Students undertaking the minor should have completed minimum preparatory course work in calculus and physics (MAT 016A, MAT 016B, and PHY 007A). Some upper division courses in Atmospheric Science have additional prerequisites in calculus and physics (MAT 021A, MAT 021B, MAT 021C, MAT 021D, MAT 022A, and MAT 022B, and PHY 009A, PHY 009B, PHY 009C, and PHY 009D).

### Lead Faculty Advisor

Kyaw Tha Paw U

### Minor Advisor

Lacole Brooks

Code	Title	Units
ATM 060	Introduction to Atmospheric Science	4
ATM 110	Weather Observation & Analysis	4
Choose four upper division courses, with the approval of the minor program advisor.		12-16
Four upper division Atmospheric Science (ATM) courses <sup>1</sup>		
OR		
Three upper division Atmospheric Science (ATM) courses <sup>1</sup>		
AND		
ESM 131	Air as a Resource	
Atmospheric Science (ATM) courses (p. 559)		

**Total Units**

20-24

<sup>1</sup> Excluding ATM 192 or ATM 199.

## Hydrology, Bachelor of Science

College of Agricultural &amp; Environmental Sciences

Faculty (<http://lawr.ucdavis.edu/people/faculty/hydrology/>)

### The Major Program

Hydrology is the study of the occurrence, distribution, circulation, and behavior of water and water-borne materials in the environment of Earth. It includes practical measurement and technical analysis of water phenomena underground, on the Earth's surface, and in the atmosphere. Contemporary hydrologic problems include environmental restoration, sustainability of groundwater and surface water resources, water pollution, and natural disasters such as floods, droughts, landslides, avalanches, and land subsidence. The management of these problems demands hydrologic scientists with the comprehensive, interdisciplinary education embodied in this program. Beyond its societal utility, hydrology can be an exciting science for the curious-minded. Hydrologists explore natural phenomena such as climate change, waterfalls, health of coral reefs, biogeochemical cycles, and aquifers.

### The Program

A hydrologist needs a strong background across the basic sciences of physics, mathematics, chemistry, and biology. Breadth of understanding comes from exposure to ecology, geology, engineering, policy, and law. Depth of experience is provided by core hydrology courses, internship opportunities, and practical outdoor training. Students choose electives to match their interests and career goals. Transfer students should have completed as much as possible of the preparatory subject matter listed below.

### Internships and Career Alternatives

Job opportunities in hydrology exceed the available supply of trained hydrologists. Students commonly obtain internships and jobs with state and federal agencies, private consulting firms, environmental interest groups, irrigation districts, and utility companies. Federal agencies hiring hydrologists include the U.S. Geological Survey, U.S. Department of Agriculture (Fish & Wildlife, Agricultural Research, Forest Service, and National Resource Conservation Service), Environmental Protection Agency, and national research laboratories (Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory). State and local agency employers include California's Departments of Water Resources, Conservation, Fish & Game, and Toxic Substances as well as the Water Resources Control Board and Regional Water Quality Control Boards. To obtain higher levels of responsibility and salary, hydrologists often seek advanced degrees, and the hydrology major is designed to provide students with a highly competitive education to get into graduate school.

### Lead Faculty Advisor

Isaya Kisekka (Land, Air &amp; Water Resources)

### Hydrology Major Advisor

Lacole Brooks (lbrooks@ucdavis.edu)

### Advising Center

1150 PES Building

Code	Title	Units
Preparatory Subject Matter		
Biological Science		

BIS 002A	Introduction to Biology: Essentials of Life on Earth	5	Choose one:	4-5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5	LDA/ABT 150	Introduction to Geographic Information Systems
<i>Chemistry</i>			HYD/ABT 182	Environmental Analysis using GIS
CHE 002A	General Chemistry	5	ESM 185	Aerial Photo Interpretation & Remote Sensing
CHE 002B	General Chemistry	5	ESM 186	Environmental Remote Sensing
CHE 002C	General Chemistry	5	<i>Hydrologic Science</i>	
<i>Physics</i>			Choose three:	8-13
PHY 009A	Classical Physics	5	HYD/ESM/ABT 110	Irrigation Systems & Water Management
PHY 009B	Classical Physics	5	HYD 118/ EBS 148/ESM 118	Evapotranspiration Principles, Measurement & Modeling
PHY 009C	Classical Physics	5	HYD 124	Plant-Water-Soil Relationships
<i>Mathematics</i>			HYD 143	Ecohydrology
MAT 021A	Calculus	4	HYD 145	Water Science & Design
MAT 021B	Calculus	4	HYD 146/GEL 156	Hydrogeology & Contaminant Transport
MAT 021C	Calculus	4	ECI 141	Engineering Hydraulics
MAT 021D	Vector Analysis	4	Depth Subject Matter Subtotal	
MAT 022A	Linear Algebra	3	45-57	
MAT 022B	Differential Equations	3	<b>Restricted Courses</b>	
<i>Geology</i>			Upper division courses to supplement or expand areas of student interest selected with approval of advisor.	
GEL 050	Physical Geology	3	16-26	
GEL 050L	Physical Geology Laboratory	2	Restricted Courses Subtotal	
Choose one:		4	16-26	
ENG 006	Engineering Problem Solving		<b>Total Units</b>	
ECS 032A	Introduction to Programming		132-154	
<b>Preparatory Subject Matter Subtotal</b>		71		
<b>Depth Subject Matter</b>			<h2>Hydrology, Minor</h2>	
Choose one:		4	<b>College of Agricultural &amp; Environmental Sciences</b>	
ECI 100	Introduction to Fluid Mechanics for Civil & Environmental Engineers		Faculty ( <a href="http://lawr.ucdavis.edu/people/faculty/hydrology/">http://lawr.ucdavis.edu/people/faculty/hydrology/</a> )	
ENG 103	Fluid Mechanics		The Hydrology Section of the Department of Land, Air & Water Resources offers a minor in Hydrology for environmental or natural science students who have an interest in water/environmental issues. The interested student should have completed preparatory course work in calculus (MAT 016B), chemistry (CHE 002A; CHE 002B recommended), physics (PHY 007A), and biology (BIS 002A). Course work in the minor provides fundamental skills and knowledge of the hydrologic sciences. The program is sufficiently flexible for students to pursue particular water issues or problems of interest to them.	
Equivalent of either:				
Choose ECI 114 or STA 130 series:		4-8		
ECI 114	Probabilistic Systems Analysis for Civil & Environmental Engineers		<b>Code</b>	<b>Units</b>
or STA 130A & STA 130B	Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course		Choose one:	4
			HYD 103N/ EBS 103	Fluid Mechanics Fundamentals
			ENG 103	Fluid Mechanics
Choose ECI 114 or STA 130 series:		4-8	Choose one:	4
			HYD 141	Physical Hydrology
			ESM 100	Principles of Hydrologic Science
<b>Hydrology</b>			<b>Hydrology</b>	
HYD 134	Aqueous Geochemistry	6	HYD/EBS 144	Groundwater Hydrology
HYD 141	Physical Hydrology	4	4	
HYD/EBS 144	Groundwater Hydrology	4	Soil Science	
ESM 108 or HYD 151	Environmental Monitoring Field Methods in Hydrology	3-4	SSC 107	Soil Physics
<b>Soil Science</b>			5	
SSC 107	Soil Physics	5	Choose one:	3-6
<b>Water Policy &amp; Law</b>			HYD 134	Aqueous Geochemistry
Choose one:		3-4	ARE 147	Resource & Environment Policy Analysis
HYD 150	Water Law		ESP 161	Environmental Law
ARE 147	Resource & Environment Policy Analysis		ESP 169	Water Policy & Politics
ESP 161	Environmental Law		ESM 121	Water Science & Management
ESP 169	Water Policy & Politics		<i>GIS &amp; Remote Sensing</i>	
ESM 121	Water Science & Management		HYD 134	Aqueous Geochemistry
			CHE 100	Environmental Water Chemistry

SSC 111	Soil Microbiology
ESP 151	Limnology

Total Units 20-23

## International Science Studies, Minor

### College of Agricultural & Environmental Sciences

#### Minor

This interdisciplinary minor in International Science Studies introduces College of Agricultural & Environmental Sciences students to global issues, which affect their major disciplines in the current world, and also provides an opportunity to gain first-hand experience abroad when appropriate. The goal of this minor is to enable our college students to develop greater international competence and to enhance their employability.

The minor assumes that the student will have a major in the sciences and that classes taken under one of the three tracks in the minor will contribute depth to the existing major or establish depth in a selected additional field of study. Students will be expected to work closely with an academic advisor in developing an intellectually coherent program of the study. A minimum of 18 units of upper division work is required. Only a single course can be counted toward both major and minor and no course can be used to satisfy the requirements of more than one minor.

#### Lead Faculty Advisor

Shu-Hua Chen (shachen@ucdavis.edu) (Land, Air, & Water Resources); 530-752-1822.

Code	Title	Units
<b>Global Issue Course Requirement</b>		<b>7-8</b>
Focusing on broad range of global issues and their impacts on ecological and environmental resources and biodiversity, in addition to international policy and economics. Beyond the courses taken under each track, choose two out of the three courses listed below:		
ATM 116	Modern Climate Change	
PLS 150	Sustainability & Agroecosystem Management	
ARE 115B/115BY/ ECN 115B/115BY	Economic Development	

Choose one of the following tracks: 16-17

Education Abroad Program courses taught overseas and relevant international internship activities will count towards the minor requirement with advisor's approval. For each track, students can take a maximum of 3 units from EAP courses, with a valid transcript, and 3 units from relevant international internship activities. The international internship activities would require a pre-approved study plan with the academic advisor before the maximum of 3 units can be awarded. Language and culture related courses are encouraged, but not required for the minor.

Education Abroad Program (EAP) courses. (p. 762)	
(1) Ecological, Environmental, & Energy Studies Track (p. 282)	
(2) Policy & Management Focus Track (p. 282)	

(3) Agriculture, Food, &amp; Fiber Systems Track (p. 282)

Total Units 23-25

## (1) Ecological, Environmental, & Energy Studies Track

Code	Title	Units
Choose 16-17 units:		16-17
ANT 103	Indigenous Peoples & Natural Resource Conservation	4
ARE 147	Resource & Environment Policy Analysis	3
ATM 116	Modern Climate Change	3
ATM 133	Biometeorology	4
ESM 100	Principles of Hydrologic Science	4
ESM 121	Water Science & Management	3
ESM 131	Air as a Resource	3
ESM/PLS 144	Trees & Forests	4
ESM 120	Global Environmental Interactions	4
ESP 100	General Ecology	4
ESP 151	Limnology	4
EVE 147	Biogeography	4
SSC 109	Sustainable Nutrient Management	4
HYD 143	Ecohydrology	4

## (2) Policy & Management Focus Track

Code	Title	Units
Choose 16-17 units:		16-17
ARE/ECN 115A	Economic Development	4
ARE 115B/115BY/ ECN 115B/115BY	Economic Development	4
ARE 138	International Commodity & Resource Markets	4
IRE 190	Topics in International Relations	4
CRD 156	Community Economic Development	5
CRD 180	Transnational Community Development	4
IAD/PLS 160	Agroforestry: Global & Local Perspectives	3
IAD 170	Program Development for International Agriculture	4
ESP/ARE 175	Natural Resource Economics	4

## (3) Agriculture, Food, & Fiber Systems Track

Code	Title	Units
Choose 16-17 units:		16-17
ANT 103	Indigenous Peoples & Natural Resource Conservation	4
ATM 133	Biometeorology	4
CRD 153A	International Community Development: Asia	4
CRD 153B	International Community Development: Europe	4
ESM 121	Water Science & Management	3
ESM 131	Air as a Resource	3

EVE 138	Ecology of Tropical Latitudes	5
HYD 124	Plant-Water-Soil Relationships	4
PLS 150	Sustainability & Agroecosystem Management	4
PLS/IAD 160	Agroforestry: Global & Local Perspectives	3
FST 109	Principles of Quality Assurance in Food Processing	3
NUT 119A	Global Nutrition	3
NUT 119B	International, Community-Based Nutritional Assessment	6

## Soil Science, Minor

College of Agricultural & Environmental Sciences

Faculty (<http://lawr.ucdavis.edu/people/faculty/>)

The Department of Land, Air & Water Resources, Soils & Biogeochemistry Program, offers a minor program in soil science. The minor is especially geared toward students in the environmental sciences including Hydrologic Science, Environmental Science & Management, Environmental Toxicology, Ecological Management & Restoration, International Agricultural Development, Crop Science & Management, Environmental Horticulture & Urban Forestry, Geology, and Plant Biology.

## Major Programs

See the Soils & Biogeochemistry track in Environmental Science & Management (p. 221).

## Graduate Study

Programs of study leading to the M.S. and Ph.D. degrees in Soils & Biogeochemistry (p. 441) are available. Information regarding these programs can be obtained from the graduate advisor, at Advising Information (<http://soils.ucdavis.edu/resource-guide/advising-information/>) and in the Graduate Announcement. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Lead Faculty Advisor

Anthony Toby O'Geen (Land, Air, & Water Resources)

Code	Title	Units
SSC 100	Principles of Soil Science	5
Choose 16 units:		16
SSC 102	Environmental Soil Chemistry	
SSC 105	Field Studies of Soils in California Ecosystems	
SSC 107	Soil Physics	
SSC 109	Sustainable Nutrient Management	
SSC 111	Soil Microbiology	
SSC 118	Soils in Land Use & the Environment	
SSC 120	Soil Genesis, Morphology, & Classification	
PLS 158	Mineral Nutrition of Plants	
HYD 124	Plant-Water-Soil Relationships	
HYD 134	Aqueous Geochemistry	
<b>Total Units</b>		<b>21</b>

# Sustainable Agriculture & Food Systems, Bachelor of Science

College of Agricultural & Environmental Sciences

Sustainable Agriculture & Food Systems is an interdisciplinary major hosted by the Department of Land, Air, & Water Resources (<http://lawr.ucdavis.edu>).

William Horwath, Ph.D., Lead Faculty Advisor

## Program Office

1150 PES; 530-752-1603; Sustainable Agriculture & Food Systems (<https://www.lawr.ucdavis.edu/students/undergrad-programs/sustainable-agriculture-and-food-systems/>)

## The Major Program

The Sustainable Agriculture & Food Systems (SA&FS) major serves students interested in improving the sustainability of agriculture and food systems. This major prepares graduates to understand the interdisciplinary and systems-based aspects of sustainability and provides them with the knowledge, leadership skills and experiences required to excel in agricultural and food systems professions.

## The Program

This program is designed to develop students' competencies for addressing the environmental, social, and economic challenges and opportunities associated with agricultural and food systems sustainability. The program emphasizes an experiential learning approach to sustainability education, allowing students to choose between three tracks within the major. Students in the Agriculture & Ecology track focus on crop and animal production systems, ecology, and practices that mitigate negative impacts while producing environmental and social benefits. Students in the Food & Society track focus on issues related to the social, cultural, political and community development aspects of agriculture and food systems. Students in the Economics & Policy track focus on issues related to agricultural and resource economics, policy and management. The program provides students with practical experiences through courses with on- and off-campus fieldwork and through internship placements at sites related to students' interests and focus of study.

## Lead Faculty Advisor

Lead Faculty Advisor & Track I Advisor. W. Horwath (Land, Air & Water Resources); Track II Advisor. R. Galt (Human Ecology); Track III Advisor. T. Tomich (Environmental Science & Policy).

Advising Center for the major is located in 1150 PES; 530-752-1603.

## Internships & Career Alternatives

Sustainable Agriculture & Food Systems students are required to complete an internship in the field before graduation. Internships have been arranged with local, county, & state agricultural agencies, production farms and commercial processors & retailers, domestic & international non-governmental organizations, and rural & urban community development programs. Graduates are prepared to pursue a broad range of careers related to agricultural production & food system management, rural & urban community services, education & development, and agricultural & environmental sciences, as well as careers in agricultural, environmental, and economic policy & analysis.

Positions may be in private industry, government and public service agencies and in the non-profit sector, nationally and internationally. The major also prepares students for graduate studies in a wide range of fields related to agriculture and food systems.

Code	Title	Units
<b>English Composition Requirement</b>		
See College requirement. ( <a href="https://caes.ucdavis.edu/students/advising/academic-planning/bachelors-degree-requirements/">https://caes.ucdavis.edu/students/advising/academic-planning/bachelors-degree-requirements/</a> )		
(1) Either two courses emphasizing written expression or one course emphasizing written expression and one course emphasizing oral expression, with a grade of C- (or P) or better. The following UC Davis courses satisfy this requirement:	4-8	
One course from ENL 003; UWP 001, UWP 001Y, UWP 001V, UWP 048, UWP 049, UWP 101, UWP 101Y, UWP 101V, UWP 102 series, or UWP 104 series; AND one course selected from the courses not selected above, or from CMN 001; COM 001, COM 002, COM 003, COM 004, or NAS 005.		
(2) Advanced Placement English score of 4 of 5 PLUS any course listed in 1(a) or 1(b) above EXCEPT UWP 001 or ENL 003.		
(3) By successfully passing the English Composition Examination administered by the College of Letters & Science upon completion of 70 units of degree credit (the examination does not yield credit).		
Must include CMN 001.		
English Composition Requirement Subtotal	4-8	
<b>Core Courses</b>		
<i>Plant Science</i>		
PLS 015	Introduction to Sustainable Agriculture	4
<i>Community &amp; Regional Development</i>		
CRD 020	Food Systems	4
ANS 112 or PLS 150	Sustainable Animal Agriculture Sustainability & Agroecosystem Management	3-4
<i>Agricultural &amp; Resource Economics</i>		
ARE 121	Economics of Agricultural Sustainability	4
<i>Plant Science</i>		
PLS 190	Seminar on Alternatives in Agriculture	2
<i>Environmental Science &amp; Policy</i>		
ESP 191A	Workshop on Food System Sustainability	3
ESP 191B	Workshop on Food System Sustainability	3
Core Courses Subtotal	23-24	
<b>Internship Requirement</b>		
Students must complete at least 8 units of internship, which may be combined off-campus or on-campus units.	8	
Internship Requirement Subtotal	8	
<b>Applied Production</b>		
Choose one:	2-3	
PLS 049	Organic Crop Production Practices	
PLP 040	Edible Mushroom Cultivation	
VEN 101A	Viticultural Practices	
VEN 101B	Viticultural Practices	
VEN 101C	Viticultural Practices	
ENH 120	Management of Container Media	
PLS 131	(Discontinued)	

<i>Animal Science</i>		
Choose one:		2
ANS 041L	Domestic Animal Production Laboratory	
ANS 049A	Animal Management Practices: Aquaculture	
ANS 049B	Animal Management Practices: Beef	
ANS 049C	Animal Management Practices: Dairy	
ANS 049D	Animal Management Practices: Goats	
ANS 049E	Animal Management Practices: Horses	
ANS 049F	Animal Management Practices: Laboratory Animals	
ANS 049G	Animal Management Practices: Meats	
ANS 049H	Animal Management Practices: Poultry	
ANS 049I	Animal Management Practices: Sheep	
ANS 049J	Animal Management Practices: Swine	
Choose one:		2-3
ABT 049	Field Equipment Operation	
ABT 052	Field Equipment Welding	
ABT 101	Engine Technology	
ABT/IAD 142	Equipment & Technology for Small Farms	
FST 050	Introduction to Food Preservation	
Applied Production Subtotal		6-8
<b>Tracks</b>		
Choose one track:		94-110
Track I: Agriculture & Ecology (p. 284)		
Track II: Food & Society (p. 285)		
Track III: Economics & Policy (p. 286)		
Tracks Subtotal		94-110
<b>Total Units</b>		<b>135-158</b>
<b>Track I: Agriculture &amp; Ecology</b>		
Focuses on crop and animal production systems, ecology, and practices that mitigate negative impacts while producing environmental and social benefits.		
<b>Code</b>	<b>Title</b>	<b>Units</b>
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
MAT 016A	Short Calculus	3
MAT 016B	Short Calculus	3
PLS 120 or STA 100	Applied Statistics in Agricultural Sciences Applied Statistics for Biological Sciences	4
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
<i>Physics</i>		
PHY 001A	Principles of Physics	3
<i>Biological Science</i>		
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
<i>Plant Science</i>		

VEN 002	Introduction to Viticulture	2	PLS 171	Principles & Practices of Plant Propagation
<i>Animal Science</i>			SSC 111	Soil Microbiology
ANS 001 or ANS 002	Domestic Animals & People Introductory Animal Science	4	SSC 112	Soil Ecology
<i>Food Science &amp; Technology</i>			Additional upper division restricted electives chosen in consultation with the track faculty advisor.	
FST 001	Principles of Food Science	3	Depth Subject Matter Subtotal	
<i>Economics</i>			36-41	
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics Principles of Microeconomics Principles of Microeconomics	4	<b>Total Units</b>	
<i>Community &amp; Regional Development</i>			<b>94-100</b>	
CRD 001	The Community	4	<b>Track II: Food &amp; Society</b>	
<i>Philosophy</i>			Focuses on issues related to the social, cultural, political and community development aspects of agriculture and food systems.	
Choose one:		4		
PHI 014	Ethical & Social Problems in Contemporary Society		<b>Code</b>	<b>Title</b>
PHI 015	Introduction to Bioethics		<b>Preparatory Subject Matter</b>	
PHI 024	Introduction to Ethics		<i>Philosophy</i>	
Choose one:		4-5	PHI 005 or PHI 031	Critical Reasoning Appraising Scientific Reasoning
ANT 002	Cultural Anthropology		Choose one:	
POL 001	American National Government		PHI 014	Ethical & Social Problems in Contemporary Society
POL 004	Basic Concepts in Political Theory		PHI 015	Introduction to Bioethics
SOC 001	Introduction to Sociology		PHI 024	Introduction to Ethics
SOC 003	Social Problems		<b>Statistics</b>	
Preparatory Subject Matter Subtotal		58-59	STA 013 or STA 013Y	Elementary Statistics Elementary Statistics
<b>Depth Subject Matter</b>			<b>Choose at least one:</b>	
<i>Agricultural &amp; Resource Economics</i>			CRD 151	Community Field Research: Theory & Analysis
Choose one:		3-4	LDA/ABT 150	Introduction to Geographic Information Systems
ARE 112	Fundamentals of Organization Management		STA 103	Applied Statistics for Business & Economics
ARE 120	Agricultural Policy		SOC 106	Intermediate Social Statistics
ARE 145	Farm & Rural Resources Appraisal		<i>Chemistry</i>	
ARE 147	Resource & Environment Policy Analysis		CHE 002A	General Chemistry
ARE 150	Agricultural Labor		<i>Biological Science</i>	
<i>Environmental Science &amp; Policy</i>			BIS 002A	Introduction to Biology: Essentials of Life on Earth
Choose one:		3-4	or BIS 010	Everyday Biology
ESP 161	Environmental Law		<i>Plant Science</i>	
ESP 169	Water Policy & Politics		PLS 002	Botany & Physiology of Cultivated Plants
HYD 150	Water Law		Choose one:	
<i>Soil Science</i>			BIS 002B	Introduction to Biology: Principles of Ecology & Evolution
SSC 100 or SSC 109	Principles of Soil Science Sustainable Nutrient Management	4-5	ESP 001	Environmental Analysis
Choose two:		6-8	WFC 010	Wildlife Ecology & Conservation
ENT 119	Apiculture		<i>Food Science &amp; Technology</i>	
HYD/ESM/ABT 110	Irrigation Systems & Water Management		FST 001	Principles of Food Science
PLS 105	Concepts in Pest Management		<i>Soil Science</i>	
PLS 111	Principles of Agronomic Crop Production Systems		SSC 010	Soils in Our Environment
PLS 112	Forage Crop Production		<i>Economics</i>	
PLS 113	Biological Applications in Fruit Tree Management		ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics Principles of Microeconomics Principles of Microeconomics
PLS/IAD 160	Agroforestry: Global & Local Perspectives			

<i>Political Science</i>		
POL 001 or POL 004	American National Government Basic Concepts in Political Theory	4
Choose one:		4-5
ANT 002	Cultural Anthropology	
SOC 001	Introduction to Sociology	
SOC 003	Social Problems	
<i>Community &amp; Regional Development</i>		
CRD 001	The Community	4
CRD 002	(Discontinued)	4
Preparatory Subject Matter Subtotal		58-63
<b>Depth Subject Matter</b>		
<i>Agricultural &amp; Resource Economics</i>		
Choose one:		4-5
ARE 112	Fundamentals of Organization Management	
ARE 145	Farm & Rural Resources Appraisal	
ARE 147	Resource & Environment Policy Analysis	
ARE 150	Agricultural Labor	
Choose one:		3-4
ARE 176	Environmental Economics	
ESP 160	The Policy Process	
ESP 161	Environmental Law	
ESP 169	Water Policy & Politics	
ESP 172	Public Lands Management	
ESP 179	Environmental Impact Assessment	
Choose 12 units:		12
ANT/ESP 101	Ecology, Nature, & Society	
CRD 118	Technology & Society	
CRD 142	Rural Change in the Industrialized World	
CRD 149	Community Development Perspectives on Environmental Justice	
CRD 152	Community Development	
SOC 130	Race Relations	
SOC 160	Sociology of the Environment	
Choose one:		4
AMS 101G	Special Topics: New Directions in American Culture Studies	
AMS 156	Race, Culture & Society in the United States	
HIS 108	Global Environmental History	
HIS 172	American Environmental History	
NAS 123	Native Foods & Farming of the Americas	
NAS 162	California Indian Environmental Policy II	
PHI 109	Philosophy of the Social Sciences	
WMS 104	Feminist Research	
WMS 136	Critical Food Studies	
Additional upper division restricted electives chosen in consultation with the track faculty advisor.		20
Depth Subject Matter Subtotal		43-45
<b>Total Units</b>	<b>101-108</b>	

## Track III: Economics & Policy

Focuses on issues related to agricultural and resource economics, policy and management.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
MAT 016A	Short Calculus	3
MAT 016B	Short Calculus	3
STA 013	Elementary Statistics	4
Choose one:		4
ARE 106	Econometric Theory & Applications	
STA 103	Applied Statistics for Business & Economics	
SOC 106	Intermediate Social Statistics	
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	4-5
or BIS 010	Everyday Biology	
<i>Plant Science</i>		
PLS 002	Botany & Physiology of Cultivated Plants	4
Choose one:		3-5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
ESP 001	Environmental Analysis	
WFC 010	Wildlife Ecology & Conservation	
<i>Food Science &amp; Technology</i>		
FST 001	Principles of Food Science	3
<i>Soil Science</i>		
SSC 010	Soils in Our Environment	3
<i>Economics</i>		
ECN 100A	Intermediate Micro Theory: Consumer & Producer Theory	4
ECN 100B	Intermediate Micro Theory: Imperfect Competition & Market Failure	4
<i>Political Science</i>		
POL 001 or POL 004	American National Government Basic Concepts in Political Theory	4
Choose one:		4-5
ANT 002	Cultural Anthropology	
SOC 001	Introduction to Sociology	
SOC 003	Social Problems	
<i>Community &amp; Regional Development</i>		
CRD 001	The Community	4
<i>Philosophy</i>		
Choose one:		4
PHI 014	Ethical & Social Problems in Contemporary Society	
PHI 015	Introduction to Bioethics	
PHI 024	Introduction to Ethics	
Preparatory Subject Matter Subtotal		60-64

<b>Depth Subject Matter</b>				
<i>Agricultural &amp; Resource Economics</i>				
Choose one:		3-4		
ARE 112	Fundamentals of Organization Management		HYD 141 or ESM 100	Physical Hydrology Principles of Hydrologic Science
ARE 145	Farm & Rural Resources Appraisal		HYD/EBS 144 or SSC 107	Groundwater Hydrology Soil Physics
ARE 150	Agricultural Labor			
ARE 157	Analysis for Operations & Production Management			
Choose 11-12 units:		11-12		
ARE 120	Agricultural Policy		SSC 100 or SSC 118	Principles of Soil Science Soils in Land Use & the Environment
ARE 130	Agricultural Markets			
ARE 147	Resource & Environment Policy Analysis			
ARE 176	Environmental Economics			
ESP 160	The Policy Process			
ESP 161	Environmental Law			
ESP 169	Water Policy & Politics			
ESP 172	Public Lands Management			
ESP 179	Environmental Impact Assessment			
Choose 8 units:		8		
ANT 101	Ecology, Nature, & Society			
CRD 118	Technology & Society			
CRD 142	Rural Change in the Industrialized World			
CRD 149	Community Development Perspectives on Environmental Justice			
CRD 152	Community Development			
SOC 130	Race Relations			
SOC 160	Sociology of the Environment			
Additional restricted electives chosen in consultation with an advisor.		20		
Depth Subject Matter Subtotal		42-44		
<b>Total Units</b>		<b>102-108</b>		

## Watershed Science, Minor

### College of Agricultural & Environmental Sciences

Will Horwath, Chairperson  
Susan Ustin, Vice Chairperson

Faculty (<http://lawr.ucdavis.edu/people/faculty/hydrology/>)

The Hydrology Program of the Department of Land, Air & Water Resources offers the minor in Watershed Science. This minor is intended for environmental, natural, or social science students who have an interest in the interfaces between hydrology, ecology, policy and management. The interested student should have completed preparatory course work in calculus (MAT 016B), chemistry (CHE 002A; CHE 002B recommended), physics (PHY 007A), and biology (BIS 002A). Course work in the minor provides fundamental skills and knowledge on the science and management of watersheds in the context of current water resources and ecological problems.

Code	Title	Units
<b>Hydrology</b>		
HYD 124 or HYD 151	Plant-Water-Soil Relationships Field Methods in Hydrology	4

HYD 141 or ESM 100	Physical Hydrology Principles of Hydrologic Science	4
HYD/EBS 144 or SSC 107	Groundwater Hydrology Soil Physics	4-5
<b>Soils Science</b>		
SSC 100 or SSC 118	Principles of Soil Science Soils in Land Use & the Environment	4-5
Choose one:		4
HYD 143	Ecohydrology	
ESM/PLS 144	Trees & Forests	
ESP 151	Limnology	
Choose one:		3-4
HYD 150	Water Law	
ESM 121	Water Science & Management	
ESP 161	Environmental Law	

**Total Units** **23-26**

## Law, School of

### School of Law

Kevin R. Johnson, J.D., Dean  
Afra Afsharipour, J.D., Associate Dean; Academic Affairs  
Emily Scivoletto, J.D., Senior Assistant Dean; Student Affairs  
Kristen Mercado, J.D., Assistant Dean; Admission & Financial Aid  
Brett C. Burns, Senior Assistant Dean; Administration

### Dean's Office

2020 Martin Luther King, Jr. Hall; 530-752-0243; School of Law (<https://law.ucdavis.edu/>); Faculty (<https://law.ucdavis.edu/faculty/>)

- Master of Laws (p. 287)
- Doctor of Jurisprudence (p. 288)

## Master of Laws

### School of Law

Master of Laws (LL.M.) Program (<https://law.ucdavis.edu/lm/>); 530-752-6081; Fax 530-752-4704; Master of Laws (llm@ucdavis.edu)

The Law School LL.M. (Master of Laws) program integrates American and foreign law students at all levels of study. For foreign law graduates, the program provides an opportunity to gain a basic knowledge of the United States legal system. United States law school graduates and selected foreign LL.M. candidates may also seek admission on a thesis rather than a course basis. Other opportunities available to all graduate law students include developing special expertise in a particular area and doing special projects and original research under the direction of a faculty member.

Each LL.M. candidate must successfully complete a minimum of 20 semester units of work, usually 10 units each semester. Foreign LL.M. students must enroll in the 2-unit course LAW 200A and the 1-unit course LAW 207A. They earn the remainder of their required course credit in elective J.D. courses. Each foreign student must also complete an intellectually rigorous legal research and writing project, constituting at least 2 units of credit.

All LL.M. candidates begin their year of study with a complete orientation in the academic and social life of the law school, the UC Davis campus,

and the city of Davis. LL.M. students are encouraged to enroll in the School of Law's Orientation in U.S.A. Law Program, given during the summer before the fall semester of LL.M. begins.

## Doctor of Jurisprudence

### School of Law

The University of California Davis School of Law offers a three-year professional curriculum leading to the degree of Juris Doctor. Within a uniquely supportive atmosphere, law students have access to a comprehensive modern law school curriculum taught by a nationally and internationally distinguished faculty. The School offers a full range of traditional law courses, opportunities for practical experience through clinical programs, and in-depth study of an area of law in an individualized program of classroom work, research, writing, or experience in the community. It further provides professional skills training in interviewing and counseling, negotiation and dispute resolution and trial practice. The School of Law seeks to promote critical evaluation of law and legal institutions in a broad perspective, integrating non-legal disciplines with professional legal education.

UC Davis Law School is fully accredited by the American Bar Association, is a member of the Association of American Law Schools, and has a chapter of the Order of the Coif.

## Program of Study

The professional curriculum requires six semesters for completion and extends over a period of three years. It is for full-time students only; no part-time or evening program is offered. New students are admitted only at the beginning of the fall semester.

After satisfactorily completing the professional curriculum of 88 semester units and the required period of resident study, you will receive the degree of Juris Doctor (J.D.). Students who fail to attain satisfactory grades may be required to withdraw from the School at the end of any academic year.

The first year's work is prescribed and provides the essential foundation for subsequent legal study. Satisfactory completion of the first-year courses is, in all cases, prerequisite to second- and third-year courses.

## Concurrent Degree Programs

Individual students may find a concurrent degree involving law and another discipline such as economics, business, sociology, or science advantageous. To support this kind of study, the School, in conjunction with other schools and university departments, has established Concurrent Degree Programs. Under these programs, a student may work toward a J.D. degree and a master's degree in another discipline at the same time. Students working toward a combined degree are required to spend their first year at the law school.

Normally, a Combined Degree Program will take at least four years. You will usually be able to earn between 6 to 10 semester-hours of law school credit for work in the related discipline and may be able to complete the combined degrees in less time than it would take to earn the two degrees separately. The first year of the Concurrent Degree Program must be taken entirely in the School of Law. During the remaining years, course work may be divided between the law school and the related discipline. You must satisfy the admission requirements for both programs and file applications with both units.

Students have pursued degree programs in combination with UC Davis departments for the M.A. degree in economics, philosophy, computer science, and sociology, and with the School of Management for the M.B.A. degree. The law school will attempt to work out an additional program if you are interested in other disciplines. You may enroll in the Concurrent Degree Program any time before the beginning of your third year in law school. If you are interested in pursuing a Concurrent Degree Program, and have made a separate application to another school or department, you should notify the School of Law if that application is accepted.

## Linguistics

### College of Letters & Science

**Chairperson.** Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>).

## Department Office

469 Kerr Hall; 530-752-0966; Linguistics (<http://linguistics.ucdavis.edu>); Faculty (<http://linguistics.ucdavis.edu/directory-of-people/lin-faculty/>)

- Linguistics, Bachelor of Arts (p. 289)
- Linguistics, Master of Arts (p. 290)
- Linguistics, Doctor of Philosophy (p. 290)
- Linguistics, Minor (p. 288)
- Linguistics for Language Teachers, Minor (p. 290)

## Linguistics, Minor

### College of Letters & Science

## Minor

Linguistics offers two minor programs:

- *Linguistics* (General) provides the student with basic knowledge of language structure and linguistic analysis.
- *Linguistics for Language Teachers* especially complements the major in English with the Teaching Area of emphasis; it is also of relevance to students interested in teaching foreign languages.

## Minor Advisor

Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>).

Code	Title	Units
LIN 001 or LIN 001Y	Introduction to Linguistics Introduction to Linguistics	4
LIN 103A	Linguistic Analysis I: Phonetics, Phonology, Morphology	4
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics	4
Choose one:		4
LIN 111	Introduction to Phonological Theory	
LIN 112	Phonetics	
LIN 121	Morphology	
LIN 131	Introduction to Syntactic Theory	
LIN 141	Semantics	
LIN 151	Historical Linguistics	

LIN 152	Language Universals & Typology	
Choose additional units from upper division Linguistics courses and other upper division courses listed in the major requirements in consultation with an advisor.	8	
<b>Total Units</b>	<b>24</b>	

## Linguistics, Bachelor of Arts

College of Letters & Science

### The Major Program

Linguistics is the systematic study of human language. It focuses on theories of language structure, variation, and use, description of contemporary languages, and the examination of language change through time. Because of the pervasive influence of language in our everyday lives, work in linguistics interacts in important ways with studies carried out in many other fields, including psychology, anthropology, neuroscience, philosophy, computer science, sociology, literature, language teaching, communication and education.

### The Program

An introductory lower division course provides students with basic concepts and some of the methods needed to analyze language in a systematic way. Upper division courses probe more deeply into specific aspects of language structure, language use, and the relationship of language to other realms of human activity.

### Career Alternatives

Majors in linguistics find practical outlets for their linguistic training in a variety of fields: the computer science industry (software development); teaching English as a second language; foreign language teaching; elementary and secondary level bilingual-bicultural programs; language-oriented missionary work; bilingual-bicultural curriculum development (e.g., for publishing houses); legal work; speech therapy; lexicography (preparation of dictionaries). All of these types of employment share an interest in persons skilled in the analysis of language, spoken and/or written. Linguistics equips students with just such skills.

### Grading Recommendation

Though not required, it is recommended that all courses offered in satisfaction of the Linguistics major be taken for a letter grade.

### Faculty Advisor

Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>).

### Honors & Honors Program

The honors program consists of 6 units of 194H credit normally taken in the fall and winter quarters of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. Specific eligibility criteria may be obtained from the major advisor. For general information regarding graduation with honors and Dean's Honors Lists, please see Academic Information.

### Graduate Study

The Department of Linguistics offers a program of study leading to M.A. and Ph.D. degrees. More detailed information may be obtained from the Graduate Advisor or from the Chairperson of the Linguistics Department.

### Graduate Advisor

Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
LIN 001 or LIN 001Y	Introduction to Linguistics Introduction to Linguistics	4
Foreign language, one course beyond the 15-unit requirement of the College of Letters & Science in the same language used to fulfill the college requirement. ( <a href="https://lettersandscience.ucdavis.edu/degree-requirements/">https://lettersandscience.ucdavis.edu/degree-requirements/</a> )		0-20
	<b>Preparatory Subject Matter Subtotal</b>	<b>4-24</b>
<b>Depth Subject Matter</b>		
LIN 103A	Linguistic Analysis I: Phonetics, Phonology, Morphology	4
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics	4
LIN 111	Introduction to Phonological Theory	4
LIN 131	Introduction to Syntactic Theory	4
Choose three:		12
LIN 111	Introduction to Phonological Theory	
LIN 112	Phonetics	
LIN 121	Morphology	
LIN 127	Text Processing & Corpus Linguistics	
LIN 131	Introduction to Syntactic Theory	
LIN 141	Semantics	
LIN 150	Languages of the World	
LIN 151	Historical Linguistics	
LIN 152	Language Universals & Typology	
Choose one:		4
LIN 160	American Voices	
LIN 163	Language, Gender, & Society	
LIN 165	Introduction to Applied Linguistics	
LIN 166	The Spanish Language in the United States	
Choose one:		4
LIN 171	Introduction to Psycholinguistics	
LIN/EDU 173	Language Development	
LIN 175	Biological Basis of Language	
LIN 177	Computational Linguistics	
LIN 180	Second Language Learning & Teaching	
LIN 182	Multilingualism	
Choose at least 8 upper division units:		8
Any LIN upper division course not used to fulfill area above or one of the approved courses below.		
AAS 156	Language & Identity in Africa & the African Diaspora	
ANT 117	The Ethnographic & Literary Imagination	
ANT 120	Language & Culture	
EDU 151	History & Approaches to Multilingualism in K-12 Contexts	
ENL 105	History of the English Language	
ENL/LIN/UWP 106	English Grammar	
FRE 109	French Phonetics	

FRE 160	Linguistic Study of French-Language in Context
FRE 161	Linguistic Study of French: Form & Meaning
FRE 162	History of the French Language
GER 105	The Modern German Language
HDE 101/PSC 141	Cognitive Development
JPN 151	Japanese Linguistics
NAS 107	Learning Native American Languages
PHI 137A	Philosophy of Language: Theory of Reference
PHI 137B	Philosophy of Language: Truth & Meaning
PHI 137C	Philosophy of Language: Semantics & Pragmatics
PHI 156	Contemporary Analytic Philosophy
PSC 132	Language & Cognition
SPA 111N	The Structure of Spanish: Sounds & Words
SPA 112N	The Structure of Spanish: Words & Phrases
SPA 113	Spanish Pronunciation
SPA 114N	Contrastive Analysis of English & Spanish
SPA 115	History of the Spanish Language
SPA 115S	History of the Spanish Language
SPA 116	Applied Spanish Linguistics
SPA 117	Teaching Spanish as a Native Tongue in the U.S.: Praxis & Theory
SPA 118	Topics in Spanish Linguistics
Depth Subject Matter Subtotal	44
Total Units	48-68

## Linguistics, Master of Arts

### College of Letters & Science

Director of Graduate Studies: Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>); Faculty ([http://linguistics.ucdavis.edu/directory-of-people/lin-faculty/#c4=all&b\\_start=0](http://linguistics.ucdavis.edu/directory-of-people/lin-faculty/#c4=all&b_start=0))

### Graduate Study

The Department of Linguistics offers a program of study leading to M.A. and Ph.D. degrees.

The M.A. program follows PLAN II. 36-38 units of coursework are required, at least 18 of which must be graduate level courses in the major field. A comprehensive final examination in the major subject is required of each candidate. No thesis is required.

### Graduate Advisors

Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>).

### Program Coordinator

Stephanie Fallas

## Linguistics, Doctor of Philosophy

### College of Letters & Science

Director of Graduate Studies: contact the Department of Linguistics (<http://linguistics.ucdavis.edu>); Faculty ([http://linguistics.ucdavis.edu/directory-of-people/lin-faculty/#c4=all&b\\_start=0](http://linguistics.ucdavis.edu/directory-of-people/lin-faculty/#c4=all&b_start=0))

## Graduate Study

The Department of Linguistics offers a program of study leading to M.A. and Ph.D. degrees.

The Ph.D. degree offers advanced training and research in linguistic theories and methods. Second language acquisition and development is a particular emphasis of the program. Detailed information on both the M.A. and the Ph.D. degrees can be obtained from the graduate advisor, from the chair of the Graduate Group or the departmental chair.

### Graduate Advisors

Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>).

### Program Coordinator

Stephanie Fallas

## Linguistics for Language Teachers, Minor

### College of Letters & Science

### Minor

Linguistics offers two minor programs:

- Linguistics (p. 288) (General) provides the student with basic knowledge of language structure and linguistic analysis.
- *Linguistics for Language Teachers* especially complements the major in English with the Teaching Area of emphasis; it is also of relevance to students interested in teaching foreign languages.

### Minor Faculty Advisor

Contact the Department of Linguistics (<http://linguistics.ucdavis.edu>).

Code	Title	Units
LIN 001 or LIN 001Y	Introduction to Linguistics	4
LIN/ENL/UWP 106	English Grammar	4
LIN 165	Introduction to Applied Linguistics	4
LIN 160 or LIN 163	American Voices Language, Gender, & Society	4
Choose two: LIN/EDU 173 LIN 180 LIN 182	Language Development Second Language Learning & Teaching Multilingualism	8
Total Units		24

## Management, Graduate School of

### Graduate School of Management

- Accounting, Minor (p. 291)
- Business Analytics, Master of Science (p. 291)
- Business Administration, Master of Business Administration (p. 291)

- Business Administration Online, Master of Business Administration Online (p. 292)
- Professional Accountancy, Master of Professional Accountancy (p. 292)
- Technology Management, Minor (p. 292)

## Accounting, Minor

Graduate School of Management

### School Office

Gallagher Hall; 530-752-7658; Graduate School of Management (<http://gsm.ucdavis.edu/>)

The UC Davis Graduate School of Management's Undergraduate Accounting Minor gives you the opportunity to enhance your accounting knowledge with a carefully crafted series of five upper division courses. These courses are designed to prepare you for accounting-related careers or advanced study in accounting. All five courses, 20 units total, must be completed to receive the minor certification.

The Accounting minor courses are open to all undergraduate and graduate majors at UC Davis.

The five courses required for the Accounting minor are offered by the Graduate School of Management. No substitutions (e.g., transfer courses, study abroad courses, or other UC Davis courses) are allowed. No course overlap is allowed with other minors. No more than one course can be counted towards both the student's major and the minor.

MGT 011A & MGT 011B are prerequisites for the Accounting minor. Please plan accordingly.

Code	Title	Units
MGT 101	Sources & Uses of Accounting Information	4
MGT 103	Intermediate Financial Accounting I	4
MGT 105	Intermediate Financial Accounting II	4
MGT 107	Intermediate Financial Accounting III	4
MGT 170	Management Accounting & Control <sup>1</sup>	4
To complete the minor, students must complete the 20 units of coursework with a GPA of 2.000 or better. Courses may be taken P/NP as long as at least one course is taken for a letter grade and minor GPA is at least 2.000.		
The OASIS Minor Declaration form will only be approved after the student is enrolled in the final course for the minor, one minor course has been successfully completed and minor GPA is at least 2.000.		
<b>Total Units</b>		<b>20</b>

<sup>1</sup> Please note that there is substantial overlap between MGT 170 & ARE 119. Students pursuing the accounting minor must complete MGT 170.

## Business Analytics, Master of Science

Graduate School of Management

The Graduate School of Management Master of Science in Business Analytics program will allow you to build competencies in analytics, data,

business and practice and prepare you to be an innovative leader in this data-driven era. Advance your career by acquiring expertise in one of the most coveted skillsets in today's, modern business environment—business analytics.

## Core Competencies

### Business

Build your business skills for achieving organizational impact through leadership, strategic thinking, communication and project management.

### Data

Build your data skills as you learn core methods for acquiring, storing, handling and representing data.

### Analytics

Analytics is the discovery, interpretation and communication of meaningful patterns of data. Build your skills in core statistical and computational techniques such as data modeling, databases, regression, data mining, machine learning and operations research methods.

### Practice

Our program will give you hands-on experience working with and implementing analytic projects in a business environment. Under the direction of program faculty and in small student teams, you will learn analytics by navigating the complete project lifecycle on business problems drawn from real industry data.

H. Rao Unnava, Ph.D., Dean

Ashwin Aravindakshan, Ph.D., Academic Director

James T. Kelly, M.B.A., Assistant Dean for Finance & Administration

### School Office

Gallagher Hall; 530-752-7658; Master of Science in Business Analytics (<https://gsm.ucdavis.edu/master-science-business-analytics-msba/>); Faculty (<http://gsm.ucdavis.edu/faculty-and-research-0/>)

The UC Davis Master of Science in Business Analytics program is designed to prepare you to thrive as an innovative leader in the digital economy.

## Business Administration, Master of Business Administration

Graduate School of Management

H. Rao Unnava, Ph.D., Dean  
Joseph Chen, Ph.D., Program Chair  
Michelle H. Yetman, Ph.D., Associate Dean  
Amy Russell, M.B.A., Senior Assistant Dean for Student Affairs  
James T. Kelly, M.B.A., Assistant Dean for Finance & Administration

### School Office

Gallagher Hall; 530-752-7658; Graduate School of Management (<http://gsm.ucdavis.edu/>); Faculty (<http://gsm.ucdavis.edu/faculty-and-research-0/>)

## Program of Study

The hallmark of the UC Davis Master of Business Administration (MBA) program is its flexibility. Our STEM-designated program reflects UC Davis' nationally recognized leadership in the STEM fields. Our rigorous

curriculum emphasizes quantitative analysis and data-driven decision-making, which will prepare you for leadership roles in STEM fields. Innovative application of data in business decision making has become a highly valued skill demanded by employers—especially here in Northern California and Silicon Valley.

The required core curriculum is designed to provide students foundation in the functional areas of business—accounting, economics, finance, marketing, organizational behavior, statistics, and strategy. These management disciplines are examined through the use of case studies, lectures and the analysis of a few select companies on which to base illustrations and spark discussions. As early as the first year of study, students are able to integrate elective courses into their personal curriculum.

Elective courses at the Graduate School of Management place an emphasis on real-world application of management principles through the use of executive guest speakers who present “live” case study analyses and actual “client” businesses for student projects. Many courses require team projects and emphasize managing by innovation and entrepreneurial thinking. These team projects develop your independent research abilities and hone your presentation skills. With a wide variety of electives offered every year, students can build their own MBA curriculum based on their goals. Most students choose functional concentrations such as:

- Business Analytics and Technologies
- Entrepreneurship
- Finance/Accounting
- Marketing
- Management
- Strategy

## **Business Administration Online, Master of Business Administration Online**

### **Graduate School of Management**

Offering first-of-its-kind access to a nationally ranked University of California management school, MBA@UCDavis provides a top-quality, transformational experience—your opportunity to earn a UC Davis graduate business degree from anywhere in the world.

Through a close-knit online community and in-person residential experiences, we empower you to collaborate with a group of diverse, highly motivated, caring professionals who will challenge you to be your best.

We'll connect you with our global alumni network and corporate partners across Northern California. You'll benefit from the strong relationships we've built in Silicon Valley.

The centerpiece of the MBA@UCDavis online experience is the live online classes where you will participate in spirited, face-to-face conversations with your peers and our world-class faculty through our state-of-the-art technology platform.

Amy Russell, M.B.A., Senior Assistant Dean for Student

Affairs James T. Kelly, M.B.A., Assistant Dean for Finance & Administration

### **School Office**

Gallagher Hall; 530-752-7658; Graduate School of Management (<https://gsm.ucdavis.edu/online-mba/>); Faculty (<http://gsm.ucdavis.edu/faculty-and-research-0/>)

## **Professional Accountancy, Master of Professional Accountancy**

### **Graduate School of Management**

H. Rao Unnava, Ph.D., Dean

Janie Chang, Ph.D., Academic Director

James T. Kelly, M.B.A., Assistant Dean for Finance & Administration

### **Group Office**

Gallagher Hall; 530-752-7658; Fax 530-754-9355; Master of Professional Accountancy (<https://gsm.ucdavis.edu/master-professional-accountancy-mpac/>)

### **Graduate Advisor**

Will Snyder, Executive Director

## **Technology Management, Minor**

### **Graduate School of Management**

### **School Office**

Gallagher Hall; 530-752-7658; Graduate School of Management (<http://gsm.ucdavis.edu/>)

The UC Davis Graduate School of Management offers a minor in Technology Management to undergraduate students. This minor complements students' undergraduate studies with courses in the ways in which engineering and science-based industrial enterprises manage and use knowledge from science, engineering and technology. The minor also provides students with business and management skills that should enable them to use their education more effectively in a technology environment.

The Technology Management minor courses are open to all undergraduate and graduate majors at UC Davis.

The courses that count for the Technology Management minor are offered by the Graduate School of Management. No substitutions (e.g., transfer courses, study abroad courses, or other UC Davis courses) are allowed for the upper division coursework.

No course overlap is allowed with other minors. No more than one course can be counted towards both the student's major and the minor.

Prerequisites for minor courses are required (e.g., MGT 011A and STA 013 for MGT 160; MGT 011A and MGT 011B for MGT 170). Please plan accordingly.

Code	Title	Units
Required preparatory course:		4
MGT 011A	Elementary Accounting	
Choose five:		20
MGT 120	Managing & Using Information Technology	
MGT 140	Marketing for the Technology-Based Enterprise	
MGT 150	Technology Management	
MGT 151	Management of Innovation & Entrepreneurship	
MGT 160	Financing New Business Ventures	
MGT 170	Management Accounting & Control	
MGT 180	Supply Chain Planning & Management	

To complete the minor, students must complete the 24 units of coursework with a GPA of 2.000 or better. Courses may be taken P/NP as long as at least one course is taken for a letter grade and minor GPA is at least 2.000.

The OASIS Minor Declaration form will only be approved after the student is enrolled in the final course for the minor, one minor course has been successfully completed and minor GPA is at least 2.000.

Important: Only one course may overlap between major and minor requirements. If MGT 011A is used for completing a major requirement, then further minor coursework cannot be counted toward major requirements.

Total Units	24
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## Materials Science & Engineering

### College of Engineering

Yayoi Takamura, Ph.D., Chairperson of the Department; term ends June 30, 2023

### Department Office

3001 Ghausi Hall; 530-752-0400; Fax 530-752-1031; Materials Science & Engineering (<http://mse.engineering.ucdavis.edu>); Faculty (<https://mse.engineering.ucdavis.edu/people/faculty/>)

The Department of Materials Science & Engineering offers one undergraduate program in Materials Science & Engineering (p. 293) and a minor in Materials Science (p. 293).

### Mission Statement

The mission of the Department of Materials Science & Engineering is to provide the highest quality of education and prepare a diverse group of students for successful careers by building a strong base of technical knowledge and professional ethics while advancing the frontiers of materials science and engineering through teaching, research, and outreach.

### Graduate Programs in the Department of Materials Science & Engineering

The Department of Materials Science & Engineering is home to a top-ranked graduate program in Materials Science & Engineering. We offer a unique interdisciplinary environment for graduate studies, with renowned faculty and state-of-the-art research facilities.

- Materials Science & Engineering, Bachelor of Science (p. 293)
- Materials Science, Minor (p. 295)
- Materials Science & Engineering, Master of Engineering (p. 295)
- Materials Science & Engineering, Master of Science (p. 296)
- Materials Science & Engineering, Doctor of Philosophy (p. 296)

## Materials Science & Engineering, Bachelor of Science

### College of Engineering

## Materials Science & Engineering Undergraduate Program

The Materials Science & Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Materials science and engineering is directed toward an understanding of the structure, properties, and processing of materials. Society demands new and improved materials with capabilities far superior to common metals, polymers, and ceramics. New materials are needed for high-speed transportation systems, surgical and dental implants, new generations of power plants, renewable energy sources, and solid-state electronic and photonics devices in computer and communication technology. Both the development of new materials and the understanding of present-day materials demand a thorough knowledge of basic engineering and scientific principles, including crystal structure, elastic and plastic behavior, thermodynamics, phase equilibria and reaction rates, and structural and physical and chemical behavior of engineering materials.

Materials engineers study phenomena found in many different engineering operations, from fracture behavior in automobiles to fatigue behavior in aircraft frames, from corrosion behavior in petro-chemical refineries to radiation-induced damage in nuclear power plants, and from the fabrication of steel to the design of semiconductors. Materials engineers are also increasingly involved in developing the new materials needed to attain higher efficiencies in existing and proposed energy conversion schemes and will play a central role in the development of new technologies based on composites and high-temperature superconductivity.

The undergraduate materials science and engineering program provides the background for activities in research, processing, and the design of materials. The curriculum is based on a common core of courses basic to engineering; courses taken during your first two years provide a strong foundation in fundamental engineering concepts.

### Objectives

We educate students in the fundamentals of materials science and engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; educate students with a sense of community, ethical responsibility, and professionalism; educate students for careers in industry, government, and academia; teach students the necessity for continuing education and self-learning; and foster proficiency in written and oral communications.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Exclusive of General Education units, the minimum number of units required for the Materials Science & Engineering major is 157.

## Honors Program

An Honors Program is available to qualified students in Materials Science & Engineering. It is a two-year program designed to challenge the most talented students in these majors. Students are invited to participate in their sophomore year. In the upper division coursework, students will complete either an honors thesis or a project that might involve local industry. Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

Code	Title	Units	
<b>Lower Division Required Courses</b>			
<i>Mathematics</i>			
MAT 021A	Calculus	4	
MAT 021B	Calculus	4	
MAT 021C	Calculus	4	
MAT 021D	Vector Analysis	4	
MAT 022A	Linear Algebra	3	
MAT 022B	Differential Equations	3	
<i>Physics</i>			
PHY 009A	Classical Physics	5	
PHY 009B	Classical Physics	5	
PHY 009C	Classical Physics	5	
PHY 009D	Modern Physics	4	
<i>Chemistry</i>			
CHE 002A	General Chemistry	5	
or CHE 002AH	Honors General Chemistry		
CHE 002B	General Chemistry	5	
or CHE 002BH	Honors General Chemistry		
CHE 002C	General Chemistry	5	
or CHE 002CH	Honors General Chemistry		
<i>Engineering</i>			
ENG 003	Introduction to Engineering Design	4	
or ENG 003Y	Introduction to Engineering Design		
ENG 017	Circuits I	4	
or ENG 017V	Circuits I		
or ENG 035	Statics		
ENG 045	Properties of Materials	4	
or ENG 045Y	Properties of Materials		
<i>Materials Science Engineering</i>			
EMS 002	Materials Marvels: The Science of Superheroes	3	
<i>Chemical Engineering</i>			
ECH 060	Numerical Methods in Engineering	4	
Lower Division Composition/Writing; choose one: a grade of C- or better is required:			
COM 001	Major Works of the Ancient World		
COM 002	Major Works of the Medieval & Early Modern World		
COM 003	Major Works of the Modern World		
COM 004	Major Works of the Contemporary World		
ENL 003	Introduction to Literature		
NAS 005	Introduction to Native American Literature		
UWP 001	Introduction to Academic Literacies (Recommended)		
UWP 001Y	Introduction to Academic Literacies (Recommended)		
UWP 001V	Introduction to Academic Literacies: Online (Recommended)		
<b>Lower Division Required Courses Subtotal</b>			<b>79</b>
<b>Upper Division Required Courses</b>			
<i>Engineering</i>			
ENG 190	Professional Responsibilities of Engineers	3	
<i>Materials Science Engineering</i>			
EMS 160	Thermodynamics of Materials	4	
EMS 162	Structure & Characterization of Engineering Materials	4	
EMS 162L	Structure & Characterization of Materials Laboratory	3	
EMS 164	Kinetics of Materials	4	
EMS 170	Sustainable Energy Technologies: Batteries, Fuel Cells, & Photovoltaic Cells	4	
EMS 170L	Sustainable Energy Technologies Laboratory	3	
EMS 172	Smart Materials	4	
EMS 172L	Smart Materials Laboratory	3	
EMS 174	Mechanical Behavior of Materials	4	
EMS 174L	Mechanical Behavior Laboratory	3	
EMS 180	Materials in Engineering Design	4	
EMS 182	Failure Analysis	4	
EMS 188A	Materials Design Project	4	
EMS 188B	Materials Design Project	4	
EMS 181	Manufacturing of 3D & Composite Materials	4	
or EMS 183	Processing of 2D & Nanomaterials		
Choose one:			<b>4</b>
ENG 180	Engineering Analysis		
MAT 135A	Probability		
STA 131A	Introduction to Probability Theory		
ECI 114	Probabilistic Systems Analysis for Civil & Environmental Engineers		
ECH 140	Mathematical Methods in Biochemical & Chemical Engineering		
EME 115	Introduction to Numerical Analysis & Methods		
PHY 104A	Introduction to Mathematical Methods in Physics		
Choose one:			<b>3-4</b>
CHE 110A	Physical Chemistry: Introduction to Quantum Mechanics		
CHE 124A	Inorganic Chemistry: Fundamentals		
CHE 128A	Organic Chemistry		
PHY 108	Optics		
& 108L	and Optics Laboratory		
PHY 110A	Electricity & Magnetism		

PHY 122A	Advanced Laboratory in Condensed Matter Physics	
PHY 151	Stellar Structure & Evolution	
PHY/ENG 160	Environmental Physics & Society	
<b>Focused Electives</b>		
Courses used to satisfy degree requirements are not eligible to be used to satisfy the elective requirement.	12	
Students may elect to choose up to 5 units from the following lower division courses:		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
EBS 075	Properties of Materials in Biological Systems	
BIM 020	Fundamentals of Bioengineering	
ENG 017 or ENG 017V	Circuits I	
ENG 035	Statics	
Remaining units must be satisfied by the following:		
BIM 106	Biotransport Phenomena	
BIM 109	Biomaterials	
ECI 130	Structural Analysis	
ECI 132	Structural Design: Metallic Elements	
EEC 140A or EEC 140AV	Principles of Device Physics I	
	Principles of Device Physics I	
EEC 140B	Principles of Device Physics II	
EEC 146A	Integrated Circuits Fabrication	
ENG 100	Electronic Circuits & Systems	
ENG 102	Dynamics	
ENG 103	Fluid Mechanics	
ENG 104	Mechanics of Materials	
<b>OR</b>		
Any upper division courses in Materials Science & Engineering (EMS); a maximum of 4 units combined in Materials Science & Engineering (EMS) courses numbered 190-197 or 199 can be used to satisfy focused electives requirement.		
Choose one; grade of C- or better is required:	0-4	
UWP 102E	Writing in the Disciplines: Engineering	
UWP 102F	Writing in the Disciplines: Food Science & Technology	
UWP 104A or UWP 104AY	Writing in the Professions: Business Writing	
	Writing in the Professions: Business Writing	
UWP 104E	Writing in the Professions: Science	
UWP 104T	Writing in the Professions: Technical Writing	
Passing the Upper Division Composition Exam.		
Upper Division Required Courses Subtotal	78-83	
<b>Total Units</b>	<b>157-162</b>	

## Materials Science, Minor

College of Engineering

## Minor

There is a constant need for professionals with more knowledge and experience in understanding the behavior of materials from which products such as electronics, sensors, biological implants, transportation vehicles, medical devices and infrastructure are made. The goal of this minor is to prepare students for careers that require training in materials science, including the fundamentals of thermodynamics and kinetics and their effects on phase composition and structure, as well as the complex relationships between composition, structure, processing and behavior/performance. Topics covered include material thermodynamics and kinetics, materials structural analysis, and structure-property relationships for electronic, optical, magnetic and mechanical behavior. The minor is expected to accommodate persons of diverse backgrounds, such as those majoring in engineering, physical sciences, biological sciences, and mathematics.

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements, with an overall GPA in minor requirement courses of 2.000 or better.

## Minor Advisor

S. Gentry (Department of Materials Science & Engineering)

Code	Title	Units
EMS 160	Thermodynamics of Materials	4
EMS 162	Structure & Characterization of Engineering Materials	4
EMS 164	Kinetics of Materials	4
EMS 172 or EMS 174	Smart Materials Mechanical Behavior of Materials	4
Choose an additional 4 units of upper division letter graded Material Science & Engineering (EMS) coursework.		4
Material Science & Engineering (EMS) courses. (p. 1064)		
<b>Total Units</b>		<b>20</b>

## Materials Science & Engineering, Master of Engineering

College of Engineering

## The Master of Engineering Degree in Materials Science & Engineering

The one-year Master of Engineering (M.Eng.) degree is the most flexible degree we offer. With two different tracks to choose from, students can mold the degree to fit their interests and goals, whether they include training in additional engineering, computer science or management courses.

## Coursework Requirements

Code	Title	Units
<b>Track A: Capstone Course</b>		
Core Courses		20
Elective Courses		8
EMS 280A & EMS 280B	Graduate Capstone Project and Graduate Capstone Project	8
<b>Total Units</b>		<b>36</b>

Code	Title	Units
<b>Track B: Internship</b>		
Core Courses		20
Elective Courses		6
EMS 292	Materials Science & Engineering Internship	10
<b>Total Units</b>		<b>36</b>

For more information, see Master of Engineering (<https://mse.engineering.ucdavis.edu/graduate/master-of-engineering/>).

## Materials Science & Engineering, Master of Science

College of Engineering

### The Master of Science Degree in Materials Science & Engineering

The Master of Science (M.S.) degree is aimed at preparing students for careers in research and development, or for further study in the field. Like the doctoral degree, the M.S. degree combines coursework and research, but with a more limited scope of the research project and thesis to reflect the shorter time-to-degree. After graduation, the majority of our M.S. degree graduates find jobs in industry.

Students in this degree track must complete a master's thesis consisting of a scholarly piece of computational, experimental, or theoretical research that is rigorous in terms of design, methodology, and analysis. When students have completed the majority of their coursework, they should advance to candidacy. When advancing to candidacy, students should prepare an outline of their thesis, which should include a critical evaluation of the methods and limitations of the research project and a full description of the experimental design, protocols, and data analysis.

## Coursework Requirements

Code	Title	Units
Core Courses		20
Elective Courses		8
Seminar		2
<b>Total Units</b>		<b>30</b>

For more information, see Master of Science (<https://mse.engineering.ucdavis.edu/graduate/master-of-science/>).

## Materials Science & Engineering, Doctor of Philosophy

College of Engineering

### The Doctoral (Ph.D.) Degree in Materials Science & Engineering

The doctoral degree in Materials Science & Engineering prepares students to solve complex, long-term research problems. Students can expect to graduate in four to five years and to work on a large research project, culminating in a dissertation. The majority of our doctoral graduates end up in industry careers, usually in research and product development positions. Others go on to careers in academia, either as a

postdoctoral researcher or an assistant professor. Students enrolled in the doctoral degree have the option to complete a designated emphasis in biophotonics and bioimaging, biotechnology, and/or nuclear science.

Doctoral students complete two examinations en route to their degrees, the preliminary exam and the qualifying examination, in addition to coursework and a dissertation.

## Coursework Requirements

Code	Title	Units
Core Courses		25
Elective Courses		12
<b>Total Units</b>		<b>37</b>

For more information, see Doctoral Degree (<https://mse.engineering.ucdavis.edu/graduate/doctoral-degree/>).

## Mathematics

College of Letters & Science

Anne Schilling, Ph.D., Chairperson; July 1, 2020-June 30, 2023

## Department Office

1130 Mathematical Sciences Bldg.; 530-752-0827;  
Mathematics (<http://www.math.ucdavis.edu>); Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)); Faculty (<https://www.math.ucdavis.edu/people/faculty/>)

- Applied Mathematics, Bachelor of Science (p. 296)
- Mathematics, Bachelor of Arts (p. 298)
- Mathematics, Bachelor of Science (p. 300)
- Mathematics, Minor (p. 302)
- Mathematics, Master of Arts (p. 302)
- Mathematics, Doctor of Philosophy (p. 302)
- Mathematical & Scientific Computation, Bachelor of Science (p. 303)
- Mathematical Analytics & Operations Research, Bachelor of Science (p. 304)

## Applied Mathematics, Bachelor of Science

College of Letters & Science

## The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

### The Program

After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty advisor. Upper division courses include real analysis, probability, modern algebra, as well as a variety of other courses that allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level

teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

## Career Alternatives

A degree in mathematics provides entry to many careers in industry in addition to teaching. For instance, operations research, data analysis, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

## Major Advisors

For a current list of faculty and staff advisors, see Math Department Advising or contact the Student Services office ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

## Mathematics Placement Requirement

Students who wish to enroll in MAT 012, MAT 016A, MAT 017A, MAT 021A, MAT 021AH, and MAT 021M must satisfy the mathematics placement requirement by taking an online exam. Students who do not satisfy the requirement will be administratively dropped from these courses. For more information, including preparation tips and how to access the online exam, please see Math Placement Requirement (MPR), well in advance of enrolling.

## Department Honors

Students who meet the minimum GPA requirement for honors at graduation from the College of Letters & Science and who complete a senior project as part of MAT 194 or MAT 199 units in consultation with their faculty advisor may also be recommended by the department for graduation with High Honors or Highest Honors. Recommendations will be based on evaluations of students' academic achievements in their major and the quality of their senior project. For complete details, see Honors & Awards (<https://www.math.ucdavis.edu/research/honors/>).

## Graduate Study

The Department offers programs of study and research leading to M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting Graduate Information (<https://www.math.ucdavis.edu/grad/>), and by email ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Calculus</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
<i>Linear Algebra &amp; Proof-Writing</i>		
Choose one option:		4-8
(a)		
MAT 022A	Linear Algebra	
MAT 108	Introduction to Abstract Mathematics	
(b)		
MAT/BIS 027A	Linear Algebra with Applications to Biology	
MAT 108	Introduction to Abstract Mathematics	

(c)		
MAT 067	Modern Linear Algebra	
MATLAB <sup>1</sup>		1
<i>Equivalent MATLAB knowledge.</i>		
<i>Differential Equations</i>		
MAT/BIS 027B	Differential Equations with Applications to Biology	3-4
or MAT 022B	Differential Equations	
<i>Programming</i>		
ECS 032A	Introduction to Programming	4
ENG 006	Engineering Problem Solving	4
Choose one two-quarter sequence:		8-10
<i>Physics</i>		
PHY 009A & PHY 009B	Classical Physics and Classical Physics	
<i>Biological Science</i>		
BIS 002A & BIS 002B	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution	
<i>Chemistry</i>		
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
<i>Economics</i>		
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics Principles of Microeconomics Principles of Microeconomics	
<i>AND</i>		
ECN 001B or ECN 001BV	Principles of Macroeconomics Principles of Macroeconomics	
<i>Statistics</i>		
STA 032 & STA 100	Gateway to Statistical Data Science and Applied Statistics for Biological Sciences	
or Other applied preparatory courses approved by your advisor.		
Preparatory Subject Matter Subtotal		40-47
<b>Depth Subject Matter</b>		
<i>A. Core Courses</i>		
MAT 119A	Ordinary Differential Equations	4
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 135A	Probability	4
MAT 150A	Modern Algebra	4
MAT 185A	Complex Analysis	4
Choose two:		8
MAT 128A	Numerical Analysis	
MAT 128B	Numerical Analysis in Solution of Equations	
MAT 128C	Numerical Analysis in Differential Equations	
<i>B. Enrichment Courses</i>		
1. Choose two:		8

MAT 111-MAT 185B; excluding MAT 180, core courses, & courses being used as a capstone.		STA 131B	Introduction to Mathematical Statistics
2. Choose one approved upper division course outside the Department of Mathematics with extensive use of mathematics. Please consult with a math advisor before selecting a course.	4	STA 131C	Introduction to Mathematical Statistics
ATM 120 Atmospheric Thermodynamics & Cloud Physics		STA 141A	Fundamentals of Statistical Data Science
ATM 121A Atmospheric Dynamics		STA 141B	Data & Web Technologies for Data Analysis
ATM 121B Atmospheric Dynamics		STA 141C	Big Data & High Performance Statistical Computing
ATM 128 Radiation & Satellite Meteorology		<i>C. Capstone Courses</i>	
ARE 106 Econometric Theory & Applications		Choose one:	3-4
CHE 110A Physical Chemistry: Introduction to Quantum Mechanics		MAT 115B	Number Theory
CHE 110B Physical Chemistry: Properties of Atoms & Molecules		MAT 118B	Partial Differential Equations: Eigenfunction Expansions
CHE 110C Physical Chemistry: Thermodynamics, Equilibria & Kinetics		MAT 119B	Ordinary Differential Equations
EEC 130A Electromagnetics I		MAT 135B	Stochastic Processes
EEC 130B Introductory Electromagnetics II		MAT 146	Algebraic Combinatorics
ECH 140 Mathematical Methods in Biochemical & Chemical Engineering		MAT 150B	Modern Algebra
ECI 114 Probabilistic Systems Analysis for Civil & Environmental Engineers		MAT 150C	Modern Algebra
ECI 153 Deterministic Optimization & Design		MAT 180	Special Topics
ECN 122 Theory of Games & Strategic Behavior		MAT 185B	Complex Analysis
ECN 140 Econometrics		MAT 189	Advanced Problem Solving
ECS 120 Theory of Computation		MAT 192	Internship in Applied Mathematics (Must take 3 units.)
ECS 122A Algorithm Design & Analysis		MAT 194	Undergraduate Thesis
ECS 127 Cryptography		Depth Subject Matter Subtotal	
EME 115 Introduction to Numerical Analysis & Methods			51-52
ESP 150A Physical & Chemical Oceanography		<b>Total Units</b>	
EVE 102 Population & Quantitative Genetics			<b>91-99</b>
GEL 150A Physical & Chemical Oceanography			
LIN 177 Computational Linguistics			
PHY 104A Introduction to Mathematical Methods in Physics			
PHY 104B Computational Methods of Mathematical Physics			
PHY 104C Intermediate Methods of Mathematical Physics			
PHY 105A Classical Mechanics			
PHY 105B Analytical Mechanics			
PHY 108 Optics			
PHY 110A Electricity & Magnetism			
PHY 110B Electricity & Magnetism			
PHY 110C Electricity & Magnetism			
PHY 112 Thermodynamics & Statistical Mechanics			
PHY 115A Foundation of Quantum Mechanics			
PHY 115B Applications of Quantum Mechanics			
PHY 116A Electronic Instrumentation			
PHY 116B Electronic Instrumentation			
PSC 103A Statistical Analysis of Psychological Data			
PSC 103B Statistical Analysis of Psychological Data			

<sup>1</sup> Note: Basic knowledge of MATLAB is required for both MAT 022A and MAT 067. Students can learn it on their own, enroll in ENG 006, EME 005, or in the 1 unit course MAT 022AL (can be taken concurrently).

## Mathematics, Bachelor of Arts

College of Letters & Science

### The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

### The Program

Students majoring in mathematics may follow a program leading to either the Bachelor of Arts or the Bachelor of Science degree. After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty advisor. Upper division courses include real analysis, probability, modern algebra, as well as a variety of other courses that allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

### Career Alternatives

A degree in mathematics provides entry to many careers in industry in addition to teaching. For instance, operations research, data analysis, systems analysis, computing, actuarial work, insurance, and financial

services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

## Major Advisors

For a current list of faculty and staff advisors; see Math Department Advising (<https://www.math.ucdavis.edu/undergrad/advising/advisers/>) or contact Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

## Mathematics Placement Requirement

Students who wish to enroll in MAT 012, MAT 016A, MAT 017A, MAT 021A, MAT 021AH, and MAT 021M must satisfy the mathematics placement requirement by taking an online exam. Students who do not satisfy the requirement will be administratively dropped from these courses. For more information, including preparation tips and how to access the online exam, please see the Department of Mathematics website, at Math Placement Requirement (MPR) ([http://www.math.ucdavis.edu/undergrad/math\\_placement/](http://www.math.ucdavis.edu/undergrad/math_placement/)), well in advance of enrolling.

## Department Honors

Students who meet the minimum GPA requirement for honors at graduation for the College of Letters & Science and who complete a senior project as part of MAT 194 or MAT 199 units in consultation with their faculty advisor may also be recommended by the department for graduation with High Honors or Highest Honors. Recommendations will be based on evaluations of students' academic achievements in their major and the quality of their senior project. For complete details, see Mathematics (<http://www.math.ucdavis.edu>).

## Teaching Credential Subject Representative

Dr. Ali Dad-del

## Graduate Study

The Department offers programs of study and research leading to M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our website, and by sending an email to Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Calculus</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
<i>Linear Algebra &amp; Proof-Writing</i> <sup>1</sup>		
Choose one option:		4-8
(a)		
MAT 022A	Linear Algebra	
MAT 108	Introduction to Abstract Mathematics	
(b)		
MAT/BIS 027A	Linear Algebra with Applications to Biology	
MAT 108	Introduction to Abstract Mathematics	
(c)		
MAT 067	Modern Linear Algebra	
MATLAB		0-1
MAT 022AL	Linear Algebra Computer Laboratory	

Equivalent MATLAB knowledge.

### Differential Equations

MAT/BIS 027B or MAT 022B	Differential Equations with Applications to Biology Differential Equations	3-4
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### Programming

ECS 032A or ENG 006	Introduction to Programming Engineering Problem Solving	4
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### Additional Non-Mathematics Courses

Chosen from the L&S Natural Sciences & Mathematics List. (p. 45)	12
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### Preparatory Subject Matter Subtotal

39-45
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### Depth Subject Matter

#### Plans

Choose one: Plan 1: General Mathematics (p. 299) Plan 2: Secondary Teaching (p. 300)	39-40
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**Note:** Students who wish to satisfy the single subject matter waiver for the teaching credential should see an advisor as early as possible.

### Depth Subject Matter Subtotal

39-40
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### Total Units

78-85
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<sup>1</sup> Note: Basic knowledge of MATLAB is required for both MAT 022A and MAT 067. Students can learn it on their own, enroll in ENG 006, EME 005, or in the one 1 unit course MAT 022AL (can be taken concurrently).

## Plan 1: General Mathematics

Code	Title	Units
<b>A. Core Courses</b>		
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 135A	Probability	4
MAT 150A	Modern Algebra	4
<b>B. Enrichment Courses</b>		
Choose four:		16
MAT 111-MAT 185B; up to four of these 16 units may be approved upper division courses outside of the Department of Mathematics with extensive use of mathematics. <sup>1</sup>		
<b>C. Capstone Course</b>		
Choose one:		3-4
MAT 115B	Number Theory	
MAT 118B	Partial Differential Equations: Eigenfunction Expansions	
MAT 119B	Ordinary Differential Equations	
MAT 135B	Stochastic Processes	
MAT 146	Algebraic Combinatorics	
MAT 150B	Modern Algebra	
MAT 150C	Modern Algebra	
MAT 180	Special Topics	
MAT 185B	Complex Analysis	

MAT 189	Advanced Problem Solving
MAT 192	Internship in Applied Mathematics (Must take 3 units.)
MAT 194	Undergraduate Thesis

<sup>1</sup> Excluding MAT 180, core courses, and courses being used as a capstone.

## Plan 2: Secondary Teaching

Code	Title	Units
<b>A. Core Courses</b>		
MAT 111	History of Mathematics	4
MAT 115A	Number Theory	4
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 135A	Probability	4
MAT 141	Euclidean Geometry	4
MAT 150A	Modern Algebra	4
<b>B. Enrichment Course</b>		
Choose one:		4
MAT 111-MAT 185B. <sup>1</sup>		
<b>C. Capstone Course</b>		
Choose one:		3-4
MAT 115B	Number Theory	
MAT 118B	Partial Differential Equations: Eigenfunction Expansions	
MAT 119B	Ordinary Differential Equations	
MAT 135B	Stochastic Processes	
MAT 146	Algebraic Combinatorics	
MAT 150B	Modern Algebra	
MAT 150C	Modern Algebra	
MAT 180	Special Topics	
MAT 185B	Complex Analysis	
MAT 189	Advanced Problem Solving	
MAT 192	Internship in Applied Mathematics (Must take 3 units.)	
MAT 194	Undergraduate Thesis	
EDU/GEL 183	Teaching High School Mathematics & Science	
GEL/EDU 183	Teaching High School Mathematics & Science	

<sup>1</sup> Excluding MAT 180, core courses, and courses being used as a capstone.

## The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

### The Program

Students majoring in mathematics may follow a program leading to either the Bachelor of Arts or the Bachelor of Science degree. After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty advisor. Upper division courses include real analysis, probability, modern algebra, as well as a variety of other courses that allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

### Career Alternatives

A degree in mathematics provides entry to many careers in industry in addition to teaching. For instance, operations research, data analysis, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

### Major Advisors

For a current list of faculty and staff advisors; see Math Department Advising (<https://www.math.ucdavis.edu/undergrad/advising/advisers/>) or contact Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

### Mathematics Placement Requirement

Students who wish to enroll in MAT 012, MAT 016A, MAT 017A, MAT 021A, MAT 021AH, and MAT 021M must satisfy the mathematics placement requirement by taking an online exam. Students who do not satisfy the requirement will be administratively dropped from these courses. For more information, including preparation tips and how to access the online exam, please see the Math Placement Requirement (MPR) ([http://www.math.ucdavis.edu/undergrad/math\\_placement/](http://www.math.ucdavis.edu/undergrad/math_placement/)), well in advance of enrolling.

### Department Honors

Students who meet the minimum GPA requirement for honors at graduation for the College of Letters & Science and who complete a senior project as part of MAT 194 or MAT 199 units in consultation with their faculty advisor may also be recommended by the department for graduation with High Honors or Highest Honors. Recommendations will be based on evaluations of students' academic achievements in their major and the quality of their senior project. For complete details, see Honors & Awards (<https://www.math.ucdavis.edu/research/honors/>).

### Teaching Credential Subject Representative

Dr. Ali Dad-del

### Graduate Study

The Department offers programs of study and research leading to M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our website or contacting Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

## Mathematics, Bachelor of Science

College of Letters & Science

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Calculus</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
<i>Linear Algebra &amp; Proof-Writing</i> <sup>1</sup>		
Choose one option:		4-8
(a)		
MAT 022A	Linear Algebra	
MAT 108	Introduction to Abstract Mathematics	
(b)		
MAT/BIS 027A	Linear Algebra with Applications to Biology	
MAT 108	Introduction to Abstract Mathematics	
(c)		
MAT 067	Modern Linear Algebra	
<i>MATLAB</i>		0-7
MAT 022AL	Linear Algebra Computer Laboratory	
Equivalent MATLAB knowledge.		
<i>Differential Equations</i>		
MAT/BIS 027B	Differential Equations with Applications to Biology	
or MAT 022B	Differential Equations	
<i>Plans</i>		
Choose one:		4-5
Plan I: General Mathematics		
PHY 009A	Classical Physics	
Plan II: Mathematics for Secondary Teaching		
Choose one:		
PHY 007A	General Physics	
PHY 009A	Classical Physics	
STA 013	Elementary Statistics	
or STA 013Y	Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
<i>Programming</i>		
ECS 032A	Introduction to Programming	4
or ENG 006	Engineering Problem Solving	
Preparatory Subject Matter Subtotal		31-38
<b>Depth Subject Matter</b>		
<i>Plans</i>		
Choose one:		51-52
Plan 1: General Mathematics (p. 301)		
Plan 2: Mathematics for Secondary Teaching (p. 301)		
Depth Subject Matter Subtotal		51-52
<b>Total Units</b>		<b>82-90</b>

<sup>1</sup> Note: Basic knowledge of MATLAB is required for both MAT 022A and MAT 067. Students can learn it on their own, enroll in ENG 006, EME 005, or in the one 1 unit course MAT 022AL (can be taken concurrently).

## Plan 1: General Mathematics

Code	Title	Units
<b>A. Core Courses</b>		
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 135A	Probability	4
MAT 150A	Modern Algebra	4
MAT 150B	Modern Algebra	4
MAT 150C	Modern Algebra	4
MAT 185A	Complex Analysis	4
<b>B. Enrichment Courses</b>		
Choose four:		16
MAT 111-MAT 185B; up to four of these 16 units may be approved upper division courses outside of the Department of Mathematics with extensive use of mathematics. <sup>1</sup>		
<b>C. Capstone Course</b>		
Choose one:		3-4
MAT 115B	Number Theory	
MAT 118B	Partial Differential Equations: Eigenfunction Expansions	
MAT 119B	Ordinary Differential Equations	
MAT 135B	Stochastic Processes	
MAT 146	Algebraic Combinatorics	
MAT 180	Special Topics	
MAT 185B	Complex Analysis	
MAT 189	Advanced Problem Solving	
MAT 192	Internship in Applied Mathematics (Must take 3 units.)	
MAT 194	Undergraduate Thesis	

<sup>1</sup> Excluding MAT 180, core courses, and courses being used as a capstone.

## Plan 2: Mathematics for Secondary Teaching

Code	Title	Units
<b>A. Core Courses</b>		
MAT 111	History of Mathematics	4
MAT 115A	Number Theory	4
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 135A	Probability	4
MAT 141	Euclidean Geometry	4
MAT 150A	Modern Algebra	4
<b>B. Enrichment Course</b>		
Choose four:		16
MAT 111-MAT 185B; up to four of these 16 units may be approved upper division courses outside of the Department of Mathematics with extensive use of mathematics. <sup>1</sup>		
<b>C. Capstone Course</b>		

Choose one:	3-4	MAT 127A	Real Analysis
MAT 115B	Number Theory	MAT 127B	Real Analysis
MAT 118B	Partial Differential Equations: Eigenfunction Expansions	MAT 127C	Real Analysis
MAT 119B	Ordinary Differential Equations	MAT 128A	Numerical Analysis
MAT 135B	Stochastic Processes	MAT 128B	Numerical Analysis in Solution of Equations
MAT 146	Algebraic Combinatorics	MAT 128C	Numerical Analysis in Differential Equations
MAT 150B	Modern Algebra	MAT 129	Fourier Analysis
MAT 150C	Modern Algebra	MAT 133	Mathematical Finance
MAT 180	Special Topics	MAT 135A	Probability
MAT 185B	Complex Analysis	MAT 135B	Stochastic Processes
MAT 189	Advanced Problem Solving	MAT 141	Euclidean Geometry
MAT 192	Internship in Applied Mathematics (Must take 3 units.)	MAT 145	Combinatorics
MAT 194	Undergraduate Thesis	MAT 146	Algebraic Combinatorics
EDU/GEL 183	Teaching High School Mathematics & Science	MAT 147	Topology
		MAT 148	Discrete Mathematics
		MAT 150A	Modern Algebra
		MAT 150B	Modern Algebra
		MAT 150C	Modern Algebra
		MAT 165	Mathematics & Computers
		MAT 167	Applied Linear Algebra
		MAT 168	Optimization
		MAT 170	Mathematics for Data Analytics & Decision Making
		MAT 180	Special Topics
		MAT 185A	Complex Analysis
		MAT 185B	Complex Analysis
<b>Total Units</b>		<b>20</b>	

<sup>1</sup> Excluding MAT 180, core courses, and courses being used as a capstone.

## Mathematics, Minor

College of Letters & Science

### The Minor Program

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

#### Minor Advisor

For a current list of faculty and staff advisors; see Mathematics Department Advising (<https://www.math.ucdavis.edu/undergrad/advising/advisers/>) or contact Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

Code	Title	Units
Choose five upper division courses (20 units total) in Mathematics: <sup>1</sup>		20
MAT/BIS 107	Probability & Stochastic Processes with Applications to Biology	
MAT 108	Introduction to Abstract Mathematics	
MAT 111	History of Mathematics	
MAT 114	Convex Geometry	
MAT 115A	Number Theory	
MAT 115B	Number Theory	
MAT 116	Differential Geometry	
MAT 118A	Partial Differential Equations: Elementary Methods	
MAT 118B	Partial Differential Equations: Eigenfunction Expansions	
MAT 118C	Partial Differential Equations: Green's Functions & Transforms	
MAT 119A	Ordinary Differential Equations	
MAT 119B	Ordinary Differential Equations	
MAT 124	Mathematical Biology	

<sup>1</sup> Exclusive of MAT 189, MAT 192, MAT 194, MAT 197TC, MAT 198, MAT 199.

## Mathematics, Master of Arts

College of Letters & Science

The Mathematics Department offers programs of study and research leading to M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our website (<https://www.math.ucdavis.edu/grad/>), and by sending an email to Graduate Program Coordinator ([gradadvisor@math.ucdavis.edu](mailto:gradadvisor@math.ucdavis.edu)).

## Mathematics, Doctor of Philosophy

College of Letters & Science

The Mathematics Department offers programs of study and research leading to M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our website (<https://www.math.ucdavis.edu/grad/>), and by sending an email to Graduate Program Coordinator ([gradadvisor@math.ucdavis.edu](mailto:gradadvisor@math.ucdavis.edu)).

# Mathematical & Scientific Computation, Bachelor of Science

College of Letters & Science

## The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the **language of the exact sciences**.

### The Program

After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty advisor. Upper division courses include real analysis, probability, modern algebra, as well as a variety of other courses that allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

### Career Alternatives

A degree in mathematics provides entry to many careers in industry in addition to teaching. For instance, operations research, data analysis, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

### Major Advisors

For a current list of faculty and staff advisors, see Math Department Advising (<https://www.math.ucdavis.edu/undergrad/advising/advisers/>) or contact Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

### Mathematics Placement Requirement

Students who wish to enroll in MAT 012, MAT 016A, MAT 017A, MAT 021A, MAT 021AH, and MAT 021M must satisfy the mathematics placement requirement by taking an online exam. Students who do not satisfy the requirement will be administratively dropped from these courses. For more information, including preparation tips and how to access the online exam, please see Math Placement Requirement (MPR) ([http://www.math.ucdavis.edu/undergrad/math\\_placement/](http://www.math.ucdavis.edu/undergrad/math_placement/)), well in advance of enrolling.

### Department Honors

Students who meet the minimum GPA requirement for honors at graduation for the College of Letters & Science and who complete a senior project as part of MAT 194 or MAT 199 units in consultation with their faculty advisor may also be recommended by the department for graduation with High Honors or Highest Honors. Recommendations will be based on evaluations of students' academic achievements in their major and the quality of their senior project. For complete details, see Honors & Awards (<https://www.math.ucdavis.edu/research/honors/>).

### Graduate Study

The Department offers programs of study and research leading to M.A. and Ph.D. degrees in Mathematics. Information regarding graduate

study may be obtained by consulting our website or contacting Student Services ([studentservices@math.ucdavis.edu](mailto:studentservices@math.ucdavis.edu)).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
MAT 017A or MAT 021A	Calculus for Biology & Medicine Calculus	4
MAT 017B or MAT 021B	Calculus for Biology & Medicine Calculus	4
MAT 017C or MAT 021C	Calculus for Biology & Medicine Calculus	4
MAT 021D	Vector Analysis	4
MAT/BIS 027B or MAT 022B	Differential Equations with Applications to Biology Differential Equations	3-4
<i>Linear Algebra &amp; Proof-Writing</i>		
Choose one option:		
(a)		4-8
MAT 108	Introduction to Abstract Mathematics	
MAT/BIS 027A or MAT 022A	Linear Algebra with Applications to Biology Linear Algebra	
<i>or</i>		
(b)		
MAT 067	Modern Linear Algebra	
Choose one:		
MAT 022AL	Linear Algebra Computer Laboratory	0-1
Equivalent MATLAB knowledge. <sup>1</sup>		
<i>Programming</i>		
ECS 032A	Introduction to Programming	4
ENG 006	Engineering Problem Solving	4
Preparatory Subject Matter Subtotal		
		31-37
<b>Depth Subject Matter</b>		
<i>A. Core Courses</i>		
MAT 127A	Real Analysis	4
MAT 127B	Real Analysis	4
MAT 127C	Real Analysis	4
MAT 128A	Numerical Analysis	4
MAT 128B	Numerical Analysis in Solution of Equations	4
MAT 128C	Numerical Analysis in Differential Equations	4
MAT 135A	Probability	4
MAT 150A	Modern Algebra	4
<i>B. Enrichment Courses</i>		
Choose two:		
MAT 111-MAT 185B worth at least 4 units each. <sup>2</sup>		
<i>C. Emphasis</i>		
Choose one:		
Computational & Mathematical Biology Emphasis		
MAT 124	Mathematical Biology	
And		

One approved upper division course in Biology; please consult with a math advisor before selecting a course.

#### OR

##### *Computational & Mathematics Emphasis*

MAT 168 Optimization

And

One approved upper division course involving extensive computation or theory of computation; please consult with a math advisor before selecting a course.

#### D. Capstone Course

Choose one:	3-4
MAT 115B Number Theory	
MAT 118B Partial Differential Equations: Eigenfunction Expansions	
MAT 119B Ordinary Differential Equations	
MAT 135B Stochastic Processes	
MAT 146 Algebraic Combinatorics	
MAT 150B Modern Algebra	
MAT 150C Modern Algebra	
MAT 180 Special Topics	
MAT 185B Complex Analysis	
MAT 189 Advanced Problem Solving	
MAT 192 Internship in Applied Mathematics (Must take 3 units.)	
MAT 194 Undergraduate Thesis	
Depth Subject Matter Subtotal	51-52
Total Units	<b>82-89</b>

<sup>1</sup> Note: Basic knowledge of MATLAB is required for both MAT 022A & MAT 067. Students can learn it on their own, enroll in ENG 006, EME 005, or in the 1 unit course MAT 022AL (can be taken concurrently).

<sup>2</sup> Excluding MAT 180. Note that core math major classes cannot be used to satisfy this requirement.

## Mathematical Analytics & Operations Research, Bachelor of Science

### College of Letters & Science

## The Major Programs

Mathematics is the study of abstract structures, space, change, and the interrelations of these concepts. It also is the language of the exact sciences.

### The Program

After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty advisor. Upper division courses include real analysis, probability, modern algebra, as well as a variety of other courses that allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as computational and applied mathematics, computer

science, or statistics, or may be combined with a major in some other field.

## Career Alternatives

A degree in mathematics provides entry to many careers in industry in addition to teaching. For instance, operations research, data analysis, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

## Major Advisors

For a current list of faculty and staff advisors, see Math Department Advising (<https://www.math.ucdavis.edu/undergrad/advising/advisers/>) or contact Student Services (studentservices@math.ucdavis.edu).

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Students who wish to enroll in MAT 012, MAT 016A, MAT 017A, MAT 021A, MAT 021AH, and MAT 021M must satisfy the mathematics placement requirement by taking an online exam. Students who do not satisfy the requirement will be administratively dropped from these courses. For more information, including preparation tips and how to access the online exam, please see Math Placement Requirement (MPR) ([http://www.math.ucdavis.edu/undergrad/math\\_placement/](http://www.math.ucdavis.edu/undergrad/math_placement/)), well in advance of enrolling.

## Department Honors

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## Graduate Study

The Department offers programs of study and research leading to M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our website or contacting Student Services (studentservices@math.ucdavis.edu).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
<i>Linear Algebra &amp; Proof-Writing</i> <sup>1</sup>		
Choose one option:		4-8
(a)		
MAT 022A	Linear Algebra	
MAT 108	Introduction to Abstract Mathematics	
<i>or</i>		
MAT/BIS 027A	Linear Algebra with Applications to Biology	
MAT 108	Introduction to Abstract Mathematics	
<i>or</i>		

(b)			
MAT 067	Modern Linear Algebra		
MATLAB		0-1	
MAT 022AL	Linear Algebra Computer Laboratory		
Equivalent MATLAB knowledge.			
Differential Equations		3-4	
MAT/BIS 027B	Differential Equations with Applications to Biology		
or MAT 022B	Differential Equations		
Programming			
ECS 032A	Introduction to Programming	4	
or ENG 006	Engineering Problem Solving		
Economics			
ECN 001A	Principles of Microeconomics	4	
or ECN 001AV	Principles of Microeconomics		
or ECN 001AY	Principles of Microeconomics		
ECN 001B	Principles of Macroeconomics	4	
or ECN 001BV	Principles of Macroeconomics		
Statistics			
STA 032	Gateway to Statistical Data Science	4	
or STA 100	Applied Statistics for Biological Sciences		
Preparatory Subject Matter Subtotal		39-45	
Depth Subject Matter			
A. Core Courses			
MAT 127A	Real Analysis	4	
MAT 127B	Real Analysis	4	
MAT 127C	Real Analysis	4	
MAT 135A	Probability	4	
MAT 135B	Stochastic Processes	4	
MAT 150A	Modern Algebra	4	
MAT 168	Optimization	4	
MAT 170	Mathematics for Data Analytics & Decision Making <sup>2</sup>	4	
Choose one:		4	
MAT 128A	Numerical Analysis		
MAT 128B	Numerical Analysis in Solution of Equations		
MAT 128C	Numerical Analysis in Differential Equations		
B. Enrichment Courses			
1. Enrichment A			
Choose two:		8	
MAT 111-MAT 185B <sup>3</sup>			
STA 131B	Introduction to Mathematical Statistics		
STA 131C	Introduction to Mathematical Statistics		
STA 137	Applied Time Series Analysis		
STA 141A	Fundamentals of Statistical Data Science		
STA 141B	Data & Web Technologies for Data Analysis		
STA 141C	Big Data & High Performance Statistical Computing		
2. Enrichment B			
Choose two:		8	
ECN 100A	Intermediate Micro Theory: Consumer & Producer Theory		
or ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption		
ECN 100B	Intermediate Micro Theory: Imperfect Competition & Market Failure		
or ARE 100B	Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics		
ECN 121A	Industrial Organization		
ECN 121B	Industrial Organization		
ECN 122	Theory of Games & Strategic Behavior		
ECN 134	Financial Economics		
ARE 155	Operations Research & Management Science		
ARE 156	Introduction to Mathematical Economics		
ARE 157	Analysis for Operations & Production Management		
C. Capstone Course			
Choose one:		3-4	
MAT 115B	Number Theory		
MAT 118B	Partial Differential Equations: Eigenfunction Expansions		
MAT 119B	Ordinary Differential Equations		
MAT 135B	Stochastic Processes		
MAT 146	Algebraic Combinatorics		
MAT 150B	Modern Algebra		
MAT 150C	Modern Algebra		
MAT 180	Special Topics		
MAT 185B	Complex Analysis		
MAT 189	Advanced Problem Solving		
MAT 192	Internship in Applied Mathematics (Must take 3 units.)		
MAT 194	Undergraduate Thesis		
Depth Subject Matter Subtotal		55-56	
Total Units		94-101	

<sup>1</sup> Note: Basic knowledge of MATLAB is required for both MAT 022A and MAT 067. Students can learn it on their own, enroll in ENG 006, EME 005, or in the 1 unit course MAT 022AL (can be taken concurrently).

<sup>2</sup> Please note that MAT 170 has a prerequisite of MAT 167, or MAT 128B, or ECS 130. MAT 167 or MAT 128B can be used to satisfy one of the two required Enrichment A courses.

<sup>3</sup> Excluding MAT 180, core courses, and courses being used as a capstone.

## Mechanical & Aerospace Engineering

### College of Engineering

Benjamin Shaw, Ph.D., Chairperson of the Department; term ends June 30, 2026

## Department Office

2132 Bainer Hall; 530-752-0580; Fax 530-752-4158; Mechanical & Aerospace Engineering (<http://mae.ucdavis.edu>); Faculty (<https://mae.ucdavis.edu/graduate-program-faculty/>)

- Aerospace Science & Engineering, Bachelor of Science (p. 306)
- Mechanical Engineering, Bachelor of Science (p. 308)
- Mechanical & Aerospace Engineering, Master of Science (p. 312)
- Mechanical & Aerospace Engineering, Doctor of Philosophy (p. 313)

## Aerospace Science & Engineering, Bachelor of Science

### College of Engineering

Valeria La Saponara, Ph.D., Vice Chairperson for Undergraduate Studies

## Mechanical & Aerospace Engineering Undergraduate Programs

The Department of Mechanical & Aerospace Engineering administers two undergraduate programs in the College of Engineering (1) Mechanical Engineering, (2) Aerospace Science & Engineering

For more information about our programs, please see Undergraduate Majors (<http://mae.ucdavis.edu/undergraduate/undergraduate-majors/>).

### Mission

The Department of Mechanical & Aerospace Engineering is committed to educating future engineers so that they may contribute to the economic growth and well-being of the state, the nation, and the world, and to the advancement of knowledge in the mechanical and aerospace sciences.

### Objectives

The objectives of the Mechanical Engineering and Aerospace Science & Engineering programs are to produce graduates who do one or more of the following: a. Practice mechanical engineering and/or aerospace engineering in a broad range of agencies, industries, and institutes; b. Pursue graduate education; c. Participate in research and development, and other creative and innovative efforts in science, engineering, and technology; d. Pursue entrepreneurial endeavors.

## Division of Aerospace Science & Engineering

The Division of Aerospace Science & Engineering administers the Aerospace Science & Engineering Program within the Department of Mechanical & Aerospace Engineering.

### Aerospace Science & Engineering Undergraduate Program

The Aerospace Science & Engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Aerospace Science & Engineering majors learn to apply the principles of the physical sciences and engineering to the design of aerospace vehicles. Specific objectives include the design, development and manufacture of aerospace vehicles and other transportation systems

through the integration of disciplines associated with aerodynamics, propulsion, structures and guidance/control.

Our Bachelor of Science degree in Aerospace Science & Engineering provides a broad background and fundamental education in mathematics, the physical sciences, and the engineering sciences. These fundamentals, when complemented by the required technical courses, prepare students for employment in government or industry, while simultaneously establishing an excellent foundation for graduate studies.

### Aerodynamics & Fluid Mechanics

This field of study is based on the fundamentals of fluid mechanics and applied aircraft aerodynamics. Areas of current research include computational fluid dynamics, turbulent boundary layer flows, aeroacoustics, rotorcraft aerodynamics, wind turbine aerodynamics, active flow control, subsonic wind tunnel measurement, vortex generators, fixed-wing tip vortices, parachute drag prediction and aircraft design and optimization. Many of these projects are sponsored by government agencies and leading industrial companies, such as NASA, the U.S. Army, Sandia National Laboratory, the National Science Foundation and Boeing. Computational research is conducted using UC Davis High Performance Computing (HPC), NASA HPC, DoD HPC and DoE HPC. Experimental studies are conducted in the UC Davis Wind Tunnel Facility.

**Relevant courses:** EAE 126 & EAE 127.

### Suggested Advisors

J. P. Delplanque, C. P. van Dam, M. Hafez, S. Lee, N. Sarigul-Klijn, S. K. Robinson, Z. Sadeghizadeh, C. Harvey, C. Badrya

### Aerospace Control

This field of study includes control theory and its application to aerospace systems. Areas of current research include adaptive control, networked system control, hybrid system control, and controller design for unmanned aerial systems, spacecraft, and other machines. Many of these projects are sponsored by government agencies and leading industrial companies, such as NASA Ames Research Center, NASA Jet Propulsion Laboratory, the National Science Foundation and Boeing.

**Relevant course:** EAE 129.

### Suggested Advisors

S. Joshi, Z. Kong, N. Sarigul-Klijn

### Aerospace Propulsion

This field of study involves air-breathing jet engines and rocket propulsion. Areas of current research include turbomachinery, computational fluid dynamics, open rotor, jet noise, turbine cooling, innovative gas-turbine cycles, rocket engine feed systems and cooling tubes, propeller design and centrifugal compressors. Many of these projects are sponsored by government agencies and leading industrial companies, such as The Wright-Patterson Air Force Research Laboratory (AFRL), Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Aerojet Rocketdyne and the University of California. Computational research is conducted using UC Davis High Performance Computing (HPC), NASA HPC, DoD HPC and DoE HPC.

**Relevant courses:** EAE 138 & EAE 140.

### Suggested Advisors

J. P. Delplanque, S. Lee, N. Sarigul-Klijn, Z. Sadeghizadeh

## Structures & Materials

This field of study analyzes the structures and materials used in aerospace engineering, expanding from traditional mechanics of materials in order to correctly understand the behavior of thin-walled structures under bending, torsion and axial loads. Composite materials are being used extensively in new airplanes and helicopters, space structures, as well as in wind energy, ships, transportation, infrastructure and biomedical joints. Current research in composite structures encompasses several areas of engineering, includes durability of composites due to in service load (for example, thermo-hydro-mechanical fatigue, impact, etc.) and structural health monitoring methods. Numerical methods (particularly, Finite Elements) are needed for the modeling of complex multi-material and multi-loading structures.

**Relevant courses:** EAE 133, EAE 135 & MAE 237 (graduate level/technical elective).

### Suggested Advisors

V. La Saponara

## Spacecraft Engineering

This field of study includes rocket propulsion, orbital mechanics, spacecraft design, human life-support in space, space environments, mission design and systems engineering. Current research in the MAE department includes spacecraft and habitat design, CubeSat design, human life-support systems and safety, space robotics, autonomous systems supported by machine learning, radiation protection, atmospheric entry and metallic additive manufacturing. A variety of federally-funded national laboratories fund this research, and research projects often result in internship and employment opportunities for students in organizations like NASA, Lawrence Livermore Lab, SpaceX, Blue Origin, Sierra Nevada, Lockheed Martin, Northrup Grumman, Aerospace Corp, Space Systems Loral and Boeing.

**Relevant courses:** EAE 140, EAE 142, EAE 143A, EAE 143B.

### Suggested Advisors

S. Joshi, N. Sarigul-Klijn, S. K. Robinson, Z. Sadeghizadeh

## Aeroelasticity & Vibrations

This field of study looks at aircraft structural dynamics and aeroelasticity. Areas of current research include aerospace structures, aeroelasticity, biomechanics, flow-induced vibrations, vibroacoustics and minimum weight design with aeroelastic and acoustic constraints. Research is also done on landing recovery systems, including winged, rotor, or parachute recovery system trades and scaled flight testing and the long-duration effects of space flight on the human spine. Aerospace engineers in this research area also work to develop advanced finite element methods to solve steep gradient problems of high temperature due to aerodynamic heating or shock loading, innovative power generation systems and environmental noise control methods. Many of these projects are sponsored by government agencies and leading industrial companies.

**Relevant course:** EME 139

### Suggested Advisors

N. Sarigul-Klijn

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Exclusive of General Education units, the minimum number of units required for the Aerospace Science & Engineering major is 160.

Code	Title	Units
<b>Lower Division Required Courses</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3
MAT 022B	Differential Equations	3
<i>Physics</i>		
PHY 009A	Classical Physics	5
PHY 009B	Classical Physics	5
PHY 009C	Classical Physics	5
<i>Chemistry</i>		
CHE 002A or CHE 002AH	General Chemistry Honors General Chemistry	5
CHE 002B or CHE 002BH	General Chemistry Honors General Chemistry	5
<i>Engineering</i>		
ENG 004	Engineering Graphics in Design	3
ENG 017 or ENG 017V	Circuits I	4
ENG 035	Statics	4
ENG 045 or ENG 045Y	Properties of Materials	4
ENG 006 or EME 005	Engineering Problem Solving Computer Programming for Engineering Applications	4
Lower Division Composition/Writing; choose one; a grade of C- or better is required:		4
COM 001	Major Works of the Ancient World	
COM 002	Major Works of the Medieval & Early Modern World	
COM 003	Major Works of the Modern World	
COM 004	Major Works of the Contemporary World	
ENL 003	Introduction to Literature	
NAS 005	Introduction to Native American Literature	
UWP 001	Introduction to Academic Literacies (Recommended)	
UWP 001V	Introduction to Academic Literacies: Online (Recommended)	
UWP 001Y	Introduction to Academic Literacies (Recommended)	
Choose one:		4
CMN 001	Introduction to Public Speaking	
ENG 003 or ENG 003Y	Introduction to Engineering Design Introduction to Engineering Design	
Lower Division Required Courses Subtotal		74
<b>Upper Division Required Courses</b>		
<i>Aerospace Science &amp; Engineering</i>		28
<i>Required Aerospace Courses</i>		
EAE 129	Stability & Control of Aerospace Vehicles	
EAE 133	Finite Element Methods in Structures	

EAE 135	Aerospace Structures		or UWP 101Y	Advanced Composition
EAE 138	Aircraft Propulsion		UWP 102E	Writing in the Disciplines: Engineering
<i>Aerodynamics Elective, choose one:</i>			UWP 104A	Writing in the Professions: Business Writing
EAE 126	Theoretical & Computational Aerodynamics		or UWP 104AY	Writing in the Professions: Business Writing
or EAE 127	Applied Aircraft Aerodynamics		UWP 104E	Writing in the Professions: Science
<i>Senior Design Capstone, choose one series:</i>			UWP 104T	Writing in the Professions: Technical Writing
EAE 130A & EAE 130B	Aircraft Performance & Design and Aircraft Performance & Design (taken in consecutive quarters)		<b>OR</b>	
EAE 143A & EAE 143B	Space Vehicle Design and Space Mission Design (taken in consecutive quarters )			Passing the Upper Division Composition Exam
<b>Engineering</b>		<b>22</b>		<b>Upper Division Required Courses Subtotal</b>
				<b>86-90</b>
			<b>Total Units</b>	<b>160-164</b>
<sup>1</sup> Courses that cannot be used are BIM 110L Discontinued, ENG 160, ECS 188 or any 197T course.				
<b>Mechanical Engineering, Bachelor of Science</b>				
<b>College of Engineering</b>				
Valeria La Saponara, Ph.D., Vice Chairperson for Undergraduate Studies				
<b>The Mechanical &amp; Aerospace Engineering Undergraduate Programs</b>				
The Department of Mechanical & Aerospace Engineering administers two undergraduate programs in the College of Engineering: (1) Mechanical Engineering, (2) Aerospace Science & Engineering.				
For more information about our programs, see Undergraduate Majors ( <a href="http://mae.ucdavis.edu/undergraduate/undergraduate-majors/">http://mae.ucdavis.edu/undergraduate/undergraduate-majors/</a> ).				
<b>Mission</b>				
The Department of Mechanical & Aerospace Engineering is committed to educating future engineers so that they may contribute to the economic growth and well-being of the state, the nation, and the world, and to the advancement of knowledge in the mechanical and aerospace sciences.				
<b>Objectives</b>				
The objectives of the Mechanical Engineering & Aerospace Science and Engineering programs are to produce graduates who do one or more of the following: a. Practice mechanical engineering and/or aerospace engineering in a broad range of agencies, industries, and institutes; b. Pursue graduate education; c. Participate in research and development, and other creative and innovative efforts in science, engineering, and technology; d. Pursue entrepreneurial endeavors.				
<b>Mechanical Engineering Undergraduate Program</b>				
The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET ( <a href="http://www.abet.org">http://www.abet.org</a> ).				
The mechanical engineer uses basic science in the design and manufacture of complex engineering systems, requiring the application of physical and mechanical principles to the development of machines,				
Up to 4 units may be selected from any upper division engineering course including any engineering 192 or 199 not used in satisfaction of other degree requirements. <sup>1</sup>				
From the above Astronautics Elective list if not used in satisfaction of other degree requirements.				
Technical Elective; choose one:				
From the above Aeronautics Elective list if not used in satisfaction of other degree requirements.				
Up to 4 units may be selected from any upper division engineering course including any engineering 192 or 199 not used in satisfaction of other degree requirements. <sup>1</sup>				
<b>Upper Division Composition Requirement</b>				
Choose one; grade of C- or better is required:				
UWP 101	Advanced Composition			
or UWP 101V	Advanced Composition			

energy conversion systems, materials, and equipment for guidance & control.

Work in this broad field of engineering requires a thorough knowledge of mathematics, physics, chemistry, material science, applied mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufacturing processes, and economics.

The Mechanical Engineering program is designed to provide knowledge in mechanical engineering and associated applied sciences so that graduates may practice in a broad range of industries, pursue graduate studies, participate in research & development, and/or pursue entrepreneurial endeavors.

## Areas of Interest

Students spend their third year in further study of fundamental courses, and in the fourth year they may tailor their studies to their interests by selecting courses in controls and systems analysis, fluid mechanics, heat transfer, mechanical design or thermodynamics. Students can either prepare for graduate study in mechanical engineering or obtain a broad background for entering engineering practice.

Students may select elective courses from among the areas of interest listed below.

### Mechanical Design

The creation and improvement of products, processes, or systems that are mechanical in nature are the primary activities of a professional mechanical engineer. The development of a product from concept generation to detailed design, manufacturing process selection and planning, quality control and assurance, and life cycle considerations are areas of study and specialization in the area of mechanical design.

Solutions to such major social problems as environmental pollution, the lack of mass transportation, the lack of raw materials, and energy shortages, will depend heavily on the engineer's ability to create new types of machinery and mechanical systems.

The engineer-designer must have a solid and relatively broad background in the basic physical and engineering sciences and have the ability to synthesize the information from such a background in creative problem solving. In addition to having technical competence, the designer must be able to consider the socioeconomic consequences of a design and its possible impact on the environment. Product safety, reliability, and economics are other considerations.

Code	Title	Units
<b>Suggested Restricted Electives</b>		
ENG 122	Introduction to Mechanical Vibrations	4
EMS 180	Materials in Engineering Design	4
EMS 182	Failure Analysis	4
EME 121	Engineering Applications of Dynamics	4
EME 134	Vehicle Stability	4
EME 139	Stability of Flexible Dynamic Systems	4
EME 150B	Mechanical Design	4
EME 151	Statistical Methods in Design & Manufacturing	4
EME 152	Computer-Aided Mechanism Design	4
EME 154	Mechatronics	4
EME 161	Combustion & the Environment	4

EME 163	Internal Combustion Engines & Future Alternatives	4
EME 164	Introduction to Heating, Ventilation & Air Conditioning Systems	4
EME 171	Analysis, Simulation & Design of Mechatronic Systems	4

### Suggested Advisors

H.H. Cheng, R.T. Farouki, M.R. Hill, B.S. Linke, B. Ravani, J. Schofield, M. Soshi

## Engineering & Biomedical Fluid Mechanics

This field of study is based on the fundamentals of fluid mechanics and their broad range of applications in the biomedical and engineering areas. Areas of current research include blood circulation and its potential role in the regulation of normal physiological function and in the development of disease; groundwater and atmospheric flows and their implications for pollutant transport and environmental concerns; aerodynamic flow around transportation vehicles and its impact on vehicle performance; flow in combustion engines and other energy systems with considerations of efficiency and environmental impact; compressible flows in aircraft engine or gas turbine; and computational fluid dynamics. These areas are investigated both experimentally and computationally.

Code	Title	Units
<b>Suggested Restricted Electives</b>		
EAE 126	Theoretical & Computational Aerodynamics	4
EAE 127	Applied Aircraft Aerodynamics	4
EAE 138	Aircraft Propulsion	4
EME 161	Combustion & the Environment	4
EME 163	Internal Combustion Engines & Future Alternatives	4
EME 164	Introduction to Heating, Ventilation & Air Conditioning Systems	4

### Suggested Advisors

R.C. Aldredge, J.P. Delplanque, M. Hafez, S. Lee, S.K. Robinson, B.D. Shaw, C.P. van Dam, A.S. Wexler

## Combustion & the Environment

Combustion is widely used for energy generation, propulsion, heating, and waste disposal, as well as for many other applications. Mechanical engineers are often heavily involved with the design of combustion systems (internal combustion engines, gas turbines, furnaces, etc.) and deal with aspects of combustion ranging from increasing efficiencies to reducing pollutant emissions. This specialization is for those who would like to work in fields that use combustion, or that deal with pollution related to combustion. With the current increased emphasis on reducing pollutants while maintaining or increasing efficiency, the efforts of mechanical engineers in designing and improving combustion systems are becoming more important.

Code	Title	Units
<b>Suggested Technical Electives</b>		
EME 161	Combustion & the Environment	4
EME 163	Internal Combustion Engines & Future Alternatives	4

**Suggested Advisors**

R.C. Aldredge, P.A. Erickson, B.D. Shaw

**Heat Transfer, Thermodynamics, & Energy Systems**

This specialization emphasizes the fundamentals of heat transfer and thermodynamics, and their application to the design of advanced engineering systems. The objective of the program is to introduce students to the fundamental processes of heat transfer and thermodynamics in complex engineering systems so that they are able to design more efficient, cost-effective, and reliable systems with less environmental pollution and impact. An understanding of heat transfer and thermodynamics is required for the design of efficient, cost-effective systems for power generation, propulsion, heat exchangers, industrial processes, refining, and chemical processing. This area of specialization is important to many industries— aerospace, defense, automotive—as well as to the thermal design of electronic and computer packages.

Code	Title	Units
<b>Suggested Restricted Electives</b>		
EAE 138	Aircraft Propulsion	4
EME 161	Combustion & the Environment	4
EME 163	Internal Combustion Engines & Future Alternatives	4
EME 164	Introduction to Heating, Ventilation & Air Conditioning Systems	4

**Suggested Advisors**

R.C. Aldredge, P.A. Erickson, J.K. Kissock, V. Narayanan, J.W. Park, B.D. Shaw

**Manufacturing**

Manufacturing is concerned with the conversion of raw materials into finished products by a variety of processes, such as machining, forming, casting, and molding. Modern manufacturing technology is increasingly dependent upon integration with computer-aided design systems and precision computer controls. State-of-the-art laboratories offer the opportunity for hands-on experience with a wide spectrum of manufacturing equipment. Manufacturing engineers must have expertise in design, materials, controls, statistical methods, computer software, and microprocessor applications.

Code	Title	Units
<b>Suggested Restricted Electives</b>		
EMS 180	Materials in Engineering Design	4
EME 150B	Mechanical Design	4
EME 151	Statistical Methods in Design & Manufacturing	4
EME 154	Mechatronics	4

**Suggested Advisors**

H.H. Cheng, R.T. Farouki, B.S. Linke, D.A. Horsley, V. La Saponara, M. Soshi, B. Ravani

**System Dynamics & Control**

Engineers are increasingly concerned with the performance of integrated dynamics systems in which it is not possible to optimize component parts without considering the overall system.

System dynamics and control specialists are concerned with the modeling, analysis, and simulation of all types of dynamic systems and with the use of automatic control techniques to change the dynamic characteristics of systems in useful ways. The emphasis in this program

is on the physical systems that are closely related to mechanical engineering, but the techniques for studying these systems apply to social, economic, and other dynamic systems.

Ongoing research includes projects on continuously variable transmissions, active and semi-active suspension systems, modeling and control of vehicle dynamics, electromechanical actuator design, electronically controlled steering, the analysis of fuel management systems, and the design of flight-control systems with humans in the loop.

Code	Title	Units
<b>Suggested Restricted Electives</b>		
EAE 129	Stability & Control of Aerospace Vehicles	4
EAE 142	Orbital Mechanics	4
EAE 143A	Space Vehicle Design	4
EAE 143B	Space Mission Design	4
ENG 111	Electric Machinery Fundamentals	4
ENG 121	Fluid Power Actuators & Systems	4
ENG 122	Introduction to Mechanical Vibrations	4
EME 121	Engineering Applications of Dynamics	4
EME 134	Vehicle Stability	4
EME 139	Stability of Flexible Dynamic Systems	4
EME 152	Computer-Aided Mechanism Design	4
EME 154	Mechatronics	4
EME 171	Analysis, Simulation & Design of Mechatronic Systems	4

**Suggested Advisors**

F. Assadian, D.A. Horsley, S. Joshi, Z. Kong, X. Lin, S. Nazari, J. Schofield, I. Soltani

**Ground Vehicle Systems**

An important aspect of mechanical engineering is the design of more environmentally benign surface vehicles that provide efficient individual and public transportation. Innovations in the field require competence in vehicle dynamics, control of vehicle dynamics, power sources & power transmission, lightweight structures & systems, alternatively fueled power systems, including electrical drives & fuel cells, and mechanical systems.

Code	Title	Units
<b>Suggested Restricted Electives</b>		
ENG 122	Introduction to Mechanical Vibrations	4
EME 121	Engineering Applications of Dynamics	4
EME 134	Vehicle Stability	4
EME 139	Stability of Flexible Dynamic Systems	4
EME 152	Computer-Aided Mechanism Design	4
EME 171	Analysis, Simulation & Design of Mechatronic Systems	4

**Suggested Advisors**

F. Assadian, P.A. Erickson, M. Hill, X. Lin, J. Moore, J. Park, N. Sarigul-Klijn

**Transportation Systems**

As society recognizes the increasing importance of optimizing transportation systems to minimize environmental degradation and energy expenditure, engineers will need to consider major innovations in the way people and goods are moved. Such innovations will require competence in vehicle dynamics, propulsion and control, and an

understanding of the problems caused by present-day modes of transportation. Vehicle control requires an understanding of sensors and actuators, and the integration of yet-to-be-proposed concepts into overall vehicular dynamics. Competence in these areas allows for the development of alternative propulsion concepts, such as electric, hybrid, and fuel cell.

<b>Code</b>	<b>Title</b>	<b>Units</b>	EME 005 or ENG 006 ENG 045 or ENG 045Y Lower Division Composition/Writing; choose one; a grade of C- or better is required:	4 4 4 4 4
<b>Suggested Restricted Electives</b>			COM 001 COM 002 COM 003 COM 004 ENL 003 NAS 005 UWP 001 UWP 001V UWP 001Y	Major Works of the Ancient World Major Works of the Medieval & Early Modern World Major Works of the Modern World Major Works of the Contemporary World Introduction to Literature Introduction to Native American Literature Introduction to Academic Literacies (Recommended) Introduction to Academic Literacies: Online (Recommended) Introduction to Academic Literacies (Recommended)
EAE 129	Stability & Control of Aerospace Vehicles	4		
ENG 122	Introduction to Mechanical Vibrations	4		
EME 134	Vehicle Stability	4		
EME 150B	Mechanical Design	4		
EME 161	Combustion & the Environment	4		
EME 163	Internal Combustion Engines & Future Alternatives	4		
EME 171	Analysis, Simulation & Design of Mechatronic Systems	4		
<b>Suggested Advisors</b>				
F. Assadian, P.A. Erickson, X. Lin, S. Nazari, J.W. Park, I. Soltani				
Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.				
Exclusive of General Education units, the minimum number of units required for the Mechanical Engineering major is 148.				
<b>Code</b>	<b>Title</b>	<b>Units</b>		
<b>Lower Division Required Courses</b>				
CMN 001 or ENG 003 or ENG 003Y	Introduction to Public Speaking Introduction to Engineering Design Introduction to Engineering Design	4		
<i>Mathematics</i>				
MAT 021A	Calculus	4		
MAT 021B	Calculus	4		
MAT 021C	Calculus	4		
MAT 021D	Vector Analysis	4		
MAT 022A	Linear Algebra	3		
MAT 022B	Differential Equations	3		
<i>Physics</i>				
PHY 009A	Classical Physics	5		
PHY 009B	Classical Physics	5		
PHY 009C	Classical Physics	5		
<i>Chemistry</i>				
CHE 002A or CHE 002AH	General Chemistry Honors General Chemistry	5		
CHE 002B or CHE 002BH	General Chemistry Honors General Chemistry	5		
<i>Engineering</i>				
ENG 004	Engineering Graphics in Design	3		
ENG 017 or ENG 035	Circuits I Statics	4		
ENG 035	Statics	4		
EME 050	Manufacturing Processes	4		
<i>Engineering</i>				
EME 106	Thermo-Fluid Dynamics	4		
EME 108	Measurement Systems	4		
EME 109	Experimental Methods for Thermal Fluids	4		
EME 150A	Mechanical Design	4		
EME 165	Heat Transfer	4		
EME 172	Automatic Control of Engineering Systems	4		
<i>Choose a series:</i>				8
EME 185A & EME 185B	Mechanical Engineering Systems Design Project and Mechanical Engineering Systems Design Project (taken in consecutive quarters)			
EAE 130A & EAE 130B	Aircraft Performance & Design and Aircraft Performance & Design (taken in consecutive quarters)			
EAE 143A & EAE 143B	Space Vehicle Design and Space Mission Design (taken in consecutive quarters)			
<i>Applied Mathematics Electives</i>				
Choose one:				4
ECH 140	Mathematical Methods in Biochemical & Chemical Engineering			
ECI 114	Probabilistic Systems Analysis for Civil & Environmental Engineers			
ECS 130	Scientific Computation			

ENG 180	Engineering Analysis	Upper Division Required Courses Subtotal	70-74
MAT 118A	Partial Differential Equations: Elementary Methods	<b>Total Units</b>	<b>148-152</b>
MAT 128A	Numerical Analysis		
MAT 128B	Numerical Analysis in Solution of Equations		
EME 115	Introduction to Numerical Analysis & Methods		
EME 151	Statistical Methods in Design & Manufacturing		
STA 130A	Mathematical Statistics: Brief Course		
STA 131A	Introduction to Probability Theory		
<i>System Dynamics/Mechanical Design Electives</i>			
Choose one:		4	
ENG 122	Introduction to Mechanical Vibrations		
EME 121	Engineering Applications of Dynamics		
EME 139	Stability of Flexible Dynamic Systems		
EME 150B	Mechanical Design		
EME 154	Mechatronics		
EME 171	Analysis, Simulation & Design of Mechatronic Systems		
<i>Restricted Electives</i>			
Choose two: <sup>1</sup>		8	
EAE 129	Stability & Control of Aerospace Vehicles		
EAE 138	Aircraft Propulsion		
EAE 140	Rocket Propulsion		
EAE 142	Orbital Mechanics		
EAE 143A	Space Vehicle Design		
EAE 143B	Space Mission Design		
ENG 188	Science & Technology of Sustainable Power Generation		
EMS 180	Materials in Engineering Design		
EMS 182	Failure Analysis		
EME 134	Vehicle Stability		
EME 152	Computer-Aided Mechanism Design		
EME 161	Combustion & the Environment		
EME 163	Internal Combustion Engines & Future Alternatives		
EME 164	Introduction to Heating, Ventilation & Air Conditioning Systems		
<i>Upper Division Composition Requirement</i>			
Choose one; a grade of C- or better is required:		0-4	
UWP 101	Advanced Composition		
or UWP 101V	Advanced Composition		
or UWP 101Y	Advanced Composition		
UWP 102E	Writing in the Disciplines: Engineering		
UWP 104A	Writing in the Professions: Business Writing		
or UWP 104AY	Writing in the Professions: Business Writing		
UWP 104E	Writing in the Professions: Science		
UWP 104T	Writing in the Professions: Technical Writing		
Passing the Upper Division Composition Exam			

<sup>1</sup> Students may also choose from EAE 130A, EAE 130B, EME 121, EME 139, EME 150B, EME 151, EME 154, EME 171, ENG 122 if these courses are not used in satisfaction of other degree requirements.

## Mechanical & Aerospace Engineering, Master of Science

### College of Engineering

The defining element of graduate study in the Mechanical & Aerospace Engineering Program is interdisciplinary design. Research within this graduate program advances design in diverse fields such as vehicles, plasma MHD propulsion, biomechanics, aerostructures, sensors, combustion, and energy systems. Graduate students acquire skills both to address fundamental issues in these areas and to design complex, multi-component systems. The highly collaborative environment fosters multidisciplinary research while drawing on the study of mathematics, experimental and space plasma science, electrical engineering, materials science, materials modeling, molecular dynamics and numerical analysis, bioengineering, space physics, and nanotechnology in addition to the core areas. Recruiters from industry are active here, knowing that, in addition to having hands-on design experience, our students are well grounded in engineering fundamentals. They study with professors who "wrote the book" on their discipline, and work on design projects with researchers who are international authorities in their field. Our graduate students are able to work closely with faculty in a friendly but demanding environment where teamwork and faculty mentoring are important, as is the cross-disciplinary, collaborative culture that is unique to UC Davis.

### Research Highlights

- Aeronautics & Aerostructures
- Spacecraft Design & Operation
- Space Environmental Studies
- Remote Sensing
- Electrical Propulsion
- Flight Dynamics & Control
- Computational Fluid Dynamics
- Experimental MHD Turbulence Studies
- Dynamic Systems & Controls
- Robotics
- Materials Modeling
- Manufacturing & Mechanical Design
- Reacting Flows
- Heat Transfer
- Automotive System Dynamics
- Biosensors/Microelectromechanical Systems (MEMS)
- Molecular Self-Assembly
- Radiation Effects In Solids
- Nonlinear Dynamics & Phase-Locking
- Biofluid Mechanics
- Biosolid Mechanics
- Sports Biomechanics
- Energy Systems/Fuel Cell/Hybrid Vehicle Technology

- High Energy Density Science & Applications
- Nuclear Fusion Energy
- Wind Energy
- Solar Energy

## Research Facilities & Partnerships

- Center for Computational Fluid Dynamics
- Institute of Transportation Studies
- Center for Advanced Highway Maintenance & Construction Technology
- GATE Center for Hybrid Electric Vehicles
- Western Cooling Efficiency Center
- Energy and Efficiency Institute
- HOME Space Technology Research Institute
- Aeronautical Wind Tunnel Facility

Complete Information on our website at Mechanical & Aerospace Engineering (<http://mae.ucdavis.edu/graduate/>).

## Mechanical & Aerospace Engineering, Doctor of Philosophy

### College of Engineering

The defining element of graduate study in the Mechanical & Aerospace Engineering Program is interdisciplinary design. Research within this graduate program advances design in diverse fields such as vehicles, plasma MHD propulsion, biomechanics, aerostructures, sensors, combustion, and energy systems. Graduate students acquire skills both to address fundamental issues in these areas and to design complex, multi-component systems. The highly collaborative environment fosters multidisciplinary research while drawing on the study of mathematics, experimental and space plasma science, electrical engineering, materials science, materials modeling, molecular dynamics and numerical analysis, bioengineering, space physics, and nanotechnology in addition to the core areas. Recruiters from industry are active here, knowing that, in addition to having hands-on design experience, our students are well grounded in engineering fundamentals. They study with professors who "wrote the book" on their discipline, and work on design projects with researchers who are international authorities in their field. Our graduate students are able to work closely with faculty in a friendly but demanding environment where teamwork and faculty mentoring are important, as is the cross-disciplinary, collaborative culture that is unique to UC Davis.

## Research Highlights

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- Robotics
- Materials Modeling
- Manufacturing & Mechanical Design

- Reacting Flows
- Heat Transfer
- Automotive System Dynamics
- Biosensors/Microelectromechanical Systems (MEMS)
- Molecular Self-Assembly
- Radiation Effects In Solids
- Nonlinear Dynamics & Phase-Locking
- Biofluid Mechanics
- Biosolid Mechanics
- Sports Biomechanics
- Energy Systems/Fuel Cell/Hybrid Vehicle Technology
- High Energy Density Science & Applications
- Nuclear Fusion Energy
- Wind Energy
- Solar Energy

## Research Facilities & Partnerships

- Center for Computational Fluid Dynamics
- Institute of Transportation Studies
- Center for Advanced Highway Maintenance & Construction Technology
- GATE Center for Hybrid Electric Vehicles
- Western Cooling Efficiency Center
- Energy and Efficiency Institute
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- Aeronautical Wind Tunnel Facility

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## Medicine, School of

### School of Medicine

## School of Medicine

Education Building; 4610 X Street, Sacramento, CA 95817; School of Medicine (<http://www.ucdmucdavis.edu/medschool/>)

- Doctor of Medicine (p. 313)

## Doctor of Medicine

### School of Medicine

The curriculum for the M.D. degree at the UC Davis School of Medicine is a four-year program providing comprehensive preparation for graduate medical training (internships and residencies) and the practice of medicine. It offers a highly integrated approach to basic science training and clinical experience with opportunities for research. The I-EXPLORE (Integrated EXplorative Patient & Learner Oriented Education) curriculum utilizes a competency-based medical education that emphasizes the achievement of knowledge, skills, abilities, and attitudes through a variety of experiences#that span all four years of the program.#Competencies are assessed through a variety of methods that include both formative and summative events. Competency-based education is designed in a collaborative and integrative manner that allows students to grow and evolve throughout their educational experience. For more

information, see UC Davis School of Medicine M.D. Program (<https://health.ucdavis.edu/mdprogram/>).

## Medieval & Early Modern Studies

### College of Letters & Science

Tiffany Werth, Ph.D.; Program Director

### Program Office

176 Voorhies Hall; 530-752-2257; Medieval & Early Modern Studies (<http://mems.ucdavis.edu>); Faculty (<http://mems.ucdavis.edu/people/>)

- Medieval & Early Modern Studies, Bachelor of Arts (p. 314)
- Medieval & Early Modern Studies, Minor (p. 316)

## Medieval & Early Modern Studies, Bachelor of Arts

### College of Letters & Science

### The Major Program

The Major in Medieval & Early Modern Studies serves as the nucleus from which to examine diverse cultures, intellectual movements, religions, politics, and literary traditions from a world-historical time frame that stretches from the fifth century to the eighteenth-century CE and into contemporary medievalisms. A transdisciplinary and interdepartmental program, the major includes studies across the humanities in art, drama, history, literature, music, national languages, philosophy, politics and political theory, religion, and rhetoric.

These premodern worlds were rarely static and the major encourages dynamic work across traditional boundaries of faiths, languages, economies, and peoples. The lower division series of Medieval Studies (MST) (<https://ucdavis-curr.courseleaf.com/courses-subject-code/mst/>) courses in the program provides the foundation for the major and prepares students for advanced work within individual disciplines. At the upper division level, students may choose humanities course work across geographic areas such as the Middle East, Europe, East Asia, South Asia, Africa, and America. There is also the option for students to choose to complete a senior thesis on a selected aspect of Medieval and/or early modern culture.

### The Program

The major requires interdisciplinary work, while allowing the student to focus on the early Middle Ages, the High Middle Ages, the Renaissance, or the Baroque. The series of medieval and early modern courses in the program provides the foundation for the major and prepares students for advanced work within the individual disciplines. On the upper division level, students may choose course work in specific areas of History, Comparative Literature, English, French, German, Italian, Spanish, and Latin, philosophy & religion, arts & language, and political thought. In addition, each student may elect to complete a senior thesis on a selected aspect of medieval and/or early modern culture.

### Career Alternatives

The major in Medieval & Early Modern Studies is a liberal arts degree providing excellent preparation for the rigors of professional schools as well as careers in law, museology, journalism, and teaching.

### Major Advisor

See Program office (<http://mems.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
MST 020A	Early Medieval Culture (Intro to Late Antique and Early Medieval Worlds)	4
MST 020B	The Culture of the High Middle Ages (Intro to Late Medieval and Early Modern Worlds )	4
Choose 12 units:		12
AHI 001B	Medieval & Renaissance Art	
AHI 001C	Baroque to Modern Art	
AHI 001E	Islamic Art & Architecture	
COM 002	Major Works of the Medieval & Early Modern World	
COM 010A	Master Authors in World Literature: Gilgamesh, Ramayana, Beowulf, Nibelungenlied	
COM 010B	Master Authors in World Literature: Metamorphoses, Decameron, Arabian Nights, Canterbury Tales	
COM 010C	Master Authors in World Literature: Chanson de Roland, El Cid, Igor's Campaign, Morte D'Arthur	
COM 010D	Master Authors in World Literature: Sakuntala, Tristan & Isolde, Aucassin & Nicolette, Gawain	
COM 010E	Master Authors in World Literature: Swift, Rabelais, La Celestina, Simplicissimus	
ENL 010A	Literatures in English I: To 1700	
GER 048	Myth & Saga in the Germanic Cultures	
HIS 004A	History of Western Civilization	
HIS 004B	History of Western Civilization	
HUM 001	Humanities Forum (Prior approval by Undergraduate Advisor necessary.)	
HUM 009	Don Quixote & the Modern World	
PHI 021	Philosophical Classics of the Ancient Era	
PHI 022	Philosophical Classics of the Modern Era	
MST 098/MST 099; total any combination:		2
MST 098	Directed Group Study	
MST 099	Special Study for Undergraduates	
Preparatory Subject Matter Subtotal		
<b>Depth Subject Matter</b>		
In consultation with the undergraduate advisor, students choose a total of eleven courses; with at least three courses from the Medieval Period (denoted as M) and at least three courses the Early Modern Period (denoted as EM):		
AHI 155	The Islamic City	
AHI 156	Arts of the Islamic Book EM	
AHI 178B	Early Italian Renaissance Art & Architecture EM	

AHI 178C	High & Late Italian Renaissance Art & Architecture <sup>EM</sup>	HIS 131A	Early Modern European History <sup>EM</sup>
AHI 179B	Baroque Art <sup>EM</sup>	HIS 131B	European History During the Renaissance & Reformation <sup>EM</sup>
AHI 190B	Undergraduate Seminar in Art History: Medieval <sup>M</sup>	HIS 131C	The Old Regime: Absolution, Enlightenment & Revolution in Europe <sup>M</sup>
AHI 190C	Undergraduate Seminar in Art History: Renaissance <sup>EM</sup>	HIS 132	Crime & Punishment in Early Modern Europe <sup>EM</sup>
CLA 110	Origins of Rhetoric <sup>M</sup>	HIS 135A	History of Science to the 18th Century <sup>EM</sup>
COM 139	Shakespeare & the Classical World <sup>EM</sup>	HIS/STS 136	Scientific Revolution <sup>EM</sup>
COM 164A	The European Middle Ages <sup>M</sup>	HIS 139A	Medieval & Renaissance Medicine
COM 164B	The Renaissance <sup>EM</sup>	HIS 144A	History of Germany, 1450 to 1789 <sup>EM</sup>
COM 164C	Baroque & Neoclassicism <sup>EM</sup>	HIS 148A	Women & Society in Europe: 1500-1789 <sup>EM</sup>
COM 166A	The Epic	HIS 151A	England: The Middle Ages <sup>M</sup>
COM 180	Selected Topics in Comparative Literature <sup>1</sup>	HIS 151B	England: The Early Modern Centuries <sup>EM</sup>
ENL 113A	Chaucer: Troilus & the "Minor" Poems <sup>M</sup>	HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400 <sup>M</sup>
ENL 113B	Chaucer: The Canterbury Tales <sup>M</sup>	HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730 <sup>EM</sup>
ENL 115	Topics in 16th- & 17th-Century Literature <sup>EM</sup>	ITA 105	Introduction to Italian Literature
ENL 117	Shakespeare <sup>EM</sup>	ITA 112	Medieval & Renaissance Poetry: St. Francis to Petrarch
ENL 122	Milton <sup>EM</sup>	ITA 113	Dante Alighieri, <i>Divina Commedia</i> ( <i>Inferno</i> , <i>Purgatorio</i> , <i>Paradiso</i> ) <sup>M</sup>
ENL 150A	British Drama to 1800 <sup>EM</sup>	ITA 114	Boccaccio, <i>Decameron</i> , & the Renaissance Novella
ENL 153	Topics in Drama <sup>1</sup>	ITA 115A	Studies in the Cinquecento <sup>EM</sup>
ENL 165	Topics in Poetry <sup>1</sup>	ITA 115B	Italian Literature of the Renaissance & the Baroque: From Cellini to Marino <sup>EM</sup>
ENL 185A	Literature by Women Before 1800 <sup>1</sup>	ITA 115C	Italian Drama from Machiavelli to the Enlightenment <sup>EM</sup>
ENL 188A	Topics in Literary & Critical Theory <sup>1</sup>	ITA 115D	Early Modern Italian Lyric <sup>EM</sup>
ENL 189	Seminar in Literary Studies <sup>1</sup>	ITA 118	Italian Literature of the 18th Century <sup>EM</sup>
FRE 115	Medieval French Literature & Society <sup>M</sup>	ITA 139B	Italian Literature in English: Boccaccio, Petrarch & the Renaissance <sup>EM</sup>
FRE 116	The French Renaissance <sup>EM</sup>	ITA 140	Italian Literature in English Translation: Dante, <i>Divine Comedy</i> <sup>M</sup>
FRE 117A	Baroque & Preclassicism <sup>EM</sup>	ITA 141/COM 138	Gender & Interpretation in the Renaissance <sup>EM</sup>
FRE 118B	Private Lives & Public Secrets: The Early French Novel	LAT 100	Readings in Latin Prose <sup>M</sup>
FRE 141	Selected Topics in French Literature <sup>1</sup>	LAT 101	Livy <sup>M</sup>
GER 101A	Survey of German Literature, 800-1800	LAT 102	Roman Comedy <sup>M</sup>
GER 112	Topics in German Literature <sup>1</sup>	LAT 103	Vergil: <i>Aeneid</i> <sup>M</sup>
GER 120	Survey of German Culture <sup>EM</sup>	LAT 104	Sallust <sup>M</sup>
GER 121	The Medieval Period in German Literature <sup>M</sup>	LAT 105	Catullus <sup>M</sup>
GER 122	Reformation & Baroque <sup>EM</sup>	LAT 106	Horace: Odes & Epodes <sup>M</sup>
GER 124	Major Movements in German Literature <sup>1</sup>	LAT 108	Horace: Satires & Epistles <sup>M</sup>
GER 131	German Lyric Poetry	LAT 109	Roman Elegy
GER 134	Topics in German Intellectual History <sup>1</sup>	LAT 110	Ovid <sup>M</sup>
GER 160	Love in the Middle Ages <sup>M</sup>	LAT 112	Cicero <sup>M</sup>
HIS 102B	Undergraduate Proseminar in History: Medieval <sup>M</sup>	LAT 115	Lucretius <sup>M</sup>
HIS 102D	Undergraduate Proseminar in History: Modern Europe to 1815	LAT 116	Vergil: <i>Eclogues</i> & <i>Georgics</i> <sup>M</sup>
HIS 121A	Medieval History <sup>M</sup>	LAT 118	Roman Historians <sup>M</sup>
HIS 121B	Medieval History <sup>M</sup>	LAT 119	Readings in Republican Latin Literature <sup>M</sup>
HIS 121C	Medieval History <sup>M</sup>	LAT 120	Readings in Imperial Latin Literature <sup>M</sup>
HIS 122	Selected Themes in Medieval History <sup>M</sup>		
HIS 125	Topics in Early Modern European History <sup>EM</sup>		
HIS 130A	Christianity & Culture in Europe: 50-1450 <sup>M</sup>		
HIS 130B	Christianity & Culture in Europe: 1450-1600 <sup>EM</sup>		

Code	Title	Units
LAT 121	Latin Prose Composition <sup>M</sup>	
LAT 125	Medieval Latin <sup>M</sup>	
LAT 130	Readings in Late Latin <sup>M</sup>	
MST 130A	Special Themes in Medieval Cultures <sup>M</sup>	
MST 130B	Special Themes in Renaissance Culture <sup>EM</sup>	
MST 131	Cross-Cultural Relations in the Medieval and/or Early Modern World	
MST 189	Seminar in Medieval & Early Modern Culture	
MST 190	Senior Thesis	
MUS 121	Topics in Music Scholarship <sup>1</sup>	
PHI 105	Philosophy of Religion	
PHI 145	Christian, Islamic, & Jewish Philosophers of the Middle Ages <sup>M</sup>	
PHI 168	Descartes <sup>EM</sup>	
PHI 170	Spinoza & Leibniz <sup>EM</sup>	
PHI 172	Locke & Berkeley <sup>EM</sup>	
POL 115	Medieval Political Thought <sup>M</sup>	
POL 116	Foundations of Political Thought	
POL 118A	History of Political Theory: Ancient <sup>M</sup>	
RST 102	Christian Origins <sup>M</sup>	
RST 115	Mysticism	
RST 130	Topics in Religious Studies <sup>1</sup>	
SPA 130	Survey of Spanish Literature to 1700	
SPA 133N	Golden Age Literature of Spain <sup>EM</sup>	
SPA 134A	Don Quijote I <sup>EM</sup>	
SPA 134B	Don Quijote II <sup>EM</sup>	
SPA 142	Special Topics in Spanish Cultural & Literary Studies <sup>1</sup>	
Depth Subject Matter Subtotal		44
Total Units		66

EM Early Modern Period

M Medieval Period

<sup>1</sup> Consult with an undergraduate advisor regarding all "topics" related courses.

## Medieval & Early Modern Studies, Minor

College of Letters &amp; Science

### Minor Advisor

See Program office (<http://mems.ucdavis.edu/>).

### Total Units

24

## Microbiology & Molecular Genetics

### College of Biological Sciences

Wolf-Dietrich Heyer, Ph.D., Chairperson of the Department; term ends June 30, 2023

### Department Office

357 Briggs Hall; 530-752-2626; Microbiology Graduate Group (<https://mmg.ucdavis.edu/>); Faculty (<https://mmg.ucdavis.edu/people/faculty/>)

- Molecular & Medical Microbiology, Bachelor of Arts (p. 316)
- Molecular & Medical Microbiology, Bachelor of Science (p. 318)

## Molecular & Medical Microbiology, Bachelor of Arts

### College of Biological Sciences

The department of Microbiology & Molecular Genetics offers the major in Molecular & Medical Microbiology.

## Molecular & Medical Microbiology A.B.

### The Major Program

Microbiology is the branch of biology that deals with bacteria, yeasts and other fungi, algae, protozoa, and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine, and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis, and physiology. The ease and power of simultaneous genetic and biochemical analysis of microbes led to the emergence of the new disciplines of molecular biology & molecular genetics, and spawned the new industry of biotechnology.

### The Program

The Molecular & Medical Microbiology Undergraduate Program offers Bachelor of Science and Bachelor of Arts degrees in the College of Biological Sciences. Both degrees are designed to provide students with quantitative skills and knowledge across the breadth of Biological Sciences, while maintaining a focus on the biology of microorganisms. The B.S. degree offers more training in mathematics, biochemistry and laboratory methodology; the A.B. degree incorporates more exposure to the liberal arts. The choice of a major program and its suitability for

particular career options should be discussed with a Biology Academic Success Center (BASC) advisor.

### Career Alternatives

A bachelor's degree in Molecular & Medical Microbiology serves as the foundation for advanced study in microbiology, entry into the professional schools of all health sciences, or immediate employment in biotechnology, health care and food science industries.

### Graduate Study

The Graduate Group in Microbiology offers programs of study and research leading to M.S. and Ph.D. degrees.

Strong preference is given to doctoral applicants. The group offers study in general microbiology, microbial physiology, microbial genetics, molecular mechanisms of microbial regulation, molecular mechanisms of microbial pathogenesis, immunology, virology, and recombinant DNA technology. For information on the graduate study and undergraduate preparation for the program contact a graduate advisor or the Chairperson of the Group.

### Related Courses

The offerings of the Department of Microbiology & Molecular Genetics are augmented by courses in Food Science & Technology (FST) (p. 842); Medical Microbiology (MMI) (p. 1092); Molecular & Cellular Biology (MCB) (p. 1116); Pathology, Microbiology, & Immunology (PMI) (p. 1193); Plant Pathology (PLP) (p. 1234); and Soil Science (SSC) (p. 1333).

Faculty of the Department of Microbiology & Molecular Genetics also teach or participate in the following courses: BIS 002A, BIS 101, BIS 104 and BIS 181.

### Faculty Advisor

Rebecca Parales, Ph.D.

### Honors & Honors Program

Rebecca Parales, Ph.D.

### Teaching Credential Subject Representative

Rebecca Parales, Ph.D.; see the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

### Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Hall (formerly known as Sciences Laboratory Building); 530-752-0410.

Please Note: MIC courses are in the process of transitioning to MMG courses within the year.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
15		
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry</i>		
Choose the 002 series or 004 series: 10		

CHE 002A & CHE 002B	General Chemistry and General Chemistry	
<b>OR</b>		
CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
	Choose the 008 series or 118 series: <sup>1</sup>	
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course (Or )	6-12
<b>OR</b>		
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<i>Mathematics</i>		
Choose a series: <sup>2</sup>		8
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B	Calculus and Calculus	
<i>Physics</i>		
Choose the 001 series or 007 series:		6-12
PHY 001A & PHY 001B	Principles of Physics and Principles of Physics	
<b>OR</b>		
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
Preparatory Subject Matter Subtotal		45-57
<b>Depth Subject Matter</b>		
<i>Biological Science</i>		
BIS 101	Genes & Gene Expression	4
BIS 105 or BIS 103 & BIS 102	Biomolecules & Metabolism Bioenergetics & Metabolism and Structure & Function of Biomolecules	3-6
<i>Microbiology</i>		
MIC 102	Introductory Microbiology	3
MIC 104L	General Microbiology Laboratory	3
MIC 105	Microbial Diversity	3
MIC 105L	Microbial Diversity Laboratory	3
MIC 111	Human Microbiology	3
<i>Areas of Study</i>		
Choose at least one course from each of the areas of study below:		
1. Microbial Genetics		
MIC 115	Recombinant DNA Cloning & Analysis	
MIC 150	Genomes of Pathogenic Bacteria	
MIC 170	Yeast Molecular Genetics	
2. Virology or Immunology		
MIC 162	General Virology	
MMI 188A	Human Immunology	

MMI 188B	Human Immunology
PMI 126	Fundamentals of Immunology
PMI 128	Biology of Animal Viruses
Choose additional course work from the list below, to achieve a total of 36 or more units. Upper division Microbiology courses not used in satisfaction of any other requirement; or:	
BIS 181	Comparative Genomics
BIS 183	Functional Genomics
FST 104	Food Microbiology
MCB 121	Advanced Molecular Biology
MCB 182	Principles of Genomics
MIC 117	Analysis of Molecular Genetic Circuits
MIC 120	Microbial Ecology
MIC 172	Host-Parasite Interactions
MIC 175	Cancer Biology
PLP 130	Fungal Biology & Disease
SSC 111	Soil Microbiology
Upper division courses in related fields, relevant to the student's interest and chosen in consultation with the advisor.	
No more than 3 units of variable-unit courses (numbered 192, 198, or 199) may be used for credit in this category.	
Note: Although a course may be listed in more than one category, that course may satisfy only one requirement in the entire major.	
Depth Subject Matter Subtotal	36
Total Units	81-93

<sup>1</sup> With BASC advisor approval, this combination also satisfies the Organic Chemistry requirement: CHE 118A-CHE 008B.

<sup>2</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B; MAT 017A-MAT 021B.

## Molecular & Medical Microbiology, Bachelor of Science

### College of Biological Sciences

The department of Microbiology & Molecular Genetics offers the major in Molecular & Medical Microbiology.

## Molecular & Medical Microbiology B.S.

### The Major Program

Microbiology is the branch of biology that deals with bacteria, yeasts and other fungi, algae, protozoa, and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine, and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis, and physiology. The ease and power of simultaneous genetic and biochemical analysis of microbes led to the emergence of the new disciplines of molecular biology & molecular genetics, and spawned the new industry of biotechnology.

### The Program

The Molecular & Medical Microbiology Undergraduate Program offers Bachelor of Science and Bachelor of Arts degrees in the College of

Biological Sciences. Both degrees are designed to provide students with quantitative skills and knowledge across the breadth of Biological Sciences, while maintaining a focus on the biology of microorganisms. The B.S. degree offers more training in mathematics, biochemistry and laboratory methodology; the A.B. degree incorporates more exposure to the liberal arts. The choice of a major program and its suitability for particular career options should be discussed with a Biology Academic Success Center (BASC) advisor.

### Career Alternatives

A bachelor's degree in Molecular & Medical Microbiology serves as the foundation for advanced study in microbiology, entry into the professional schools of all health sciences, or immediate employment in biotechnology, health care and food science industries.

### Graduate Study

The Graduate Group in Microbiology offers programs of study and research leading to M.S. and Ph.D. degrees.

Strong preference is given to doctoral applicants. The group offers study in general microbiology, microbial physiology, microbial genetics, molecular mechanisms of microbial regulation, molecular mechanisms of microbial pathogenesis, immunology, virology, and recombinant DNA technology. For information on the graduate study and undergraduate preparation for the program contact a graduate advisor or the Chairperson of the Group.

### Related Courses

The offerings of the Department of Microbiology & Molecular Genetics are augmented by courses in Food Science & Technology (FST) (p. 472); Medical Microbiology (MMI) (p. 472); Molecular & Cellular Biology (MCB) (p. 472); Pathology, Microbiology, & Immunology (PMI) (p. 472); Plant Pathology (PLP) (p. 472); and Soil Science (SSC) (p. 472).

Faculty of the Department of Microbiology & Molecular Genetics also teach or participate in the following courses: BIS 002A, BIS 101, BIS 104 and BIS 181.

### Faculty Advisor

Rebecca Parales, Ph.D.

### Honors & Honors Program

Rebecca Parales, Ph.D.

### Teaching Credential Subject Representative

Rebecca Parales, Ph.D.; see the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

### Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Please Note: MIC courses are in the process of transitioning to MMG courses within the year.

Code	Title	Units
Preparatory Subject Matter		
Biological Science		18

BIS 002A & BIS 002B & BIS 002C & BIS 002D	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life and Introduction to Biology: Principles of Cell Biology & Physiology	MIC 104L MIC 105 MIC 105L MIC 111	General Microbiology Laboratory Microbial Diversity Microbial Diversity Laboratory Human Microbiology	3 3 3 3
		Areas of Study		
		Choose at least one course from each of the areas of study below:		9-10
		1. Molecular Microbiology		
		MIC 115 Recombinant DNA Cloning & Analysis		
		MIC 150 Genomes of Pathogenic Bacteria		
		MIC 170 Yeast Molecular Genetics		
		2. Virology		
		MIC 162 General Virology		
		PMI 128 Biology of Animal Viruses		
		3. Immunology		
		MMI 188A Human Immunology		
		or MMI 188B Human Immunology		
		PMI 126 Fundamentals of Immunology		
		Choose additional course work from the list below, to achieve a total of 45 or more units. Upper division Microbiology courses not used in satisfaction of any other requirement; or:		
		BIS 181 Comparative Genomics		
		BIS 183 Functional Genomics		
		FST 104 Food Microbiology		
		MCB 121 Advanced Molecular Biology		
		MCB 182 Principles of Genomics		
		MIC 117 Analysis of Molecular Genetic Circuits		
		MIC 120 Microbial Ecology		
		MIC 172 Host-Parasite Interactions		
		MIC 175 Cancer Biology		
		PLP 130 Fungal Biology & Disease		
		SSC 111 Soil Microbiology		
		Upper division courses in related fields, relevant to the student's interest and chosen in consultation with the advisor.		
Mathematics		8-12		
	Choose the 017 series or 021 series: <sup>3</sup>			
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	MIC 117 MIC 120 MIC 172 MIC 175 PLP 130 SSC 111	Analysis of Molecular Genetic Circuits Microbial Ecology Host-Parasite Interactions Cancer Biology Fungal Biology & Disease Soil Microbiology	
OR				
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus (Recommended)			
Physics		12		
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics			
Microbiology		7		
MIC 091 or MIC 191	Introduction to Research Introduction to Research for Advanced Undergraduates			
Subtotal		60-70		
Depth Subject Matter				
Biological Science				
BIS 101	Genes & Gene Expression	4		
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6		
Statistics				
STA 100	Applied Statistics for Biological Sciences	4		
Microbiology				
MIC 102	Introductory Microbiology	3		

## Microbiology (Graduate Group)

### Graduate Studies

<sup>1</sup> With BASC advisor approval, these combination also satisfies the General Chemistry requirement: CHE 004A-CHE 002A (3 units w/no lab )-CHE 002B-CHE 002C or CHE 004A-CHE 004B-CHE 002C.

<sup>2</sup> With BASC advisor approval, this combination also satisfies the Organic Chemistry requirement: CHE 118A-CHE 008B.

<sup>3</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.

Renée Tsolis, Ph.D., Chairperson of the Group

## Group Office

5519 Genome & Biomedical Sciences Building (GBSF); 530-754-8497;  
Microbiology Graduate Group (<https://mgg.ucdavis.edu/>); Faculty  
(<https://mgg.ucdavis.edu/our-faculty/>)

- Microbiology, Master of Science (p. 320)
- Microbiology, Doctor of Philosophy (p. 320)

# Microbiology, Master of Science

School of Medicine

## Graduate Study

The Graduate Group in Microbiology offers study and research leading to M.S. and Ph.D. degrees. Strong preference is given to doctoral applicants. The group offers study in modern molecular approaches to microbiological problems. Areas of research span fundamental, applied, and pathogenic microbiology, including bacterial and viral pathogenesis, eukaryotic microbiology, microbial genomics and genetics, microbial physiology and development, microbial ecology and environmental microbiology, cancer biology, and bioengineering and bioremediation. For information on the graduate study and undergraduate preparation for the program, contact a graduate advisor or the chairperson of the group.

The Master of Science degree is offered only en route to the Ph.D.

### Graduate Advisors

A. Gelli (Med: Pharmacology), J. Leveau (Plant Pathology), S.J. Lin (Microbiology & Molecular Genetics), R.E. Parales (Microbiology & Molecular Genetics), B. Shacklett (Med: Microbiology & Immunology), E.E. Sparger (Vet Med: Medicine), S. Rothenburg (Med: Microbiology & Immunology)

# Microbiology, Doctor of Philosophy

Graduate Studies

## Graduate Study

The Graduate Group in Microbiology offers study and research leading to M.S. and Ph.D. degrees. Strong preference is given to doctoral applicants. The group offers study in modern molecular approaches to microbiological problems. Areas of research span fundamental, applied, and pathogenic microbiology, including bacterial and viral pathogenesis, eukaryotic microbiology, microbial genomics and genetics, microbial physiology and development, microbial ecology and environmental microbiology, cancer biology, and bioengineering and bioremediation. For information on the graduate study and undergraduate preparation for the program, contact a graduate advisor or the chairperson of the group.

### Graduate Advisors

A. Gelli (Med: Pharmacology), J. Leveau (Plant Pathology), S.J. Lin (Microbiology & Molecular Genetics), R.E. Parales (Microbiology & Molecular Genetics), B. Shacklett (Med: Microbiology & Immunology), E.E. Sparger (Vet Med: Medicine), S. Rothenburg (Med: Microbiology & Immunology)

# Middle East/South Asia Studies

College of Letters & Science

Jocelyn Sharlet, Ph.D., Program Director

## Program Office

116 Everson Hall; 530-754-4926; Middle East/South Asia Studies (<http://mesa.ucdavis.edu>); Faculty (<https://mesa.ucdavis.edu/people/faculty/>)

### Language Courses

To enforce Academic Senate Regulation 536 (ASR) (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#536>), a student who has completed a second or more advanced year of high-school-level course work in a foreign language in tenth, eleventh, or twelfth grade shall be awarded credit for Course 1 (or its equivalent) in that language only if he or she takes the course on a Passed or Not Passed basis. Enforcement of this regulation occurs in the sixth week of the quarter. For more information, contact the Office of the University Registrar (<https://registrar.ucdavis.edu/contact/>). Please note this UC Davis policy applies to Arabic 001, Hebrew 001, Hindi/Urdu 001, Persian 001, and Punjabi 001/001V.

### Major and Minors Advisor

Consult the Middle East/South Asia Studies Advisor in 1287 Social Science & Humanities, 530-752-3576, or at Middle East/South Asia Studies (<http://mesa.ucdavis.edu>).

- Arab Studies, Minor (p. 320)
- Arabic, Minor (p. 321)
- India & South Asia Studies, Minor (p. 322)
- Iran & Persian Studies, Minor (p. 323)
- Middle East/South Asia Studies, Bachelor of Arts (p. 323)
- Middle East/South Asia Studies, Minor (p. 325)

# Arab Studies, Minor

College of Letters & Science

The Arab Studies Minor is an interdisciplinary minor that allows students to learn about the pre-modern and modern history, cultures, societies, and diasporas of Arabic-speaking peoples of West Asia and North Africa as well as other users of Arabic. The Arab Studies Minor is open to undergraduates in all four colleges.

### Minor Advisor

Consult the Middle East/South Asia Studies Advisor in 1287 Social Science & Humanities, 530-752-3576, or at Middle East/South Asia Studies (<http://mesa.ucdavis.edu>).

Code	Title	Units
MSA 100	Middle East & South Asia: Comparative Perspectives	4
MSA 180	Topics in Middle East & South Asian Studies	4
HIS 193A or HIS 193B	History of the Modern Middle East, 1750-1914 History of the Modern Middle East, From 1914	4

MSA 181C or MSA 182C	Topics in Regional ME/SA Studies: Arab Studies Undergraduate Proseminar in Middle East/South Asia: Arab Studies Seminar	4	POL 135 POL 136 RST 060 RST 065C RST 160 RST 161 RST 162 RST 163 WMS 184 WMS 185	International Politics of the Middle East The Arab-Israeli Conflict Introduction to Islam The Qur'an & Its Interpretation Introduction to Islamic Thought Modern Islam Introduction to Islamic Law Social Life of Islam Gender in the Arab World (Discontinued)
<b>Core Course List</b>				
Choose additional electives from the Core Course list: 4-15				
No more than one lower division course can be counted toward the minor requirements.				
MSA 111A or ARB 140/ COM 172/ MSA 121C	Great Cities of Arab Middle East & South Asia Shahnameh: The Persian Book of Kings A Story for a Life: The Arabian Nights			With prior consultation with an advisor, students can petition in advance the Program Committee to accept other elective courses toward the minor program if the content is 50% or more on the Arab World.
MSA 122A MSA 150/ GSW 185	Themes in the Arabic Novel Women & Islamic Discourses			With prior consultation with an advisor, students can petition in advance the Program Committee to accept more than 4 units of MSA 181C and/or MSA 182C towards the minor program.
MSA 181C	Topics in Regional ME/SA Studies: Arab Studies			<b>Total Units</b>
MSA 182C	Undergraduate Proseminar in Middle East/South Asia: Arab Studies Seminar			20-31
ANT 142	Peoples of the Middle East			
ARB 001 or ARB 001A	Elementary Arabic 1 Accelerated Intensive Elementary Arabic			
ARB 002	Elementary Arabic 2			
ARB 003	Elementary Arabic 3			
ARB 021	Intermediate Arabic 21			
ARB 022	Intermediate Arabic 22			
ARB 023	Intermediate Arabic 23			
ARB 121	Advanced Arabic			
ARB 122	Advanced Arabic			
ARB 123	Advanced Arabic			
ARB 198	Directed Group Study			
AHI 155	The Islamic City			
COM 053C	Literatures of the Islamic World			
COM 155	Classical Literatures of the Islamic World 600-1900			
COM 166	Literatures of the Modern Middle East			
HIS 006	Introduction to the Middle East			
HIS 102R	Undergraduate Proseminar in History: Muslim Societies			
HIS 112C	History of Jews in the Muslim World			
HIS 115F	History of Modern North Africa, 1800 to the Present			
HIS 190A	Middle Eastern History I: The Rise of Islam, 600-1000			
HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400			
HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730			
HIS 193A	History of the Modern Middle East, 1750-1914			
HIS 193B	History of the Modern Middle East, From 1914			
Choose one upper division course in Arabic language or Arabic literature:				
	COM 148	Mystical Literatures of South Asia & the Middle East		
	COM 155	Classical Literatures of the Islamic World 600-1900		
	COM 166	Literatures of the Modern Middle East		
Choose one:				
	ARB 140/ COM 172/ MSA 121C	A Story for a Life: The Arabian Nights		
	COM 172/ ARB 140/ MSA 121C	A Story for a Life: The Arabian Nights		
	MSA 121C/ COM 172/ ARB 140	A Story for a Life: The Arabian Nights		
Choose one additional upper division course in Arabic language or Arabic literature from the list above, or one humanities or social science course from the following:				
				4-5

MSA 111A	Great Cities of Arab Middle East & South Asia
MSA 121A/ COM 175	Shahnameh: The Persian Book of Kings
MSA 122A	Themes in the Arabic Novel
MSA 150/ GSW 185	Women & Islamic Discourses
MSA 181C	Topics in Regional ME/SA Studies: Arab Studies
MSA 182C	Undergraduate Proseminar in Middle East/South Asia: Arab Studies Seminar
WMS 185	(Discontinued)
<b>Choose one:</b>	
ARB 140/ COM 172/ MSA 121C	A Story for a Life: The Arabian Nights
COM 172/ ARB 140/ MSA 121C	A Story for a Life: The Arabian Nights
MSA 121C/ COM 172/ ARB 140	A Story for a Life: The Arabian Nights
ANT 142	Peoples of the Middle East
AHI 155	The Islamic City
COM 053C	Literatures of the Islamic World
COM 155	Classical Literatures of the Islamic World 600-1900
COM 166	Literatures of the Modern Middle East
HIS 006	Introduction to the Middle East
HIS 102R	Undergraduate Proseminar in History: Muslim Societies
HIS 112C	History of Jews in the Muslim World
HIS 115F	History of Modern North Africa, 1800 to the Present
HIS 190A	Middle Eastern History I: The Rise of Islam, 600-1000
HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400
HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730
HIS 193A	History of the Modern Middle East, 1750-1914
HIS 193B	History of the Modern Middle East, From 1914
POL 135	International Politics of the Middle East
POL 136	The Arab-Israeli Conflict
RST 060	Introduction to Islam
RST 065C	The Qur'an & Its Interpretation
RST 160	Introduction to Islamic Thought
RST 161	Modern Islam
RST 162	Introduction to Islamic Law
WMS 184	Gender in the Arab World
<b>Total Units</b>	<b>20-21</b>

## India & South Asia Studies, Minor

### College of Letters & Science

The India & South Asia Studies Minor is an interdisciplinary minor that enables students to learn about the history, culture, society, religion, gender relations, media, political economy, international relations, urbanism, migration and diaspora, and languages and literatures of India and South Asia across regional and national boundaries. The India and South Asia Studies Minor is open to undergraduates in all four colleges.

### Minor Advisor

Consult the Middle East/South Asia Studies Advisor in 1287 Social Science & Humanities, 530-752-3576, or Middle East/South Asia Studies (<http://mesa.ucdavis.edu>).

Code	Title	Units
<i>Middle East/South Asia Studies</i>		
MSA 100	Middle East & South Asia: Comparative Perspectives	4
MSA 180	Topics in Middle East & South Asian Studies	4
MSA 181B or MSA 182B	Topics in Regional ME/SA Studies Undergraduate Proseminar in Middle East/South Asia	4
<i>History</i>		
HIS 196A or HIS 196B	Medieval India Modern India	4
<i>Core Course List</i>		
Choose additional electives from Core Course list below:		4-8
MSA 112	History of South Asian Islam	
MSA 181B	Topics in Regional ME/SA Studies (If not taken above.)	
MSA 182B	Undergraduate Proseminar in Middle East/South Asia (If not taken above.)	
ANT 145	Performance, Embodiment, & Space in South Asia	
ASA 150F	South Asian American History, Culture, & Politics	
COM 053B	Literature of South Asia	
COM 148	Mystical Literatures of South Asia & the Middle East	
COM 156/RST 158	The Ramayana	
HIN 001	Elementary Hindi/Urdu I	
HIN 002	Elementary Hindi/Urdu II	
HIN 003	Elementary Hindi/Urdu III	
HIN 021	Intermediate Hindi/Urdu I	
HIN 022	Intermediate Hindi/Urdu II	
HIN 023	Intermediate Hindi/Urdu III	
HIS 008	History of Indian Civilization	
HIS 102Q	Undergraduate Proseminar in History: India	
HIS 196A	Medieval India	
HIS 196B	Modern India	
MUS 148	Hindustani Vocal Ensemble	
RST 030	Religions of South Asia	
RST 068	Introduction to Hinduism	

RST 069	Introduction to Hindu Mythology	HIS 190D	Middle Eastern History IV: Safavids Iran, 1300-1720		
RST 156	Religion & the Performing Arts in India	HIS 193D	History of Modern Iran, From 1850 to Present		
RST 157	Hindu Women & Goddesses	With prior consultation with an advisor, students can petition in advance the Program Committee to accept:			
With prior consultation with an advisor, students can petition in advance the Program Committee to accept:					
Other elective courses toward the minor program if the content is 50% or more on the South Asia World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.					
More than 4 units <sup>1</sup> towards the minor program.					
<b>Total Units</b>	<b>20-24</b>	<b>Total Units</b>	<b>20-24</b>		

<sup>1</sup> Of MSA 181C and/or MSA 182C

## Iran & Persian Studies, Minor

### College of Letters & Science

The Iran & Persian Studies Minor is an interdisciplinary minor that allows students to learn about the pre-modern and modern history, cultures, societies, and diasporas of the peoples of Iran, Afghanistan, and Tajikistan as well as other users of Persian in West Asia, Central Asia, and South Asia. The Iran & Persian Studies Minor is open to undergraduates in all four colleges.

### Minor Advisor

Consult the Middle East/South Asia Studies Advisor (<https://mesa.ucdavis.edu/advising-office/>) in 1287 Social Science and Humanities, 530-752-3576, or Middle East/South Asia Studies (<http://mesa.ucdavis.edu>).

Code	Title	Units
<i>Middle East/South Asia Studies</i>		
MSA 100	Middle East & South Asia: Comparative Perspectives	4
MSA 180	Topics in Middle East & South Asian Studies	4
MSA 181A or MSA 182A	Topics in Regional ME/SA Studies Undergraduate Proseminar in Middle East/South Asia	4
<i>History</i>		
HIS 190D or HIS 193D	Middle Eastern History IV: Safavids Iran, 1300-1720 History of Modern Iran, From 1850 to Present	4

### Core Course List

Choose additional electives from Core Course list:	4-8
MSA 131A/ CTS 146A or CTS 146A/ MSA 131A	Modern Iranian Cinema
MSA 151A	Iranian Society & Culture
MSA 181A	Topics in Regional ME/SA Studies
MSA 182A	Undergraduate Proseminar in Middle East/South Asia
COM 155	Classical Literatures of the Islamic World 600-1900

<b>Total Units</b>	<b>20-24</b>
<sup>1</sup> Of MSA 181A and/or MSA 182A	
Other elective courses toward the minor program if the content is 50% or more on the Iranian and Persian World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.	
More than 4 units <sup>1</sup> towards the minor program.	

<sup>1</sup> Of MSA 181A and/or MSA 182A

## Middle East/South Asia Studies, Bachelor of Arts

### College of Letters & Science

### The Major Program

Are you interested in languages and culture? Do you want a global education? Middle East/South Asia Studies is a unique major where you can learn about the interconnected regions of South Asia, Central and West Asia, and North Africa. This area encompasses many countries, including Afghanistan, Algeria, Egypt, India, Iran, Iraq, Israel, Lebanon, Morocco, Pakistan, Palestine, Sudan, Syria, Turkey, the United Arab Emirates, and Yemen. Students can explore these regions through a variety of courses: anthropology, art history, art studio, Asian American Studies, cinema, classics, comparative literature, English, gender studies, history, music, political science, religious studies, and sociology. As a ME/SA major, you will be able to learn a regional language (Arabic, Hebrew, Hindi/Urdu, Persian or Punjabi). Beyond coursework, ME/SA majors also have the opportunity to get involved in research, special projects with faculty guidance, and study abroad.

The Middle East/South Asia Studies major focuses on the comparative study of these regions and their historically intertwined cultures and societies. Students will receive a strong foundation in one regional language, with two years required in Arabic, Hebrew, Hindi/Urdu, Persian, Punjabi, or another language of this area. The two required ME/SA Studies courses lay a comparative foundation, and options for remaining requirements include coursework from a wide range of departments/programs in the College of Letters and Science.

### Language Courses

To enforce Academic Senate Regulation 536 (ASR) (<https://academicsenate.ucdavis.edu/bylaws-regulations/regulations/#536>), a student who has completed a second or more advanced year of high-school-level course work in a foreign language in tenth, eleventh, or twelfth grade shall be awarded credit for Course 1 (or its equivalent) in that language only if he or she takes the course on a Passed or Not Passed basis. Enforcement of this regulation occurs in the sixth week of the quarter. For more information, contact the Office of the University Registrar (<https://registrar.ucdavis.edu/contact/>). Please note this UC Davis policy applies to Arabic 001, Hebrew 001, Hindi/Urdu 001, Persian 001, and Punjabi 001/001V.

## Major Advisor

Consult the Middle East/South Asia Studies Advisor in 1287 Social Science & Humanities, 530-752-3576, or at Middle East/South Asia Studies (<http://mesa.ucdavis.edu>).

## Programs, Internships, & Career Alternatives

Many internship opportunities are available for the Middle East/South Asia Studies major and minor, consult with your advisor.

## Middle East/South Asia Studies Abroad Program

For information, see Global Learning Hub (<https://globallearning.ucdavis.edu/>) and UC Davis Summer Abroad (<https://globallearning.ucdavis.edu/pathways/academics/studyabroad/sa/>).

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>History</i>			
HIS 006	Introduction to the Middle East	4	
HIS 008	History of Indian Civilization	4	
Two years (or the equivalent) of Arabic, Hebrew, or Hindi/Urdu (other Middle East/South Asia Studies regional languages accepted with petition):		0-27	
<i>Arabic</i>			
ARB 001	Elementary Arabic 1		
ARB 002	Elementary Arabic 2		
ARB 003	Elementary Arabic 3		
ARB 021	Intermediate Arabic 21		
ARB 022	Intermediate Arabic 22		
ARB 023	Intermediate Arabic 23		
<i>Hebrew</i>			
HEB 001	Elementary Hebrew		
HEB 002	Elementary Hebrew		
HEB 003	Elementary Hebrew		
HEB 021	Intermediate Modern Hebrew I		
HEB 022	Intermediate Modern Hebrew II		
HEB 023	Intermediate Modern Hebrew III		
<i>Hindi/Urdu</i>			
HIN 001	Elementary Hindi/Urdu I		
HIN 002	Elementary Hindi/Urdu II		
HIN 003	Elementary Hindi/Urdu III		
HIN 021	Intermediate Hindi/Urdu I		
HIN 022	Intermediate Hindi/Urdu II		
HIN 023	Intermediate Hindi/Urdu III		
Preparatory Subject Matter Subtotal		8-35	
<b>Depth Subject Matter</b>			
<i>Middle East &amp; South Asia</i>			
MSA 100	Middle East & South Asia: Comparative Perspectives	4	
MSA 180	Topics in Middle East & South Asian Studies	4	
Choose two:		8	
ANT 142	Peoples of the Middle East		
COM 166	Literatures of the Modern Middle East		
HIS 113	History of Modern Israel		
HIS 190A	Middle Eastern History I: The Rise of Islam, 600-1000		
HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400		
HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730		
HIS 193A	History of the Modern Middle East, 1750-1914		
HIS 193B	History of the Modern Middle East, From 1914		
POL 135	International Politics of the Middle East		
POL 136	The Arab-Israeli Conflict		
RST 160	Introduction to Islamic Thought		
RST 162	Introduction to Islamic Law		
WMS 184	Gender in the Arab World		
Choose 8 units:			8
ANT 145	Performance, Embodiment, & Space in South Asia		
HIS 102Q	Undergraduate Proseminar in History: India		
HIS 196A	Medieval India		
HIS 196B	Modern India		
RST 170	(Discontinued)		
<i>Additional Electives from Core Course List</i>			
Additional Electives (p. 324) 16-18			
Note: With prior consultation with an advisor, students can petition in the Program Committee in advance to accept other elective courses toward the major program, including language courses.			
Note: While some courses are identified as fulfilling more than one requirement, a given course can only fulfill one such requirement. <sup>1</sup>			
Depth Subject Matter Subtotal			40-42
<b>Total Units</b>			<b>48-77</b>

<sup>1</sup> Restriction: No more than 6 units of MSA 092, MSA 098, MSA 099, MSA 192, MSA 198, MSA 199 may be offered in satisfaction of the major requirements. However, students must have completed at least 40 units of upper division course work in satisfaction of the major requirements.

## Additional Electives

Code	Title	Units
ANT 142	Peoples of the Middle East	4
ANT 145	Performance, Embodiment, & Space in South Asia	4
ARB 001	Elementary Arabic 1	5
ARB 002	Elementary Arabic 2	5
ARB 003	Elementary Arabic 3	5
ARB 021	Intermediate Arabic 21	4
ARB 022	Intermediate Arabic 22	4
ARB 023	Intermediate Arabic 23	4
AHI 001E	Islamic Art & Architecture	4
AHI 155	The Islamic City	4

ASA 150F	South Asian American History, Culture, & Politics	4	RST 065C	The Qur'an & Its Interpretation	4
ASA 189E	Topics in Asian American Studies: Comparative Racial Studies	4	RST 068	Introduction to Hinduism	4
CLA 001	Ancient Near East & Early Greece: 3000-500 B.C.E.	4	RST 160	Introduction to Islamic Thought	4
COM 053B	Literature of South Asia	4	RST 161	Modern Islam	4
COM 053C	Literatures of the Islamic World	4	RST 162	Introduction to Islamic Law	4
COM 166	Literatures of the Modern Middle East	4	RST 170	(Discontinued)	4
HEB 001	Elementary Hebrew	5	WMS 184	Gender in the Arab World	4
HEB 002	Elementary Hebrew	5			
HEB 003	Elementary Hebrew	5			
HEB 021	Intermediate Modern Hebrew I	4			
HEB 022	Intermediate Modern Hebrew II	4			
HEB 023	Intermediate Modern Hebrew III	4			
HIN 001	Elementary Hindi/Urdu I	5			
HIN 002	Elementary Hindi/Urdu II	5			
HIN 003	Elementary Hindi/Urdu III	5			
HIN 021	Intermediate Hindi/Urdu I	4			
HIN 022	Intermediate Hindi/Urdu II	4			
HIN 023	Intermediate Hindi/Urdu III	4			
HIS 102Q	Undergraduate Proseminar in History: India	5			
HIS 102R	Undergraduate Proseminar in History: Muslim Societies	5			
HIS 113	History of Modern Israel	4			
HIS 190A	Middle Eastern History I: The Rise of Islam, 600-1000	4	Code	Title	Units
HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400	4	MSA 100	Middle East & South Asia: Comparative Perspectives	4
HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730	4	Choose one:		
HIS 193A	History of the Modern Middle East, 1750-1914	4	ANT 142	Peoples of the Middle East	
HIS 193B	History of the Modern Middle East, From 1914	4	ASA 189E	Topics in Asian American Studies: Comparative Racial Studies	
HIS 196A	Medieval India	4	COM 166	Literatures of the Modern Middle East	
HIS 196B	Modern India	4	HIS 113	History of Modern Israel	
MSA 092	Internship	1-12	HIS 190A	Middle Eastern History I: The Rise of Islam, 600-1000	
MSA 098	Directed Group Study	1-5	HIS 190B	Middle Eastern History II: The Age of the Crusades, 1001-1400	
MSA 099	Special Study for Undergraduates	1-5	HIS 190C	Middle Eastern History III: The Ottomans, 1401-1730	
MSA 180	Topics in Middle East & South Asian Studies	4	HIS 193A	History of the Modern Middle East, 1750-1914	
MSA 192	Internship	1-12	HIS 193B	History of the Modern Middle East, From 1914	
MSA 198	Directed Group Study	1-5	MUS 129B	Musics of Africa, Middle East, Indian Subcontinent	
MSA 199	Special Study for Advanced Undergraduates	1-5	RST 160	Introduction to Islamic Thought	
MUS 129B	Musics of Africa, Middle East, Indian Subcontinent	4	RST 161	Modern Islam	
MUS 148	Hindustani Vocal Ensemble	2	RST 162	Introduction to Islamic Law	
POL 135	International Politics of the Middle East	4	WMS 184	Gender in the Arab World	
POL 136	The Arab-Israeli Conflict	4	Choose 4 units:		4
RST 021	The Bible & Its Interpreters	4	ANT 145	Performance, Embodiment, & Space in South Asia	
RST 023	Introduction to Judaism	4	ASA 150F	South Asian American History, Culture, & Politics	
RST 060	Introduction to Islam	4			

ASA 189E	Topics in Asian American Studies: Comparative Racial Studies	
HIS 102Q	Undergraduate Proseminar in History: India	
HIS 196A	Medieval India	
HIS 196B	Modern India	
MUS 129B	Musics of Africa, Middle East, Indian Subcontinent	
MUS 148	Hindustani Vocal Ensemble	
RST 170	(Discontinued)	
Additional Electives from Core Course list for major.		8-12
With prior consultation with an advisor, students can petition the Program Committee in advance to accept: <sup>1</sup>		
Other elective courses toward the minor program. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.		

**20-24**

Students may be cadets in the lower division courses without incurring a military obligation. Students must contract with ROTC to participate in the upper division pre-commissioning program and incur a military obligation. Extracurricular activities for cadets include an intercollegiate sports team (Ranger Challenge), the university color guard, a military honor society, and opportunities to participate in field training exercises.

## Department Programs

Students are enrolled in Military Science under one of two programs.

### Four-Year Program

There is no military obligation associated with attendance in lower division courses. Students are enrolled in the basic course (lower division) for the first two years on a voluntary basis. Admission to the advanced course (upper division) is by application from second-year lower division students who meet the academic, physical, and military aptitude requirements. Qualified veterans can enter the advanced course immediately based on their military service experience and graduation from Basic Training, upon approval by the Department Chairperson.

During the course, all Military Science textbooks, uniforms and equipment are provided without cost. Contracted students are given leadership development experience at the ROTC Advanced Camp in Fort Knox, Kentucky, between their third and fourth years of the course. Emphasis is on military fitness, tactics, and leadership.

### Two-Year Program

The two-year program is for students, including graduate students, who have not attended lower division Military Science classes. In lieu of lower division courses an applicant attends a six-week summer program, Basic Camp, which is voluntary and carries no military obligation. Basic Camp attendees are paid and transportation costs are covered. Applications are accepted at any time prior to the student's junior year; graduate students are also accepted, as long as they have two years of academics remaining.

### Scholarship Program

There are three- and two-year scholarship opportunities available at the discretion of the Department Chairperson that covers full tuition and fees and \$1200 annually for books. Cadets also receive a \$420 monthly stipend.

Army Reserve Officers' Training Corps four-year Active Duty merit scholarships are awarded to qualified high school seniors in a national competition each year. As high school seniors, students compete for the scholarship by submitting a complete application at Army ROTC (<https://www.goarmy.com/careers-and-jobs/find-your-path/army-officers/rotc.html>).

If high school seniors are not awarded the four-year National Scholarship, there are still opportunities for campus-based three and two-year scholarships.

### Leadership Laboratory

During the course of the school year, two hours per week are spent conducting practical exercises. Classes emphasize adventure activities including military offense, defense and patrolling, operations, weapons familiarization, rappelling, leadership scenarios, and land navigation. All cadets are required to attend leadership laboratories for practical leadership experience and to prepare for attendance at Advanced Camp.

**Total Units****20-24**

<sup>1</sup> No more than 4 units of MSA 192, MSA 198, and/or MSA 199 towards the minor program.

# Military Science

## College of Letters & Science

Justin Ottenwalter, Major, Chairperson of the Department; term ends June 30, 2025.

## Department Office

Reserve Officers' Training Corps (ROTC), Army; 125 Hickey Gymnasium; 530-752-5211; Faculty (<https://militaryscience.ucdavis.edu/people/>)

## Program of Study

The Military Science Department is a classroom and hands-on leadership and management program. The program stresses the following Army Values: loyalty, duty, respect, selfless service, honor, integrity, and personal courage. We cover the basics of the Army, including Army ranks, organizational structure, basic skills, and tactics. We also discuss current events, national and international politics, military affairs, ethics, and human relations. Military skills (such as drill and ceremony, map reading, and squad tactics) are taught to the extent necessary to create an environment where students can enter leadership positions and apply theories taught in the classroom. The program assists students in all academic fields to prepare for positions of leadership in military or civilian careers.

The department offers two program tracks: (1) a purely academic track; (2) a pre-commissioning track for those desiring a commission as an Officer in the Active Duty U.S. Army, Army National Guard, or Army Reserves. The academic track entails no obligation to the military and is open to all students but is limited to MSC 012 and MSC 022B. Students pursuing the academic track do not wear a uniform or otherwise participate in extra-curricular activities designed as part of the pre-commissioning process.

Students who desire a commission in the U.S. Army participate in both the academic portion of the program and in the leadership laboratories and extra-curricular activities designed to enhance their military leadership and tactical and technical skills. They wear uniforms to leadership laboratories and selected classes and become ROTC cadets.

## Academic Credit

### College of Agricultural & Environmental Sciences

The Bachelor of Science degree in agriculture requires the completion of 180 units. Military Science courses are counted in the unit allowance for electives.

### College of Biological Sciences

The Bachelor of Science degree requires the completion of 180 units. Military Science courses are counted in the allowance for electives.

### College of Engineering

Military Science units are acceptable toward the requirements for the Bachelor of Science degree to the extent of the unrestricted elective units available in the curriculum being followed.

### College of Letters & Science

The Bachelor of Arts and Bachelor of Science degrees require the completion of 180 units. Military Science courses are counted in the allowance for electives.

### School of Veterinary Medicine

The number of Military Science units acceptable toward the Bachelor of Science degree in Veterinary Medicine is on an individual program basis approved by the Dean of the School. Graduates with the D.V.M. degree may apply for a direct commission in the United States Army Veterinary Corps.

### Aerospace Studies (Air Force)

The Air Force Reserve Officer's Training Corps (AFROTC) is an educational program providing training in leadership, management, communications and military proficiency on college and university campuses. It also provides an opportunity to obtain a commission as a second lieutenant in the Air Force and enter the active-duty forces after you complete a bachelor's or a graduate degree. The skills you acquire will become valuable assets for any subsequent career you choose.

The program is normally four years long, but a flexible design allows students to complete the curriculum in as little as two years. Undergraduate scholarships are available, but are not necessary for participation. Until you accept a scholarship or enter your junior year of the program, you have no obligation to join the Air Force. There are no costs for AFROTC uniforms, books, or classes.

UC Davis students have the option of taking the Air Force program on the UC Berkeley or CSU Sacramento campus.

## Qualifications

Freshmen/Sophomore applicants must:

- Be full-time college students in good academic standing
- Have good moral character
- Be in strong physical condition
- Be at least 14 years old

Additionally, Juniors/Seniors/Scholarship recipients must:

- Be United States citizens or in the process of applying for citizenship
- Be 18 years old (or 17 years old with the consent of parent or guardian)
- Pass the Air Force Officer Qualifying Test
- Pass a medical examination
- Be under the age of 31 at time of graduation (may be waived)

## Scholarships

Opportunities for four-year and three-year undergraduate scholarships are better than ever. Scholarships cover the full cost of tuition, books and required fees at the University of California and are available for eligible high school seniors. It also includes \$300-\$500 monthly stipend during the school year. If you are a junior or senior in high school and plan on attending a college or university in Northern California, you can write, call or visit the local AFROTC detachments for a scholarship application. Applications are also available from local Air Force recruiters or your high school guidance counselors.

All scholarships are merit-based and consider a variety of factors: cumulative GPA, class standing, SAT/ACT scores, academic awards/achievements, leadership ability, athletic involvement, extracurricular activities, community service and letters of recommendation. A personal interview with an Air Force officer is also part of the application process. Prior to activating a scholarship, students must meet AFROTC medical and physical fitness standards. All scholarships must be used at an accredited college or university that offers AFROTC on campus or through cross-registration. The program is available at more than 1,000 universities and colleges nationwide.

If you are already in college, contact our office directly and apply for enrollment into AFROTC as a cadet. Three- and two-year full-tuition scholarships are available for all academic majors, especially scientific and technical majors such as engineering, atmospheric science, math, computer science, and physics. GPA Scholarship requirements for nontechnical majors are slightly higher. Applicants are primarily evaluated on their leadership ability and academic performance.

## Challenging Careers

All commissioned officers enter the Air Force as second lieutenants for a 4-year active duty service commitment. Pilots and navigators serve longer commitments, based on training requirements. Once on active duty, you'll be given instant responsibility in one of 32 primary career fields. Opportunities to fly are better than ever. Whether you are piloting the F-22 fighter, supervising 150 aircraft maintainers on the flightline, or caring for sick personnel in the emergency room, you will be rewarded knowing that you are making a difference.

Air Force ROTC is offered through the Aerospace Studies departments at California State University Sacramento and U.C. Berkeley. Scholarships (including tuition, book allowance, and stipend) are available for qualified students. Students may enroll and attend one course per semester at the U.C. Berkeley or CSU Sacramento campus at no cost. Topics covered in AFROTC courses include Heritage and Values of the United States Air Force (1-credit), Team and Leadership Fundamentals (1-credit), Leading People and Effective Communication (3-credits), and U.S. National Security Affairs and Preparation for Active Duty (3-credits). Additional components of the AFROTC program include 2 hours per week of fitness activities, 2 hours per week of Leadership Lab, and a 2-week Summer Field Training between the sophomore and junior years. Upon completion of the program and granting of 4-year degree, students will commission as Second Lieutenants in the United States Air Force. To be eligible for AFROTC, applicants should be a full time student and meet additional fitness, GPA, testing, and other requirements. Interested students, please contact their department of choice:

- CSU Sacramento ROTC (<https://www.csus.edu/academic-affairs/air-force-rotc/>); 916-278-7315 or 916-278-7449; email [sacramento@afrotdcadmissions.com](mailto:sacramento@afrotdcadmissions.com))

- UC Berkeley Air Force ROTC (<http://airforcerotc.berkeley.edu>);  
510-642-3572; email ([airforce@berkeley.edu](mailto:airforce@berkeley.edu))

## Department of Naval Science

152 Hearst Gymnasium; UC Berkeley, Berkeley, CA 94270-3640;  
510-642-3551; UC Berkeley Naval ROTC (<http://nrotc.berkeley.edu>)

UC Davis students may participate in the Navy and Marine Corps ROTC program at UC Berkeley. The program is 4 years long and includes courses and weekly professional development laboratories (drill) at UC Berkeley. Students normally compete for national scholarships as high school seniors, although interested students may enroll as freshmen or sophomores and compete for scholarships based on successful participation in the program. A student who satisfactorily completes an ROTC program and is awarded a degree from UC Davis receives an active duty commission as a Second Lieutenant in the U.S. Marine Corps or an Ensign in the U.S. Navy.

Navy option students take the following courses:

### Freshman Year

- NS 1 Introduction to Naval Science
- NS 2 Sea Power and Maritime Affairs

### Sophomore Year

- NS 3 Leadership and Management
- NS 10 Naval Ship Systems I

### Junior Year

- NS 12A Navigation and Naval Operations I
- NS 12B Navigation and Naval Operations II

### Senior Year

- NS 401 Naval Ship Systems II
- NS 412 Leadership and Ethics

In lieu of NS401, NS10, NS12A and NS12B, Marine Corps students participate in Marine Seminars and complete MA154, History of Littoral Warfare and MA20, Evolution of Warfare (or a designated equivalent).

Scholarship students are required to complete a number of other courses at Davis, including one year each of calculus, physics, and English, and one quarter each of computer science, and military history or national security policy.

Interested students should contact the Department of Naval Science at UC Berkeley at the address above to obtain information and apply.

## Molecular & Cellular Biology

### College of Biological Sciences

Frédéric Chédin ([flchedin@ucdavis.edu](mailto:flchedin@ucdavis.edu)), Ph.D., Professor, Chairperson of the Department; term ends June 30, 2026

## Department Office

149 Briggs Hall; 530-752-3611; Molecular & Cellular Biology (<http://www.mcb.ucdavis.edu>); Faculty (<https://biology.ucdavis.edu/faculty/departments/molecular-and-cellular-biology/>)

- Biochemistry & Molecular Biology, Bachelor of Science (p. 328)
- Cell Biology, Bachelor of Science (p. 330)
- Genetics & Genomics, Bachelor of Science (p. 332)

## Biochemistry & Molecular Biology, Bachelor of Science

### College of Biological Sciences

## The Biochemistry & Molecular Biology Major Program

The Biochemistry & Molecular Biology major introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem solving will find this major a rewarding field of study.

### The Program

The upper division curriculum in the Biochemistry & Molecular Biology program begins with the three-course, upper-division common curriculum that introduces the principles of biochemistry and genetics. Majors then take a comprehensive and rigorous laboratory course to familiarize them with the most important aspects of biochemical research. Additional upper-division courses in biochemistry and molecular biology examine detailed aspects of these subjects. Students are also required to take courses in other biological sciences and a full year of physical chemistry.

### Career Alternatives

The Biochemistry & Molecular Biology program provides a solid scientific background for students seeking a research, teaching, or service career in the life sciences. Positions are open to biochemists in bio-medical, biotechnological, pharmaceutical, agricultural research, and some chemical industries. Also, university-affiliated research laboratories, hospital laboratories, and government-sponsored research facilities provide employment opportunities. The major provides excellent preparation for advanced study in graduate or professional schools.

### Graduate Study

See Biochemistry, Molecular, Cellular, & Developmental Biology (Graduate Group) (p. 96).

### Faculty Advisor

David Wilson ([dkwilson@UCDAVIS.EDU](mailto:dkwilson@UCDAVIS.EDU)), Ph.D.

### Advising

Biology Academic Success Center (BASC), CBS Dean's Office Advising in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410; [cbsundergrads@ucdavis.edu](mailto:cbsundergrads@ucdavis.edu).

Code	Title	Units
Preparatory Subject Matter		
<i>Biological Science</i>		

BIS 002A & BIS 002B & BIS 002C & BIS 002D	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life and Introduction to Biology: Principles of Cell Biology & Physiology	& CHE 129B Choose the 107 or 110 series:  CHE 107A & CHE 107B	and Organic Chemistry Laboratory Physical Chemistry for the Life Sciences and Physical Chemistry for the Life Sciences	6-12
<b>Chemistry</b>		<b>or</b>		
Choose 002 or 004 series: <sup>1</sup>	15	CHE 110A & CHE 110B & CHE 110C	Physical Chemistry: Introduction to Quantum Mechanics and Physical Chemistry: Properties of Atoms & Molecules and Physical Chemistry: Thermodynamics, Equilibria & Kinetics	
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry			
<b>Mathematics</b>			<b>Molecular &amp; Cellular Biology</b>	
Choose the 017 or 021 series: <sup>2</sup>	8-12	MCB 120	Molecular Biology & Biochemistry Laboratory Associated Lecture	3
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	MCB 120L	Molecular Biology & Biochemistry Laboratory	3
<b>Physics</b>		MCB 121	Advanced Molecular Biology	3
Choose the 007 or 009 series: <sup>3</sup>	12-15	MCB 123	Behavior & Analysis of Enzyme & Receptor Systems	3
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	MCB 124 or MCB 143	Macromolecular Structure & Function Cell & Molecular Biophysics	3-4
<b>or</b>				
MAT 021A & MAT 021B	Calculus and Calculus		<b>Statistics</b>	
MAT 021C	Calculus (Recommended)	STA 100 or STA 130A & STA 130B	Applied Statistics for Biological Sciences Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course	4-8
<b>Preparatory Subject Matter Subtotal</b>	53-60			
<b>Depth Subject Matter</b>			<b>Restricted Electives</b>	
<i>Biological Science</i>			Choose at least 6 additional units (p. 329)	6
BIS 101	Genes & Gene Expression	STA 100		
BIS 102	Structure & Function of Biomolecules	or STA 130A & STA 130B		
BIS 103	Bioenergetics & Metabolism			
<i>Chemistry</i>				
Choose the 118 series or CHE 128 series & 129 A-B: <sup>4</sup>	12-13			
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences			
<b>or</b>				
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry and Organic Chemistry and Organic Chemistry			
CHE 129A	Organic Chemistry Laboratory			
			<b>Total Units</b>	<b>106-125</b>
			<sup>1</sup> With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units with no lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.	
			<sup>2</sup> With BASC advisor approval, these combinations also satisfy the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.	
			<sup>3</sup> With BASC advisor approval, these combinations also satisfy the Physics requirement: PHY 007A-PHY 009A-PHY 049*-PHY 007C; PHY 009A-PHY 009B-PHY 049*-PHY 007C. *PHY 049 requires approval from the PHY Department to enroll.	
			<sup>4</sup> With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C; CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128C-CHE 129B.	

## Restricted Electives

Code	Title	Units
ANS 137	Techniques & Practices of Avian Culture	3
ANT 151	Primate Evolution	4
ANT 152	Human Evolution	5
ANT 158	The Evolution of Sex: A Biological Perspective	4

BIS, any upper division 100-199, except 101, 101D, 102, 103, 105 (p. 569)	1-5	MCB 160 MCB 160L MCB 162 MCB 163 MCB 164 MCB 182	Genetics Laboratory Associated Lecture Principles of Genetics Laboratory Human Genetics & Genomics Developmental Genetics Advanced Eukaryotic Genetics Principles of Genomics	3 5 3 3 3 3
BIM 162 Introduction to the Biophysics of Molecules & Cells	4			
BIT, any upper division 100-199, except tutoring 197T (p. 594)	1-5			
CHE any upper division 100-199, except 107AB, 108, 110ABC, 197T (p. 608)	3-4			
EXB 106/CHA 101 Human Gross Anatomy	4			
EXB 106L/CHA 101L Human Gross Anatomy Laboratory	3			
ECH 140 Mathematical Methods in Biochemical & Chemical Engineering	4			
ECH 142 Heat Transfer for Biochemical & Chemical Engineers	4			
ECH 143 Mass Transfer for Biochemical & Chemical Engineers	4			
ECH 152A Chemical Engineering Thermodynamics	3			
ECH 152B Chemical Engineering Thermodynamics	4			
ENT 100 General Entomology	4			
ENT 102 Insect Physiology	4			
ENT 153 Medical Entomology	3			
ENT 158 Forensic Entomology	3			
EXB 101 Exercise Physiology	4			
EXB 117 Exercise & Aging in Health & Disease	3			
EXB 124 Physiology of Maximal Human Performance	4			
ETX 101 Principles of Environmental Toxicology	4			
ETX/NUT 104 Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants	4			
ETX 110 Toxic Tragedies & Their Impact on Society	2			
ETX 120 Perspectives in Aquatic Toxicology	4			
ETX/FST 128 Food Toxicology	3			
ETX 130 Role & Applications of Toxicology in Modern Industry	3			
EVE, any upper division 100-199, except tutoring 197T (p. 825)	1-5			
FST 100A Food Chemistry	4			
FST 100B Food Properties	4			
FST 102A Malting & Brewing Science	4			
FST 102B Practical Malting & Brewing	4			
FST 104 Food Microbiology	3			
FST 123 Introduction to Enzymology	3			
FST/ETX 128 Food Toxicology	3			
GDB 101 Epidemiology	4			
GDB 103 Microbiome of People, Animals, & Plants	3			
GEL 107 Earth History: Paleobiology	3			
IDI 141 Infectious Diseases of Humans	1			
MCB/PLB 126 Plant Biochemistry	3			
MCB 140 Cell Biology Laboratory Associated Lecture	3			
MCB 140L Cell Biology Laboratory	5			
MCB 142 Advanced Cell Biology: Contractile & Motile Systems	4			
MCB 143 Cell & Molecular Biophysics	3			
MCB 144 Mechanisms of Cell Division	3			
MCB 145 Assembly & Function of Cell Signaling Machinery	3			
NPB, any upper division 100-199, except 102 & tutoring 197T (p. 1148)	1-5			
NUT/ETX 104 Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants	4			
NUT 105 Nutrition through the Life Cycle	3			
NUT 111AY Introduction to Nutrition & Metabolism	3			
NUT 112 Nutritional Assessment	4			
PHY 140B Introduction to Solid State Physics	4			
PLB, any upper division 100-199, except tutoring 197T (p. 1231)	1-5			
PLS 147 California Plant Communities	3			
PMI, any upper division 100-199, except tutoring 197T (p. 1193)	1-5			
PSC 101 Introduction to Biological Psychology	4			
STA 101 Advanced Applied Statistics for the Biological Sciences	4			
STA 103 Applied Statistics for Business & Economics	4			
STA 104 Applied Statistical Methods: Nonparametric Statistics	4			
STA 106 Applied Statistical Methods: Analysis of Variance	4			
STA 108 Applied Statistical Methods: Regression Analysis	4			
VMB 101V Principles of Pharmacology & Toxicology	3			
VMB 101Y Principles of Pharmacology & Toxicology (Up to 3 units of Research 192, 193, 199, 189, 190C, etc.)	3			
Up to 3 units of Research 192, 193, 199, 189, 190C, etc.	3			
A small selection of other courses may work upon consultation with BMB master or BASC advisor.	1-3			

## Cell Biology, Bachelor of Science

College of Biological Sciences

### The Cell Biology Major Program

The Cell Biology major provides students with a comprehensive understanding of the cell, the basic structural and functional unit of all living organisms.

### The Program

To understand living organisms, the biologist must understand the cell. Hence, cell biology lies at the core of the biological sciences. Students taking this major gain a solid foundation in biological principles. The major emphasizes how cellular organization and function contribute to the development, maintenance, and reproduction of adult organisms. The major illustrates the ways in which principles derived from the physical sciences, genetics, biochemistry, molecular biology, and physiology are

integrated in the study of living cells and emphasizes the experimental nature of the study of cell biology.

## Career Alternatives

The major provides an excellent background for students wishing to enter postgraduate and professional programs in biological, health sciences or veterinary sciences; for students pursuing careers involving teaching or research in the biological sciences; for students interested in careers in the biotechnological or pharmaceutical industries; or for students interested in careers related to the administrative, legal, or commercial aspects of biomedical science.

## Faculty Advisor

F.J. McNally ([fjmcnally@ucdavis.edu](mailto:fjmcnally@ucdavis.edu)), Ph.D.

## Graduate Study

See Biochemistry, Molecular, Cellular & Developmental Biology Graduate Group (p. 96).

## Advising

Biology Academic Success Center (BASC) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410, [cbsundergrads@ucdavis.edu](mailto:cbsundergrads@ucdavis.edu).

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>Biological Science</i>		18	
BIS 002A & BIS 002B & BIS 002C & BIS 002D	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life and Introduction to Biology: Principles of Cell Biology & Physiology		
<i>Chemistry</i>		15	
Choose the 002 or 004 series: <sup>1</sup>			
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry		
<b>OR</b>			
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering		
Choose the 008 series or 118 series or 128 series & 129A-B: <sup>2</sup>		6-13	
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course		
<b>OR</b>			
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences		
<b>OR</b>			
CHE 128A & CHE 128B & CHE 128C & CHE 129A & CHE 129B	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory and Organic Chemistry Laboratory		
<b>Mathematics</b>			
Choose the 017 or 021 series: <sup>3</sup>		8-12	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine		
<b>OR</b>			
MAT 021A & MAT 021B	Calculus and Calculus		
MAT 021C	Calculus (Recommended)		
<b>Physics</b>			
Choose the 007 or 009 series: <sup>4</sup>		12-15	
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics		
<b>OR</b>			
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics		
<b>Preparatory Subject Matter Subtotal</b>		59-73	
<b>Depth Subject Matter</b>			
<i>Biological Science</i>			
BIS 101	Genes & Gene Expression	4	
BIS 102	Structure & Function of Biomolecules	3	
BIS 103	Bioenergetics & Metabolism	3	
BIS 104	Cell Biology	3	
<i>Statistics</i>			
Choose STA 100 or 130A & 130B:		4-8	
STA 100 or STA 130A & STA 130B	Applied Statistics for Biological Sciences Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course		
<i>Molecular &amp; Cellular Biology</i>			
MCB 121	Advanced Molecular Biology	3	
MCB 140L	Cell Biology Laboratory	5	
Choose two:		6	
MCB 143	Cell & Molecular Biophysics		
MCB 144	Mechanisms of Cell Division		
MCB 145	Assembly & Function of Cell Signaling Machinery		
MCB 150 or MCB 163	Developmental Biology Developmental Genetics	3-4	
Choose at least 10 units:		10	
CHE 107A CHE 107B EVE 100 MIC 101 MIC 102 MIC 103L MIC 170 MIC 172	Physical Chemistry for the Life Sciences Physical Chemistry for the Life Sciences Introduction to Evolution Introductory Microbiology Introductory Microbiology Introductory Microbiology Laboratory Yeast Molecular Genetics Host-Parasite Interactions		

MIC 175	Cancer Biology
MCB 120	Molecular Biology & Biochemistry Laboratory Associated Lecture
MCB 120L	Molecular Biology & Biochemistry Laboratory
MCB 123	Behavior & Analysis of Enzyme & Receptor Systems
MCB 124	Macromolecular Structure & Function
MCB/PLB 126	Plant Biochemistry
MCB 138	Undergraduate Seminar in Biochemistry
MCB 139	Undergraduate Seminar in Biochemistry
MCB 143	Cell & Molecular Biophysics
MCB 144	Mechanisms of Cell Division
MCB 145	Assembly & Function of Cell Signaling Machinery
MCB 148	Undergraduate Seminar in Cell Biology
MCB 150	Developmental Biology
MCB 160L	Principles of Genetics Laboratory
MCB 162	Human Genetics & Genomics
MCB 163	Developmental Genetics
MCB 164	Advanced Eukaryotic Genetics
MCB 178	Undergraduate Seminar in Molecular Genetics
MCB 182	Principles of Genomics
MCB 191	Introduction to Research
NPB 100	Neurobiology
NPB 101	Systemic Physiology
PMI 126	Fundamentals of Immunology
PMI 126L	Immunology Laboratory
PMI 128	Biology of Animal Viruses
PLB 111	Plant Physiology
PLB 111D	Problems in Plant Physiology
PLB 113	Molecular & Cellular Biology of Plants
PLB 113D	Problems in Molecular & Cellular Biology of Plants
MMI 188A or MMI 188B	Human Immunology Human Immunology
	3-4
No more than 4 units of research (193, 194H, 199) may be used for credit in this category.	
Depth Subject Matter Subtotal	47-53
<b>Total Units</b>	<b>106-126</b>

- <sup>1</sup> With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units with no lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.
- <sup>2</sup> With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 118A-CHE 008B; CHE 128A-CHE 128B-CHE 008B; CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C; CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128C-CHE 129B.
- <sup>3</sup> With BASC advisor approval, these combinations also satisfy the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.

<sup>4</sup> With BASC advisor approval, these combinations also satisfy the Physics requirement: PHY 007A-PHY 009A-PHY 049\*-PHY 007C; PHY 009A-PHY 009B-PHY 049\*-PHY 007C. \*PHY 049 requires approval from the PHY Department to enroll.

## Genetics & Genomics, Bachelor of Science

College of Biological Sciences

### The Genetics & Genomics Major Program

The Genetics & Genomics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. The major is sufficiently flexible to accommodate students interested in the subject either as a basic discipline in the biological sciences or in terms of its applied aspects such as biotechnology, medicine, and agriculture.

### The Program

The upper division curriculum in the Genetics & Genomics program begins with the four-course, upper-division core curriculum that provides an introduction to the principles of genetics, biochemistry, and cell biology. Students then take additional upper-division courses in specialized areas of modern genetics including gene expression, evolution, development, human genetics, and genomics, as well as laboratory courses in the principles of genetics and genomics. Additional upper-division courses in biological sciences, as well as internship/research coursework, can be chosen to fulfill required elective units.

### Career Alternatives

The Genetics & Genomics degree provides suitable preparation for a wide variety of careers, including teaching, research, work with biotechnology companies, medicine, and all the health sciences. It is also an excellent background for students wishing to continue their education in a graduate program, a teacher-training program, medical school, veterinary school, or other professional schools.

### Faculty Advisor

Ted Powers, ([erpowers@ucdavis.edu](mailto:erpowers@ucdavis.edu)) Ph.D.

### Advising

Biology Academic Success Center (BASC) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410, [cbsundergrads@ucdavis.edu](mailto:cbsundergrads@ucdavis.edu).

## Graduate Study

See Integrative Genetics & Genomics (Graduate Group) (p. 276).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		18
BIS 002A & BIS 002B & BIS 002C & BIS 002D	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life and Introduction to Biology: Principles of Cell Biology & Physiology	

<b>Chemistry</b>			
Choose CHE 002 series or CHE 004 series: <sup>1</sup>	15	MCB 121	Advanced Molecular Biology
CHE 002A & CHE 002B & CHE 002C General Chemistry and General Chemistry and General Chemistry		MCB 182	Principles of Genomics
<b>OR</b>		Choose one:	3-4
CHE 004A & CHE 004B & CHE 004C General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering		EVE 100 or BIS 181	Introduction to Evolution Comparative Genomics
Choose CHE 008 series or CHE 118 series or CHE 128 series & CHE 129A-CHE 129B: <sup>2</sup>	6-13	Choose one:	3
CHE 008A & CHE 008B Organic Chemistry: Brief Course and Organic Chemistry: Brief Course		MCB 164 or BIS 183	Advanced Eukaryotic Genetics Functional Genomics
<b>OR</b>		Choose MCB 160L or BIS 180L:	5
CHE 118A & CHE 118B & CHE 118C Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences		MCB 160L or BIS 180L	Principles of Genetics Laboratory Genomics Laboratory
<b>OR</b>		Choose STA 100 or CHE 130A & CHE 130B:	4-8
CHE 128A & CHE 128B & CHE 128C Organic Chemistry and Organic Chemistry and Organic Chemistry		STA 100 or STA 130A & STA 130B	Applied Statistics for Biological Sciences Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course
<b>Restricted Electives</b>			
Choose at least 9 additional units:	9	BIS 181	Comparative Genomics
CHE 129A & CHE 129B Organic Chemistry Laboratory and Organic Chemistry Laboratory		BIS 183	Functional Genomics
<b>Mathematics</b>		BIT 150	Applied Bioinformatics
Choose MAT 017 series or MAT 021 series: <sup>3</sup>	8-12	ECS 124	Theory & Practice of Bioinformatics
MAT 017A & MAT 017B & MAT 017C Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine		EVE 100	Introduction to Evolution
<b>OR</b>		EVE 102	Population & Quantitative Genetics
MAT 021A & MAT 021B Calculus and Calculus		EVE 103	Phylogeny, Speciation & Macroevolution
MAT 021C Calculus (Recommended)		EVE 131	Human Genetic Variation & Evolution
<b>Physics</b>		EVE 161	Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes
Choose PHY 007 series or PHY 009 series: <sup>4</sup>	12-15	MIC 105	Microbial Diversity
PHY 007A & PHY 007B & PHY 007C General Physics and General Physics and General Physics		MIC 170	Yeast Molecular Genetics
<b>OR</b>		MIC 172	Host-Parasite Interactions
PHY 009A & PHY 009B & PHY 009C Classical Physics and Classical Physics and Classical Physics		MIC 175	Cancer Biology
Preparatory Subject Matter Subtotal	59-73	MCB 150	Developmental Biology
<b>Depth Subject Matter</b>		MCB 162	Human Genetics & Genomics
<b>Biological Science</b>		MCB 163	Developmental Genetics
BIS 101 Genes & Gene Expression	4	MCB 164	Advanced Eukaryotic Genetics
BIS 104 Cell Biology	3	PLB 112	Plant Growth & Development
BIS 105 Biomolecules & Metabolism or BIS 102 Structure & Function of Biomolecules & BIS 103 and Bioenergetics & Metabolism	3-6	PLB 113	Molecular & Cellular Biology of Plants
<b>Molecular &amp; Cellular Biology</b>		PLS 154	Introduction to Plant Breeding
Depth Subject Matter Subtotal		<b>OR</b>	
Total Units	40-48	Upper division courses in genetics or other fields relevant to the student's interest chosen in consultation with the GGN master and BASC advisor. No more than 4 units of 192, 193, 194H, 198, or 199 may be used for credit in this category.	
		Depth Subject Matter Subtotal	40-48
		Total Units	99-121

<sup>1</sup> With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units with no lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.

<sup>2</sup> With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 118A-CHE 008B; CHE 128A-CHE 128B-CHE 008B; CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C;

CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B;  
CHE 118A-CHE 118B-CHE 128C-CHE 129B.

- <sup>3</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.
- <sup>4</sup> With BASC advisor approval, these combinations also satisfy the Physics requirement: PHY 007A-PHY 009A-PHY 049\*-PHY 007C; PHY 009A-PHY 009B-PHY 049\*-PHY 007C. \*PHY 049 requires approval from the PHY Department to enroll.

## Molecular, Cellular, & Integrative Physiology (Graduate Group)

### Graduate Studies

Julie Bossuyt, Ph.D., Chairperson of the Group

### Group Office

227 Green Hall (formerly Life Sciences Building); 530-752-9092;  
Molecular, Cellular, & Integrative Physiology Graduate Group (<http://mcip.ucdavis.edu>); Faculty (<http://mcip.ucdavis.edu/faculty/>)

- Molecular, Cellular, & Integrative Physiology, Master of Science (p. 334)
- Molecular, Cellular, & Integrative Physiology, Doctor of Philosophy (p. 334)

## Molecular, Cellular, & Integrative Physiology, Master of Science

### Graduate Studies

### Graduate Study

The Graduate Group in Molecular, Cellular, & Integrative Physiology offers programs of study and research leading to M.S. and Ph.D. degrees and participates in joint Ph.D./M.D. and Ph.D./D.V.M. programs. The programs emphasize broad training in the fundamental principles of cellular, molecular, and integrative physiology.

### Master Advisor

Nipavan Chiamvimonvat

### Graduate Advisors

Nipavan Chiamvimonvat, Eleonora Grandi, Manuel Navedo, Madeline Nieves-Cintrón, Crystal Ripplinger

## Molecular, Cellular, & Integrative Physiology, Doctor of Philosophy

### College of Biological Sciences

### Graduate Study

The Graduate Group in Molecular, Cellular, & Integrative Physiology offers programs of study and research leading to M.S. and Ph.D. degrees and participates in joint Ph.D./M.D. and Ph.D./D.V.M. programs. The programs

emphasize broad training in the fundamental principles of cellular, molecular, and integrative physiology.

### Master Advisor

Nipavan Chiamvimonvat

### Graduate Advisors

Nipavan Chiamvimonvat, Eleonora Grandi, Manuel Navedo, Madeline Nieves-Cintrón, Crystal Ripplinger

## Music

### College of Letters & Science

Laurie San Martin, Ph.D., Chairperson of the Department; term ends June 30, 2023

### Department Office

112 Music Building; 530-752-5537; Fax 530-752-0983; Music (<http://music.ucdavis.edu>); Faculty (<http://arts.ucdavis.edu/music-faculty/>)

- Music, Bachelor of Arts (p. 334)
- Music, Minor (p. 342)
- Music, Master of Arts (p. 342)
- Music, Doctor of Philosophy (p. 342)

## Music, Bachelor of Arts

### College of Letters & Science

### The Major Program

The Bachelor of Arts degree in music provides both a broad liberal arts education and the skills necessary to explore music through its history, composition, theory, and performance. Students majoring in music may choose from three tracks in the major: (1) composition, (2) music history, theory, and ethnomusicology, or (3) performance. After a common core of courses in the lower division, students pursue their chosen track with specialized courses leading to an appropriate senior project. All majors are expected to complete a substantial project (composition, research presentation, recital) in the senior year (MUS 195).

### Study Abroad & the Music Major

The department encourages students to pursue a portion of their studies abroad. In close collaboration with their undergraduate advisors, students plan a course of study abroad that complements their coursework at Davis. UC Davis Music Majors have completed upper division coursework at EAP partner institutions in Australia, England, France, Germany, and Italy; Music faculty members lead summer programs in Argentina, Austria, and France.

### The Program

A fundamental grounding in music theory, music history, and performance during the first two years of study leads to more specialized study of composition, music scholarship, or performance during the last two years of undergraduate work.

### Career Alternatives

Students who graduate with a B.A. in music from UC Davis have gone on to careers as composers, performers, educators, scholars, and as

professionals in the concert, media, and computing industries. Others have continued in medicine, law, government, and business.

## Foreign Language

Students contemplating graduate study in music are advised to consider pursuing foreign language study beyond the elementary level.

**Diagnostic Exams:** Diagnostic exams in musicianship and theory are administered at the start of the school year to all incoming students.

## Student Performing Activities

The Department of Music presents more than 100 concerts each year, offering performance opportunities for both majors and non-majors in more than 15 performance ensembles including the Symphony Orchestra, Chorus, Chamber Singers, Concert Band, Early Music Ensemble, Chamber Music Ensembles, Jazz Bands and Combos, Samba Ensembles, Indonesian Gamelan, Hindustani Vocal Ensemble, Afro-Cuban Ensemble, Capoeira, and Mariachi Ensemble. Most concerts are performed in the Pitzer Center or the Margrit Mondavi Center for the Performing Arts.

Professional chamber ensembles perform frequently in the weekly series of free Thursday Noon Concerts, named after Joy S. Shinkoskey. Performance groups have collaborated with the Department of Theatre and Dance in productions of musical theater and opera. Study of instruments and voice with professional performers and teachers is required of all majors. Similar opportunities exist for qualified non-majors.

Note: A maximum of 19 units in performance courses (MUS 131, MUS 140-MUS 155) apply toward the degree; see Unit Credit Guidelines, College of Letters & Science degree requirements section. Faculty of the College of Letters & Science bylaws makes it possible for students to take more than 19 units of performance classes without those additional units counting toward the 225-unit cap on units.

## Faculty & Facilities

The faculty is noted for its achievements in a variety of areas. The music scholars are active in research, writing, and performance; the music of the composers is performed and recorded nationally and internationally.

The regular faculty is joined throughout the year by visiting Artists-in-Residence, distinguished performers who give public concerts and lectures and who work with students informally.

The Empyrean Ensemble, a professional new music ensemble, is in residence at UC Davis, where it performs concerts of new music and annually premieres the work of student composers.

The department's facilities include a collection of Renaissance, Baroque, and modern instruments, along with non-western instruments including a Sundanese & Balinese gamelan, a Brazilian Capoeira & Samba bateria, and various other percussion instruments for our world music ensembles. The arts quadrangle houses the Sound lab, practice and rehearsal rooms, and a music library with well over 12,000 CDs, several hundred videos and a collection of music reference materials. Opened in 2016, the Ann E. Pitzer Center, next door to the Music Building, features a state-of-the-art 399-seat concert hall, six practice rooms, and five large teaching/rehearsal studios. Scores and music monographs are housed in the Peter J. Shields Library, adjacent to the Music Building. A partnership of campus libraries affords online access to more than 100,000 tracks of classical and world music by streaming audio.

## Honors

A student becomes eligible for graduation with honors by meeting the minimum GPA and course requirements established by the College of Letters & Science. To qualify for high or highest honors, students must also complete the Music Department honors program with a GPA of 3.500 or above and write a thesis or submit a portfolio that meets the criteria for high honors or highest honors. Students apply to participate in the department honors program during the latter part of their junior year. Admission to the program is based on GPA, a thesis proposal, examples of previous writing, and the recommendation of a faculty member who is willing to sponsor the student's project. Students who anticipate seeking admission to the honors program are urged to complete at least one offering of MUS 121 or MUS 122 before the end of their junior year. Interested students are urged to consult with faculty in their field early in their junior year.

## Major Advisors

J. Diaz, S. Nichols, I. Oseguera

Code	Title	Units
<b>Preparatory Subject Matter</b>		
MUS 006 Series		
MUS 006A & MUS 006B	Elementary Theory, Part 1 and Elementary Theory, Part 2	6
MUS 007 Series		
MUS 007A & MUS 007B & MUS 007C	Intermediate Theory, Part 1 and Intermediate Theory, Part 2 and Intermediate Theory, Part 3	9
MUS 013	(Pending Approval)	2
MUS 013 may be excused by diagnostic examination at the beginning of each quarter.		
<i>Music 016 Series</i>		
MUS 016A & MUS 016B	Elementary Musicianship, Part 1 and Elementary Musicianship, Part 2	4
MUS 016 courses may be excused by diagnostic examination at the beginning of each quarter.		
<i>Music 017 Series</i>		
MUS 017A & MUS 017B & MUS 017C	Intermediate Musicianship, Part 1 and Intermediate Musicianship, Part 2 and Intermediate Musicianship, Part 3	6
MUS 017 courses may be excused by diagnostic examination at the beginning of each quarter.		
<i>Music 024 Series</i>		
MUS 024A & MUS 024B	History of Western Music: Baroque & Classic Eras and History of Western Music: Romantic Era	8
Preparatory Subject Matter Subtotal		
<b>Depth Subject Matter</b>		
Choose one track:		
Track 1: Music Composition (p. 336)		
Track 2: Music History, Theory, & Ethnomusicology (p. 337)		
Track 3: Music Performance (p. 338)		
Trackless Option (p. 339)		
Composition Honors Track (p. 340)		
Music History, Theory & Ethnomusicology Honors Track (p. 341)		

Depth Subject Matter Subtotal	38-51
Total Units	61-86

## Track 1: Music Composition

Code	Title	Units	
MUS 101A	Advanced Theory, Part 1	4	MUS 131U Applied Study of Music: Advanced (Individual); Saxophone
MUS 101B	Advanced Theory, Part 2	4	MUS 131W Applied Study of Music: Advanced (Individual); Harp
MUS 103	Workshop in Composition	3	Choose at least 6 units: 6
Choose a total of 4 units:		4	MUS 140 University Jazz Band
MUS 121 or MUS 122	Topics in Music Scholarship Topics in Analysis & Theory		MUS 141 University Symphony
MUS 123	Music as Culture	4	MUS 142 University Chamber Singers
MUS 124C	History of Western Music: 20th Century to the Present	4	MUS 143 University Concert Band
MUS 124D	History of Western Music: Middle Ages & Renaissance	4	MUS 144 University Chorus
MUS 195	Senior Project	2	MUS 145 Early Music Ensemble
MUS 131 (three quarters):		6	MUS 146 Chamber Music Ensemble
MUS 131A	Applied Study of Music: Advanced (Individual)		MUS 147 University Wind Ensemble
MUS 131B	Applied Study of Music: Advanced (Individual); Piano		MUS 148 Hindustani Vocal Ensemble
MUS 131C	Applied Study of Music: Advanced (Individual); Harpsichord		MUS 149 Indonesian Gamelan Ensemble
MUS 131D	Applied Study of Music: Advanced (Individual); Organ		MUS 150 Brazilian Samba School
MUS 131E	Applied Study of Music: Advanced (Individual); Violin		MUS 151 Korean Percussion Ensemble
MUS 131F	Applied Study of Music: Advanced (Individual); Viola		MUS 152 Afro-Cuban Ensemble
MUS 131G	Applied Study of Music: Advanced (Individual); Cello		MUS 153 Brazilian Capoeira Ensemble
MUS 131H	Applied Study of Music: Advanced (Individual); Double Bass		MUS 155 Percussion Ensemble
MUS 131I	Applied Study of Music: Advanced (Individual); Flute		Choose at least 4 units: 4
MUS 131J	Applied Study of Music: Advanced (Individual); Oboe		MUS 102 Tonal Counterpoint
MUS 131K	Applied Study of Music: Advanced (Individual); Clarinet		MUS 105 History & Analysis of Jazz
MUS 131L	Applied Study of Music: Advanced (Individual); Bassoon		MUS 106 History of Rock Music
MUS 131M	Applied Study of Music: Advanced (Individual); French Horn		MUS 107A Introduction to Electronic Music
MUS 131N	Applied Study of Music: Advanced (Individual); Trumpet		MUS 107B Handmade Electronic Music
MUS 131O	Applied Study of Music: Advanced (Individual); Trombone		MUS 108A Orchestration
MUS 131P	Applied Study of Music: Advanced (Individual); Tuba		MUS 108B Orchestration
MUS 131Q	Applied Study of Music: Advanced (Individual); Percussion		MUS 110A The Musical World of Beethoven
MUS 131R	Applied Study of Music: Advanced (Individual); Classical Guitar		MUS 110B The Musical World of a 20th-Century Composer
			MUS 110C The Musical World of J. S. Bach
			MUS 110D The Musical World of Mozart
			MUS 110E The Musical World of an 18th-Century Composer
			MUS 110F The Musical World of an American Composer
			MUS 113 Introduction to Conducting
			MUS 114 Intermediate Conducting
			MUS 115 History of Film Music
			MUS 116 Introduction to the Music of The Beatles
			MUS 117 The Broadway Musical
			MUS 121 Topics in Music Scholarship
			MUS 122 Topics in Analysis & Theory
			MUS 126 American Music
			MUS 127/SPA 171 Music from Latin America
			or MUS 127S/ SPA 171S Music from Latin America
			MUS 129A Musics of the Americas
			MUS 129B Musics of Africa, Middle East, Indian Subcontinent
			MUS 129C Musics of East & Southeast Asia
			MUS 129D Folk Musics of Europe

MUS 192	Internship in Music
MUS 199	Special Study for Advanced Undergraduates
<b>Total Units</b>	<b>45</b>

## Track 2: Music History, Theory, & Ethnomusicology

Code	Title	Units
Choose a total of 4 units:		4
MUS 121 or MUS 122	Topics in Music Scholarship Topics in Analysis & Theory	4
MUS 123	Music as Culture	4
MUS 124C	History of Western Music: 20th Century to the Present	4
MUS 124D	History of Western Music: Middle Ages & Renaissance	4
MUS 195	Senior Project	2
MUS 131 (three quarters):		6
MUS 131A	Applied Study of Music: Advanced (Individual)	
MUS 131B	Applied Study of Music: Advanced (Individual); Piano	
MUS 131C	Applied Study of Music: Advanced (Individual); Harpsichord	
MUS 131D	Applied Study of Music: Advanced (Individual); Organ	
MUS 131E	Applied Study of Music: Advanced (Individual); Violin	
MUS 131F	Applied Study of Music: Advanced (Individual); Viola	
MUS 131G	Applied Study of Music: Advanced (Individual); Cello	
MUS 131H	Applied Study of Music: Advanced (Individual); Double Bass	
MUS 131I	Applied Study of Music: Advanced (Individual); Flute	
MUS 131J	Applied Study of Music: Advanced (Individual); Oboe	
MUS 131K	Applied Study of Music: Advanced (Individual); Clarinet	
MUS 131L	Applied Study of Music: Advanced (Individual); Bassoon	
MUS 131M	Applied Study of Music: Advanced (Individual); French Horn	
MUS 131N	Applied Study of Music: Advanced (Individual); Trumpet	
MUS 131O	Applied Study of Music: Advanced (Individual); Trombone	
MUS 131P	Applied Study of Music: Advanced (Individual); Tuba	
MUS 131Q	Applied Study of Music: Advanced (Individual); Percussion	
MUS 131R	Applied Study of Music: Advanced (Individual); Classical Guitar	

MUS 131U	Applied Study of Music: Advanced (Individual); Saxophone
MUS 131W	Applied Study of Music: Advanced (Individual); Harp
Choose at least 6 units:	6
MUS 140	University Jazz Band
MUS 141	University Symphony
MUS 142	University Chamber Singers
MUS 143	University Concert Band
MUS 144	University Chorus
MUS 145	Early Music Ensemble
MUS 146	Chamber Music Ensemble
MUS 147	University Wind Ensemble
MUS 148	Hindustani Vocal Ensemble
MUS 149	Indonesian Gamelan Ensemble
MUS 150	Brazilian Samba School
MUS 151	Korean Percussion Ensemble
MUS 152	Afro-Cuban Ensemble
MUS 153	Brazilian Capoeira Ensemble
MUS 155	Percussion Ensemble
Choose at least 12 units:	12
MUS 101A	Advanced Theory, Part 1
MUS 101B	Advanced Theory, Part 2
MUS 102	Tonal Counterpoint
MUS 103	Workshop in Composition
MUS 105	History & Analysis of Jazz
MUS 106	History of Rock Music
MUS 107A	Introduction to Electronic Music
MUS 107B	Handmade Electronic Music
MUS 108A	Orchestration
MUS 108B	Orchestration
MUS 110A	The Musical World of Beethoven
MUS 110B	The Musical World of a 20th-Century Composer
MUS 110C	The Musical World of J. S. Bach
MUS 110D	The Musical World of Mozart
MUS 110E	The Musical World of an 18th-Century Composer
MUS 110F	The Musical World of an American Composer
MUS 113	Introduction to Conducting
MUS 114	Intermediate Conducting
MUS 115	History of Film Music
MUS 116	Introduction to the Music of The Beatles
MUS 117	The Broadway Musical
MUS 121	Topics in Music Scholarship
MUS 122	Topics in Analysis & Theory
MUS 126	American Music
MUS 127/SPA 171 or MUS 127S/ SPA 171S	Music from Latin America
	Music from Latin America
MUS 129A	Musics of the Americas

MUS 129B	Musics of Africa, Middle East, Indian Subcontinent	MUS 131R	Applied Study of Music: Advanced (Individual); Classical Guitar
MUS 129C	Musics of East & Southeast Asia	MUS 131U	Applied Study of Music: Advanced (Individual); Saxophone
MUS 129D	Folk Musics of Europe	MUS 131W	Applied Study of Music: Advanced (Individual); Harp
MUS 192	Internship in Music	Choose at least 13 units:	
MUS 199	Special Study for Advanced Undergraduates	MUS 140	University Jazz Band
<b>Total Units</b>	<b>42</b>	MUS 141	University Symphony
<b>Track 3: Music Performance</b>		MUS 142	University Chamber Singers
<b>Code</b>	<b>Title</b>	MUS 143	University Concert Band
Choose a total of 4 units:		MUS 144	University Chorus
MUS 121 or MUS 122	Topics in Music Scholarship Topics in Analysis & Theory	MUS 145	Early Music Ensemble
MUS 123	Music as Culture	MUS 146	Chamber Music Ensemble
MUS 124C	History of Western Music: 20th Century to the Present	MUS 147	University Wind Ensemble
MUS 124D	History of Western Music: Middle Ages & Renaissance	MUS 148	Hindustani Vocal Ensemble
MUS 195	Senior Project	MUS 149	Indonesian Gamelan Ensemble
MUS 131 (three quarters):		MUS 150	Brazilian Samba School
MUS 131A	Applied Study of Music: Advanced (Individual)	MUS 151	Korean Percussion Ensemble
MUS 131B	Applied Study of Music: Advanced (Individual); Piano	MUS 152	Afro-Cuban Ensemble
MUS 131C	Applied Study of Music: Advanced (Individual); Harpsichord	MUS 153	Brazilian Capoeira Ensemble
MUS 131D	Applied Study of Music: Advanced (Individual); Organ	MUS 155	Percussion Ensemble
MUS 131E	Applied Study of Music: Advanced (Individual); Violin	Choose at least 6 units:	
MUS 131F	Applied Study of Music: Advanced (Individual); Viola	MUS 101A	Advanced Theory, Part 1
MUS 131G	Applied Study of Music: Advanced (Individual); Cello	MUS 101B	Advanced Theory, Part 2
MUS 131H	Applied Study of Music: Advanced (Individual); Double Bass	MUS 102	Tonal Counterpoint
MUS 131I	Applied Study of Music: Advanced (Individual); Flute	MUS 103	Workshop in Composition
MUS 131J	Applied Study of Music: Advanced (Individual); Oboe	MUS 105	History & Analysis of Jazz
MUS 131K	Applied Study of Music: Advanced (Individual); Clarinet	MUS 106	History of Rock Music
MUS 131L	Applied Study of Music: Advanced (Individual); Bassoon	MUS 107A	Introduction to Electronic Music
MUS 131M	Applied Study of Music: Advanced (Individual); French Horn	MUS 107B	Handmade Electronic Music
MUS 131N	Applied Study of Music: Advanced (Individual); Trumpet	MUS 108A	Orchestration
MUS 131O	Applied Study of Music: Advanced (Individual); Trombone	MUS 108B	Orchestration
MUS 131P	Applied Study of Music: Advanced (Individual); Tuba	MUS 110A	The Musical World of Beethoven
MUS 131Q	Applied Study of Music: Advanced (Individual); Percussion	MUS 110B	The Musical World of a 20th-Century Composer
		MUS 110C	The Musical World of J. S. Bach
		MUS 110D	The Musical World of Mozart
		MUS 110E	The Musical World of an 18th-Century Composer
		MUS 110F	The Musical World of an American Composer
		MUS 113	Introduction to Conducting
		MUS 114	Intermediate Conducting
		MUS 115	History of Film Music
		MUS 116	Introduction to the Music of The Beatles
		MUS 117	The Broadway Musical
		MUS 121	Topics in Music Scholarship
		MUS 122	Topics in Analysis & Theory
		MUS 126	American Music
		MUS 127/SPA 171	Music from Latin America
		or MUS 127S/ SPA 171S	Music from Latin America

MUS 129A	Musics of the Americas
MUS 129B	Musics of Africa, Middle East, Indian Subcontinent
MUS 129C	Musics of East & Southeast Asia
MUS 129D	Folk Musics of Europe
MUS 192	Internship in Music
MUS 199	Special Study for Advanced Undergraduates

Total Units **43**

## Trackless Option

Code	Title	Units
Core Academic Courses		14
MUS 123	Music as Culture	
MUS 124C	History of Western Music: 20th Century to the Present	
MUS 124D	History of Western Music: Middle Ages & Renaissance	
MUS 195	Senior Project	
Performance (one year)		6
MUS 131A	Applied Study of Music: Advanced (Individual)	
MUS 131C	Applied Study of Music: Advanced (Individual); Harpsichord	
MUS 131E	Applied Study of Music: Advanced (Individual); Violin	
MUS 131F	Applied Study of Music: Advanced (Individual); Viola	
MUS 131G	Applied Study of Music: Advanced (Individual); Cello	
MUS 131H	Applied Study of Music: Advanced (Individual); Double Bass	
MUS 131I	Applied Study of Music: Advanced (Individual); Flute	
MUS 131J	Applied Study of Music: Advanced (Individual); Oboe	
MUS 131K	Applied Study of Music: Advanced (Individual); Clarinet	
MUS 131L	Applied Study of Music: Advanced (Individual); Bassoon	
MUS 131M	Applied Study of Music: Advanced (Individual); French Horn	
MUS 131N	Applied Study of Music: Advanced (Individual); Trumpet	
MUS 131O	Applied Study of Music: Advanced (Individual); Trombone	
MUS 131P	Applied Study of Music: Advanced (Individual); Tuba	
MUS 131Q	Applied Study of Music: Advanced (Individual); Percussion	
MUS 131R	Applied Study of Music: Advanced (Individual); Classical Guitar	
MUS 131U	Applied Study of Music: Advanced (Individual); Saxophone	

Ensembles (three quarters) **6**

MUS 140	University Jazz Band
MUS 141	University Symphony
MUS 142	University Chamber Singers
MUS 143	University Concert Band
MUS 144	University Chorus
MUS 145	Early Music Ensemble
MUS 146	Chamber Music Ensemble
MUS 147	University Wind Ensemble
MUS 148	Hindustani Vocal Ensemble
MUS 149	Indonesian Gamelan Ensemble
MUS 150	Brazilian Samba School
MUS 152	Afro-Cuban Ensemble
MUS 153	Brazilian Capoeira Ensemble
Electives	12
MUS 101A	Advanced Theory, Part 1 <sup>1</sup>
MUS 101B	Advanced Theory, Part 2 <sup>1</sup>
MUS 102	Tonal Counterpoint <sup>1</sup>
MUS 103	Workshop in Composition <sup>1</sup>
MUS 105	History & Analysis of Jazz
MUS 106	History of Rock Music
MUS 107A	Introduction to Electronic Music
MUS 107B	Handmade Electronic Music
MUS 107C	Computer Music
MUS 108A	Orchestration
MUS 108B	Orchestration
MUS 110A	The Musical World of Beethoven
MUS 110B	The Musical World of a 20th-Century Composer
MUS 110C	The Musical World of J. S. Bach
MUS 110D	The Musical World of Mozart
MUS 110E	The Musical World of an 18th-Century Composer
MUS 110F	The Musical World of an American Composer
MUS 113	Introduction to Conducting
MUS 114	Intermediate Conducting
MUS 115	History of Film Music
MUS 116	Introduction to the Music of The Beatles
MUS 117	The Broadway Musical
MUS 121	Topics in Music Scholarship
MUS 122	Topics in Analysis & Theory
MUS 126	American Music
MUS 127/SPA 171	Music from Latin America
MUS 129A	Musics of the Americas
MUS 129B	Musics of Africa, Middle East, Indian Subcontinent
MUS 129C	Musics of East & Southeast Asia
MUS 129D	Folk Musics of Europe
MUS 192	Internship in Music

Total Units **38**

<sup>1</sup> One year.

## Composition Honors Track

Code	Title	Units		
MUS 101A	Advanced Theory, Part 1	4	MUS 140 University Jazz Band	
MUS 101B	Advanced Theory, Part 2	4	MUS 141 University Symphony	
MUS 103	Workshop in Composition	3	MUS 142 University Chamber Singers	
Choose a total of 4 units:		4	MUS 143 University Concert Band	
MUS 121 or MUS 122	Topics in Music Scholarship Topics in Analysis & Theory		MUS 144 University Chorus	
MUS 123	Music as Culture	4	MUS 145 Early Music Ensemble	
MUS 124C	History of Western Music: 20th Century to the Present	4	MUS 146 Chamber Music Ensemble	
MUS 124D	History of Western Music: Middle Ages & Renaissance	4	MUS 147 University Wind Ensemble	
MUS 131 (three quarters):		6	MUS 148 Hindustani Vocal Ensemble	
MUS 131A	Applied Study of Music: Advanced (Individual)		MUS 149 Indonesian Gamelan Ensemble	
MUS 131B	Applied Study of Music: Advanced (Individual); Piano		MUS 150 Brazilian Samba School	
MUS 131C	Applied Study of Music: Advanced (Individual); Harpsichord		MUS 151 Korean Percussion Ensemble	
MUS 131D	Applied Study of Music: Advanced (Individual); Organ		MUS 152 Afro-Cuban Ensemble	
MUS 131E	Applied Study of Music: Advanced (Individual); Violin		MUS 153 Brazilian Capoeira Ensemble	
MUS 131F	Applied Study of Music: Advanced (Individual); Viola		MUS 155 Percussion Ensemble	
MUS 131G	Applied Study of Music: Advanced (Individual); Cello		Two quarters of Music 194H for a total of at least 6 units resulting in a senior thesis:	
MUS 131H	Applied Study of Music: Advanced (Individual); Double Bass		MUS 194HA Special Study for Honors Students	
MUS 131I	Applied Study of Music: Advanced (Individual); Flute		MUS 194HB Special Study for Honors Students	
MUS 131J	Applied Study of Music: Advanced (Individual); Oboe		Choose at least 4 units:	
MUS 131K	Applied Study of Music: Advanced (Individual); Clarinet		MUS 102 Tonal Counterpoint	
MUS 131L	Applied Study of Music: Advanced (Individual); Bassoon		MUS 105 History & Analysis of Jazz	
MUS 131M	Applied Study of Music: Advanced (Individual); French Horn		MUS 106 History of Rock Music	
MUS 131N	Applied Study of Music: Advanced (Individual); Trumpet		MUS 107A Introduction to Electronic Music	
MUS 131O	Applied Study of Music: Advanced (Individual); Trombone		MUS 107B Handmade Electronic Music	
MUS 131P	Applied Study of Music: Advanced (Individual); Tuba		MUS 108A Orchestration	
MUS 131Q	Applied Study of Music: Advanced (Individual); Percussion		MUS 108B Orchestration	
MUS 131R	Applied Study of Music: Advanced (Individual); Classical Guitar		MUS 110A The Musical World of Beethoven	
MUS 131U	Applied Study of Music: Advanced (Individual); Saxophone		MUS 110B The Musical World of a 20th-Century Composer	
MUS 131W	Applied Study of Music: Advanced (Individual); Harp		MUS 110C The Musical World of J. S. Bach	
Choose at least 6 units:		6	MUS 110D The Musical World of Mozart	
			MUS 110E The Musical World of an 18th-Century Composer	
			MUS 110F The Musical World of an American Composer	
			MUS 113 Introduction to Conducting	
			MUS 114 Intermediate Conducting	
			MUS 115 History of Film Music	
			MUS 116 Introduction to the Music of The Beatles	
			MUS 117 The Broadway Musical	
			MUS 121 Topics in Music Scholarship	
			MUS 122 Topics in Analysis & Theory	
			MUS 126 American Music	
			MUS 127/SPA 171 Music from Latin America or MUS 127S/ SPA 171S Music from Latin America	
			MUS 129A Musics of the Americas	
			MUS 129B Musics of Africa, Middle East, Indian Subcontinent	
			MUS 129C Musics of East & Southeast Asia	
			MUS 129D Folk Musics of Europe	
			MUS 192 Internship in Music	

MUS 199	Special Study for Advanced Undergraduates	
<b>Total Units</b>		<b>49-51</b>

## Music History, Theory & Ethnomusicology Honors Track

Code	Title	Units	
Choose a total of 4 units:		4	
MUS 121 or MUS 122	Topics in Music Scholarship Topics in Analysis & Theory	4	
MUS 123	Music as Culture	4	
MUS 124C	History of Western Music: 20th Century to the Present	4	
MUS 124D	History of Western Music: Middle Ages & Renaissance	4	
MUS 131 (three quarters):		6	Two quarters of Music 194H for a total of at least 6 units resulting in a senior thesis: 6-8
MUS 131B	Applied Study of Music: Advanced (Individual); Piano		MUS 194HA Special Study for Honors Students
MUS 131C	Applied Study of Music: Advanced (Individual); Harpsichord		MUS 194HB Special Study for Honors Students
MUS 131D	Applied Study of Music: Advanced (Individual); Organ		Choose at least 12 units: 12
MUS 131E	Applied Study of Music: Advanced (Individual); Violin		MUS 101A Advanced Theory, Part 1
MUS 131F	Applied Study of Music: Advanced (Individual); Viola		MUS 101B Advanced Theory, Part 2
MUS 131G	Applied Study of Music: Advanced (Individual); Cello		MUS 102 Tonal Counterpoint
MUS 131H	Applied Study of Music: Advanced (Individual); Double Bass		MUS 103 Workshop in Composition
MUS 131I	Applied Study of Music: Advanced (Individual); Flute		MUS 105 History & Analysis of Jazz
MUS 131J	Applied Study of Music: Advanced (Individual); Oboe		MUS 106 History of Rock Music
MUS 131K	Applied Study of Music: Advanced (Individual); Clarinet		MUS 107A Introduction to Electronic Music
MUS 131L	Applied Study of Music: Advanced (Individual); Bassoon		MUS 107B Handmade Electronic Music
MUS 131M	Applied Study of Music: Advanced (Individual); French Horn		MUS 108A Orchestration
MUS 131N	Applied Study of Music: Advanced (Individual); Trumpet		MUS 108B Orchestration
MUS 131O	Applied Study of Music: Advanced (Individual); Trombone		MUS 110A The Musical World of Beethoven
MUS 131P	Applied Study of Music: Advanced (Individual); Tuba		MUS 110B The Musical World of a 20th-Century Composer
MUS 131Q	Applied Study of Music: Advanced (Individual); Percussion		MUS 110C The Musical World of J. S. Bach
MUS 131R	Applied Study of Music: Advanced (Individual); Classical Guitar		MUS 110D The Musical World of Mozart
MUS 131U	Applied Study of Music: Advanced (Individual); Saxophone		MUS 110E The Musical World of an 18th-Century Composer
MUS 131W	Applied Study of Music: Advanced (Individual); Harp		MUS 110F The Musical World of an American Composer
Choose at least 6 units:		6	MUS 113 Introduction to Conducting
			MUS 114 Intermediate Conducting
			MUS 115 History of Film Music
			MUS 116 Introduction to the Music of The Beatles
			MUS 117 The Broadway Musical
			MUS 121 Topics in Music Scholarship
			MUS 122 Topics in Analysis & Theory
			MUS 126 American Music
			MUS 127/SPA 171 Music from Latin America or MUS 127S/ SPA 171S Music from Latin America
			MUS 129A Musics of the Americas
			MUS 129B Musics of Africa, Middle East, Indian Subcontinent

MUS 129C	Musics of East & Southeast Asia
MUS 129D	Folk Musics of Europe
MUS 192	Internship in Music
MUS 199	Special Study for Advanced Undergraduates
<b>Total Units</b>	<b>46-48</b>

## Music, Minor

### College of Letters & Science

The music minor allows students to explore and engage with a wide range of musical styles and genres, including classical music, jazz, popular music, and many musics of the world. The minor aims to enrich student experience by integrating performance experience with diverse music department ensembles, including the University Symphony, University Chorus, University Concert Band, Jazz Band, world music ensembles (Indonesian Gamelan, Samba School, Hindustani Vocal Ensemble, Afro-Cuban Ensemble, Brazilian Capoeira Ensemble, Samba School) and numerous chamber ensembles. By providing opportunities to build musical skills and to research and write about a variety of musical traditions, the minor helps students of all backgrounds highlight their creativity, collaborative skills, careful listening and cultural awareness.

## Major Advisors

J. Diaz, S. Nichols, I. Oseguera

Code	Title	Units
Choose a minimum of 16 units:		16
MUS 105	History & Analysis of Jazz	
MUS 106	History of Rock Music	
MUS 107A	Introduction to Electronic Music	
MUS 107B	Handmade Electronic Music	
MUS 110A	The Musical World of Beethoven	
MUS 110B	The Musical World of a 20th-Century Composer	
MUS 110C	The Musical World of J. S. Bach	
MUS 110D	The Musical World of Mozart	
MUS 110E	The Musical World of an 18th-Century Composer	
MUS 110F	The Musical World of an American Composer	
MUS 115	History of Film Music	
MUS 116	Introduction to the Music of The Beatles	
MUS 117	The Broadway Musical	
MUS 126	American Music	
MUS 127/SPA 171	Music from Latin America or MUS 127S/ SPA 171S	Music from Latin America
MUS 129A	Musics of the Americas	
MUS 129B	Musics of Africa, Middle East, Indian Subcontinent	
MUS 129C	Musics of East & Southeast Asia	
MUS 129D	Folk Musics of Europe	
Choose a minimum of 6 units:		6
MUS 140	University Jazz Band	

MUS 141	University Symphony
MUS 142	University Chamber Singers
MUS 143	University Concert Band
MUS 144	University Chorus
MUS 145	Early Music Ensemble
MUS 146	Chamber Music Ensemble
MUS 147	University Wind Ensemble
MUS 148	Hindustani Vocal Ensemble
MUS 149	Indonesian Gamelan Ensemble
MUS 150	Brazilian Samba School
MUS 151	Korean Percussion Ensemble
MUS 152	Afro-Cuban Ensemble
MUS 153	Brazilian Capoeira Ensemble
MUS 155	Percussion Ensemble
<b>Total Units</b>	<b>22</b>

## Music, Master of Arts

### College of Letters & Science

## Graduate Study

The Department of Music offers programs of study and research leading to the M.A. degree in composition/theory, musicology, ethnomusicology, and conducting, and the Ph.D. degree in composition/theory, musicology, and ethnomusicology. Detailed information regarding graduate study may be obtained from the Graduate Advisor.

## Graduate Advisors

K. Rohde, H. Spiller, B. Levy

## Music, Doctor of Philosophy

### College of Letters & Science

## Graduate Study

The Department of Music offers programs of study and research leading to the M.A. degree in composition/theory, musicology, ethnomusicology, and conducting, and the Ph.D. degree in composition/theory, musicology, and ethnomusicology. Detailed information regarding graduate study may be obtained from the Graduate Advisor.

## Graduate Advisors

K. Rohde, H. Spiller, B. Levy

## Native American Studies

### College of Letters & Science

Zoila Mendoza, Chairperson of the Department; July 1, 2021-June 30, 2024

## Department Office

2407 Hart Hall; 530-752-3237; Native American Studies (<http://nas.ucdavis.edu>); Faculty (<https://nas.ucdavis.edu/faculty/>)

- Native American Studies, Bachelor of Arts (p. 343)
- Native American Studies, Minor (p. 345)

- Native American Studies, Master of Arts (p. 346)
- Native American Studies, Doctor of Philosophy (p. 346)

# Native American Studies, Bachelor of Arts

College of Letters & Science

## The Major Program

Native American Studies provides a multi-disciplinary introduction to the indigenous cultures of North, Central, and South America. It challenges students to consider issues of cultural diversity, sovereignty, and indigenous knowledge systems in preparation for living in a world of constantly increasing social and cultural complexity.

### The Program

Students electing a major in Native American Studies may complete Plan I, Plan II, or Plan III. Plan I enables students to concentrate chiefly upon the Native experience in North America (north of Mexico). Plan II encourages interested students to focus upon Meso-America with some course work integrating Meso-America with North America and South America. Plan III focuses upon South America with some course work integrating that region with areas to the north. See Undergraduate Major Requirements (<https://nas.ucdavis.edu/undergraduate-major-requirements/>).

### Major Advisor & Advising

All new and prospective Native American Studies majors are encouraged to see the Student Affairs Officer individually, once per year, at minimum. See Native American Studies Advising (<https://nas.ucdavis.edu/contact-information/>).

### Career Alternatives

Native American Studies is excellent preparation for a scholarly career or professional career such as teaching, law, human services, health, tribal administration, social work, and inter-ethnic relations. Graduate schools and agencies in these and related areas are looking for students with broad interdisciplinary preparation and who possess knowledge and sensitivity relating to ethnic issues and cultural diversity.

### Study Off Campus

Majors have the option of spending one to three quarters elsewhere in the Americas or on or near a reservation as part of the fulfillment of the Area of Specialization. Each student's plan must be approved by the student's advisor and by the chairperson and may fulfill from 12 to 20 of the 28 units required for the emphasis. The courses or field internship taken elsewhere must be focused upon indigenous peoples or indigenous languages and the institution of study shall be located in an area with substantial indigenous population. Students must have upper division standing and, for Plan I, course 107 or the equivalent should have been completed; for Plan II, courses 107 and 133 should have been completed; and for Plan III, courses 107 and 120 should have been completed prior to departure. Several options may be used for receiving academic credit, including course 195. The department strongly encourages students to participate in the UC Education Abroad Program or Short-Term Programs Abroad.

### Graduate Study

The Department offers a program of study leading to M.A. and Ph.D. degrees in Native American Studies, as well as a designated emphasis

in Native American Studies for graduate students in approved programs. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies.

### Graduates Advisor

Graduate Advisors (<https://nas.ucdavis.edu/graduate-advisor/>)

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Native American Studies</i>		
NAS 001	Introduction to Native American Studies	4
NAS 010 or NAS 012	Native American Experience Native American/Indigenous Film	4
Choose one or two:		4-8
NAS 005	Introduction to Native American Literature	
NAS 012	Native American/Indigenous Film	
NAS 032	Native American Music & Dance	
NAS 033	Introduction to Native American Art	
NAS 034	Native American Art Studio	
Choose one or two:		3-8
AAS 012	Introduction to African Studies	
AAS 052	African Traditional Religion	
ANT 002	Cultural Anthropology	
ANT 020	Comparative Cultures	
ANT 024	Ancient Crops & People	
ASA 001	Historical Experience of Asian Americans	
ASA 002	Contemporary Issues of Asian Americans	
ASA 004	Asian American Cultural Studies	
CHI 010	Introduction to Chicana/o Studies	
CHI 021	Chicana/o & Latina/o Health Care Issues	
CHI 023	Qualitative Research Methods	
COM 025	Ethnic Minority Writers in World Literature	
CRD 002	(Discontinued)	
ESP 010	Current Issues in the Environment	
HIS 007A	History of Latin America to 1700	
HIS 007B	History of Latin America, 1700-1900	
HIS 007C	History of Latin America 1900-present	
HIS 017A	History of the United States	
LIN 001 or LIN 001Y	Introduction to Linguistics Introduction to Linguistics	
Preparatory Subject Matter Subtotal		15-24
<b>Depth Subject Matter</b>		
<i>Native American Studies</i>		
NAS 157	Native American Religion & Philosophy	4
Choose one:		4
NAS 130A	Native American Ethno-Historical Development	
NAS 130B	Native American Ethno-Historical Development	
NAS 130C	Native American Ethno-Historical Development	
NAS 180 or NAS 135	Native American Women Gender Construction in Native Societies	4
Choose three:		12

NAS 101	Contemporary Native American Art	NAS 122	Native American Community Development	
NAS 107	Learning Native American Languages	NAS 125	Performance & Culture Among Native Americans	
NAS 108	Indigenous Languages of California	NAS 130A	Native American Ethno-Historical Development	
NAS 115	Native Americans in the Contemporary World	NAS 130B	Native American Ethno-Historical Development	
NAS 119	Introduction to Federal Indian Law	NAS 130C	Native American Ethno-Historical Development	
NAS 122	Native American Community Development	NAS 135	Gender Construction in Native Societies	
NAS 125	Performance & Culture Among Native Americans	NAS 146	Orientation to Research in Native American Studies	
NAS 130A	Native American Ethno-Historical Development	NAS 161	California Indian Environmental Policy I	
NAS 130B	Native American Ethno-Historical Development	NAS 162	California Indian Environmental Policy II	
NAS 130C	Native American Ethno-Historical Development	NAS 181A	Native American Literature	
NAS 133A	Ethnohistory of Native Peoples of Mexico & Central America to 1500	NAS 181B	Native American Literature	
NAS 133B	Ethnohistory of Native Peoples of Mexico & Central America 1500 to 2000	NAS 181C	Contemporary Native American Poetry	
NAS 135	Gender Construction in Native Societies	NAS 185	Native American Literature in Performance	
NAS 146	Orientation to Research in Native American Studies	NAS 188	Special Topics in Native American Literary Studies	
NAS 161	California Indian Environmental Policy I	NAS 191	Topics in Native American Studies	
NAS 162	California Indian Environmental Policy II	Choose one:		
NAS 180	Native American Women	AMS 100	Methods in American Studies	
NAS 181A	Native American Literature	ANT 103	Indigenous Peoples & Natural Resource Conservation	
NAS 181B	Native American Literature	ANT 136	Ethnographic Film	
NAS 181C	Contemporary Native American Poetry	ANT 172	New World Prehistory: The First Arrivals	
NAS 185	Native American Literature in Performance	ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors	
NAS 188	Special Topics in Native American Literary Studies	ANT 176	California Archaeology	
NAS 191	Topics in Native American Studies	AAS 100	Survey of Ethnicity in the US	
Note: If a course is counted for either Plans I, II, or III (below), it cannot also be counted as part of the 24 units of Depth Subject Matter (above).		AAS 107B	African Descent Communities & Culture in North America	
Depth Subject Matter Subtotal	24	AAS 145B	Black Intellectuals	
<b>Areas of Specialization</b>		AAS 152	Major Voices in Black World Literature	
Complete one plan:	20-21	AAS 153/COM 154	African Literature	
Plan I—North American Emphasis (p. 344)		AAS 163	African Religions in the Americas	
Plan II—Mexico-Central America Emphasis (p. 345)		AAS 172	Diaspora & New Black Identities	
Plan III—South American Emphasis (p. 345)		AAS 176	The Politics of Resources	
Areas of Specialization Subtotal	20-21	AAS 181	Hip Hop in Urban America	
Total Units	59-69	ASA 102	Theoretical Perspective in Asian American Studies	
<b>Plan I—North American Emphasis</b>		ASA 112	Asian American Women	
<b>Code</b>	<b>Title</b>	<b>Units</b>	ASA 115	Multiracial Asian Pacific American Issues
<b>Native American Studies</b>		ASA 121	Asian American Performance	
NAS 107 or NAS 108	Learning Native American Languages Indigenous Languages of California	4	CHI 100	Chicana/o Theoretical Perspective
Choose two:		8	CHI 110	Sociology of the Chicana/o Experience
NAS 101	Contemporary Native American Art		SOC 128	Interracial Interpersonal Dynamics
NAS 115	Native Americans in the Contemporary World		WMS 160	Women, "Race" & Sexuality in Postcolonial Cinema
NAS 119	Introduction to Federal Indian Law		WMS 162	Feminist Film Theory & Criticism
			WMS 170	Queer Studies
			WMS 180	Women of Color Writing in the United States

WMS 182	Globalization, Gender & Culture	
One other upper division Native American Studies course, selected in consultation with advisor.		4
<b>Total Units</b>	<b>20</b>	

## Plan II—Mexico-Central America Emphasis

Code	Title	Units
<b>Native American Studies</b>		
NAS 107	Learning Native American Languages	4
NAS 133	Ethnohistory of Native People of Mexico & Central America	4
or NAS 133B	Ethnohistory of Native Peoples of Mexico & Central America 1500 to 2000	
Choose two:		8-9
AMS 100	Methods in American Studies	
HIS 110A	Colonialism & the Making of the Modern World	
HIS 160	Spain & America in the 16th Century	
HIS 165	Latin American Social Revolutions	
HIS 166A	History of Mexico to 1848	
HIS 166B	History of Mexico since 1848	
AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America	
AAS 180	Race & Ethnicity in Latin America	
ANT 144	Contemporary Societies & Cultures of Latin America	
CHI 111	Chicanas/Mexicanas in Contemporary Society	
CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities	
CHI 125S	Latino Families in the Age of Globalization: Migration & Transculturation	
CHI 130	United States-Mexican Border Relations	
CHI 135S	Transnational Latina/o Political Economy	
CHI 147S	Indigenous Healing & Biodiversity in Latin America	
NAS 122	Native American Community Development	
NAS 133A	Ethnohistory of Native Peoples of Mexico & Central America to 1500	
NAS 184	Contemporary Indigenous Literature of Mexico (Study Abroad)	
NAS 185	Native American Literature in Performance	
POL 143B	Mexican Politics	
SPA 177	California & Latin America	
Choose one:		4
AHI 151	Arts of the Ancient New World	
NAS 181B	Native American Literature	
NAS 181C	Contemporary Native American Poetry	
If student's work is specifically focused upon a Meso-American language or topic, choose:		
NAS 188	Special Topics in Native American Literary Studies	

NAS 191	Topics in Native American Studies
<b>Total Units</b>	<b>20-21</b>

## Plan III—South American Emphasis

Code	Title	Units
<b>Native American Studies</b>		
Choose two:		8
NAS 107	Learning Native American Languages	
NAS 110A	Quechua Language & Society: Beginning Level 1	
NAS 110B	Quechua Language & Society: Beginning Level 2	
NAS 110C	Quechua Language & Society: Intermediate Level 1	
NAS 110D	Quechua Language & Society: Intermediate Level 2	
NAS 120	Ethnopolitics of South American Indians (Study Abroad)	
Choose two:		8
AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America	
AAS/DRA 155A	African-American Dance & Culture in the United States, Brazil & the Caribbean	
AAS 163	African Religions in the Americas	
AAS 180	Race & Ethnicity in Latin America	
ANT 103	Indigenous Peoples & Natural Resource Conservation	
ANT 144	Contemporary Societies & Cultures of Latin America	
ANT 175	Andean Prehistory: Archaeology of the Incas & Their Ancestors	
HIS 162	History of the Andean Region	
HIS 165	Latin American Social Revolutions	
POL 143A	Latin American Politics	
SOC/IRE 104	The Political Economy of International Migration	
SPA 170	Introduction to Latin American Culture	
SPA 170S	Introduction to Latin American Culture	
SPA 171/MUS 127	Music from Latin America	
SPA 171S/ MUS 127S	Music from Latin America (Summer Abroad.)	
Choose one:		4
HIS 163B	History of Brazil	
HIS 164	History of Chile	
HIS 167	Modern Latin American Cultural & Intellectual History	
POL 143A	Latin American Politics	
<b>Total Units</b>		<b>20</b>

## Native American Studies, Minor

College of Letters & Science

The Native American Studies minor provides an interdisciplinary introduction to the Native experience in the Americas through coursework

in history, literature, art, performance, languages, values, philosophy, religion, current events, political economic, and the environment. See Undergraduate Minor Requirements (<https://nas.ucdavis.edu/undergraduate-minor-requirements/>).

Code	Title	Units
Choose one lower division Native American Studies course.		4
Native American Studies (NAS) courses. (p. 1138)		
Choose five upper division Native American Studies courses.		20
Native American Studies (NAS) courses. (p. 1138)		
<b>Total Units</b>		<b>24</b>

## Native American Studies, Master of Arts

College of Letters & Science

### Graduate Study

The Department offers a program of study leading to M.A. and Ph.D. degrees in Native American Studies, as well as a designated emphasis in Native American Studies for graduate students in approved programs. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies.

For full information and requirements, see Master's Degree (<https://nas.ucdavis.edu/masters-degree/>).

### Graduate Advisors

Graduate Advisors (<https://nas.ucdavis.edu/graduate-advisor/>)

## Native American Studies, Doctor of Philosophy

College of Letters & Science

### Graduate Study

The Department offers a program of study leading to M.A. and Ph.D. degrees in Native American Studies, as well as a designated emphasis in Native American Studies for graduate students in approved programs. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies.

For full information and requirements, see Ph.D. Program (<https://nas.ucdavis.edu/phd-program/>).

### Graduate Advisors

Graduate Advisors (<https://nas.ucdavis.edu/graduate-advisor/>)

## Neurobiology, Physiology, & Behavior

College of Biological Sciences

W. Martin Usrey, Ph.D., Chairperson of the Department

### Department Office

196 Briggs Hall; 530-752-0203; Neurobiology, Physiology, & Behavior (<https://npb.ucdavis.edu/>); Faculty ([https://npb.ucdavis.edu/people/?first=&last=&title=&unit=&field\\_sf\\_person\\_type\\_target\\_id\[0\]=26](https://npb.ucdavis.edu/people/?first=&last=&title=&unit=&field_sf_person_type_target_id[0]=26))

- Exercise Biology, Minor (p. 346)
- Human Biology, Bachelor of Science (p. 346)
- Human Physiology, Minor (p. 349)
- Neurobiology, Physiology, & Behavior, Bachelor of Science (p. 349)
- Neuroscience, Minor (p. 352)

## Exercise Biology, Minor

College of Biological Sciences

Learn how physical activity levels impact human form and function. The courses are designed to foster intellectual curiosity, problem-solving and critical thinking skills, in the context of understanding organismal animal (including human) biology.

### Faculty Advisor

Aldrin V. Gomes, Ph.D.

### Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Only one course used to satisfy a requirement for the minor may be applied toward a student's major.

Code	Title	Units
Choose at least 15 units:		15
EXB 101	Exercise Physiology	
EXB 110	Exercise Metabolism	
EXB 112	Clinical Exercise Physiology	
EXB 117	Exercise & Aging in Health & Disease	
EXB 124	Physiology of Maximal Human Performance	
EXB 125	Neuromuscular & Behavioral Aspects of Motor Control	
NPB 109	Kinesiology: Analysis & Control of Human Movement	
Exercise Biology or other approved course; an additional 3 upper division units from either the previous list of Exercise Biology (EXB) courses <b>or</b> from:		3
EXB 106/CHA 101	Human Gross Anatomy	
NPB 101	Systemic Physiology	
BIS 101	Genes & Gene Expression	
BIS 104	Cell Biology	
BIS 105	Biomolecules & Metabolism	
<b>Total Units</b>		<b>18</b>

## Human Biology, Bachelor of Science

College of Biological Sciences

Frédéric Chédin ([flchedin@ucdavis.edu](mailto:flchedin@ucdavis.edu)), Ph.D., Professor, Chairperson of the Department of Molecular & Cellular Biology; term ends June 30, 2026  
W. Martin Usrey, Ph.D., Chairperson of the Department Neurobiology, Physiology, & Behavior

## Department Office

149 Briggs Hall; 530-752-3611; Molecular & Cellular Biology (<http://www.mcb.ucdavis.edu>)  
 196 Briggs Hall; 530-752-0203; Neurobiology, Physiology & Behavior (<https://npb.ucdavis.edu/>)

## Faculty

Faculty includes all members of the Departments of Neurobiology, Physiology, & Behavior, Molecular & Cellular Biology, Evolution & Ecology, Microbiology & Molecular Genetics, and Plant Biology in the College of Biological Sciences.

## The Human Biology Major Program

The Human Biology major provides students with a broad biological understanding of our species, from molecules, genes, and cells to tissues, organ systems and organism/environment interactions. The curriculum includes classes on the basic principles that help us understand normal human physiology, human health, and the molecular basis of disease.

### The Program

In the freshman and sophomore years, students majoring in Human Biology build a broad scientific background, taking courses in chemistry, biology, physics, and mathematics. As juniors or seniors, students can enroll in a variety of courses focused on biological processes and diseases that affect humans.

### Career Alternatives

The Human Biology major provides fundamental knowledge needed for a broad range of careers, including those in the areas of healthcare, biotechnology, public health, public policy, and education, and for advanced study in health-related disciplines, including medicine, dentistry, nursing, physical therapy, and pharmacy.

### Faculty Advisors

Mona Monfared, Ph.D; Alex Nord, Ph.D.

### Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		15
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry</i>		15
Choose CHE 002 or CHE 004 series: <sup>1</sup>		
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	

CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
Choose CHE 008 or CHE 118 series: <sup>2</sup>		6-12
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
<b>OR</b>		
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<b>Mathematics</b>		
Choose MAT 017 or MAT 021 series: <sup>3</sup>		
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B	Calculus and Calculus	
MAT 021C	Calculus (recommended.)	
<b>Physics</b>		
PHY 007A	General Physics	4
PHY 007B	General Physics	4
PHY 007C	General Physics	4
Preparatory Subject Matter Subtotal		56-66
<b>Depth Subject Matter</b>		
<i>Biological Science</i>		
BIS 101	Genes & Gene Expression	4
BIS 104	Cell Biology	3
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6
<i>Statistics</i>		
STA 100	Applied Statistics for Biological Sciences	4
Choose one:		3-4
EVE 100	Introduction to Evolution	
EVE 131	Human Genetic Variation & Evolution	
MCB 162	Human Genetics & Genomics	
<i>Microbiology</i>		
MIC 102	Introductory Microbiology	3
<i>Neurobiology, Physiology, &amp; Behavior</i>		
NPB 101	Systemic Physiology	5
Depth Subject Matter Subtotal		25-29
<b>Restricted Electives</b>		
Courses meeting this requirement must come from at least two of the following categories; any cross-listed courses taken will count for only one category; must include at least one approved lab course.		15-19
Genetics, Genomics, & Development (p. 348)		
Physiology & Neurobiology (p. 348)		

Origins of Disease & Human Health (p. 348)			
Restricted Electives Subtotal	15-19		
<b>Total Units</b>	<b>96-114</b>		
<sup>1</sup> With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units w/no lab)-CHE 002B- CHE 002C; CHE 004A, CHE 004B-CHE 002C		NPB 113	Cardiovascular, Respiratory, & Renal Physiology
<sup>2</sup> With BASC advisor approval, this combination also satisfies the Organic Chemistry requirement: CHE 118A-CHE 008B.		NPB 114	Gastrointestinal Physiology
<sup>3</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.		NPB 122	Developmental Endocrinology
		NPB 130	Physiology of the Endocrine Glands
		NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health
		NPB 133	Genes & the Brain
		NPB 134	General Immunology for Physiologists
		NPB 140	Principles of Environmental Physiology
		NPB 152/PSC 123	Hormones & Behavior

**Genetics, Genomics, & Development**

Code	Title	Units	
ANT 153	Human Genetics: Mutation & Migration	5	
BIS 181	Comparative Genomics	3	
BIS 183	Functional Genomics	3	
EVE 102	Population & Quantitative Genetics	4	
EVE 131	Human Genetic Variation & Evolution	3	
MCB 121	Advanced Molecular Biology	3	
MCB 144	Mechanisms of Cell Division	3	
MCB 150	Developmental Biology	4	
MCB 162	Human Genetics & Genomics	3	
MCB 163	Developmental Genetics	3	
MCB 164	Advanced Eukaryotic Genetics	3	
MCB 182	Principles of Genomics	3	
MIC 150	Genomes of Pathogenic Bacteria	3	
NPB 122	Developmental Endocrinology	3	
NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health	3	
NPB 133	Genes & the Brain	4	
NPB 161	Developmental Neurobiology	3	
Approved Laboratory Courses:			
MIC 103L	Introductory Microbiology Laboratory		
MCB 160L	Principles of Genetics Laboratory		
EVE 105	Phylogenetic Analysis of Vertebrate Structure		
NPB 161	Developmental Neurobiology		3
NPB 163	Systems Neuroscience		4
NPB 164	Mammalian Vision		4
NPB 165	Neurobiology of Speech Perception		3
NPB 167	Computational Neuroscience		5
NPB 168	Neurobiology of Addictive Drugs		4
NPB 171	Physiology of Neuroimmune Interactions		4
NPB 172	Map Formation in the Brain		3
NPB 173	Neurobiology of Brain Disorders		3
Approved Laboratory Courses:			
EVE 105	Phylogenetic Analysis of Vertebrate Structure		
NPB 100L	Neurobiology Laboratory		
NPB 101L	Systemic Physiology Laboratory		
<b>Origins of Disease &amp; Human Health</b>			
Code	Title	Units	
EVE 161	Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes		3
EXB 101	Exercise Physiology		4
EXB 106	Human Gross Anatomy		4
EXB 106L	Human Gross Anatomy Laboratory		3
EXB 110	Exercise Metabolism		3
EXB 124	Physiology of Maximal Human Performance		4

# **Physiology & Neurobiology**

Code	Title	Units		
EXB 101	Exercise Physiology	4	MIC 150	Genomics of Pathogenic Bacteria
EXB 106/CHA 101	Human Gross Anatomy	4	MIC 162	General Virology
EXB 106L/CHA 101L	Human Gross Anatomy Laboratory	3	MIC 172	Host-Parasite Interactions
EXB 110	Exercise Metabolism	3	MIC 175	Cancer Biology
EXB 124	Physiology of Maximal Human Performance	4	NPB 107	Cell Signaling in Health & Disease
NPB 100	Neurobiology	4	NPB 109	Kinesiology: Analysis & Control of Human Movement
NPB 107	Cell Signaling in Health & Disease	3	NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health
NPB 109	Kinesiology: Analysis & Control of Human Movement	4	NPB 134	General Immunology for Physiologists
			NPB/HPH 157	Advanced Physiology of Animal/Human Disease

NPB 168	Neurobiology of Addictive Drugs	4	<i>Functional Anatomy</i>
NPB 171	Physiology of Neuroimmune Interactions	4	EXB 106/CHA 101 Human Gross Anatomy
NPB 173	Neurobiology of Brain Disorders	3	<b>OR</b>
<b>Approved Laboratory Courses:</b>			<i>Genetics &amp; Development</i>
MCB 120L	Molecular Biology & Biochemistry Laboratory		ANT 153 Human Genetics: Mutation & Migration
MMG 103L or MIC 103L	(Pending Approval) Introductory Microbiology Laboratory		HDE 100C Adulthood & Aging
			HDE 101 Cognitive Development
			HDE/ENT 117 Longevity
			MCB 162 Human Genetics & Genomics
<i>Immunology</i>			MMI 188A Human Immunology
			or MMI 188B Human Immunology
<i>Nutrition</i>			NUT 111B Recommendations & Standards for Human Nutrition
<b>Total Units</b>			<b>23-30</b>

## Human Physiology, Minor

### College of Biological Sciences

This minor exposes students to general and specialized courses related to human biology including courses such as exercise and aging in health and disease and exercise metabolism. Students who obtain a human physiology minor will be able to demonstrate knowledge of the physiological processes that allow animals to function in their environment. This minor provides a foundation for further training in health-related professions.

### Faculty Advisors

William DeBello, Ph.D., Lee Miller, Ph.D.

### Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Only one course used to satisfy a requirement for the minor may be applied toward a student's major.

Code	Title	Units
<b>Human Physiology</b>		
EXB 101	Exercise Physiology	4
NPB 101	Systemic Physiology	5
Choose one:		3-4
EXB 102	Introduction to Motor Learning & the Psychology of Sport & Exercise	
EXB 110	Exercise Metabolism	
EXB 117	Exercise & Aging in Health & Disease	
EXB 125	Neuromuscular & Behavioral Aspects of Motor Control	
NPB 109	Kinesiology: Analysis & Control of Human Movement	
Choose one:		3-4
NPB 113	Cardiovascular, Respiratory, & Renal Physiology	
NPB 114	Gastrointestinal Physiology	
NPB 130	Physiology of the Endocrine Glands	
NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health	
NPB/HPH 157	Advanced Physiology of Animal/Human Disease	
NPB 168	Neurobiology of Addictive Drugs	

Choose one from two of the following areas:

5-9

## Neurobiology, Physiology, & Behavior, Bachelor of Science

### College of Biological Sciences

## The Neurobiology, Physiology, & Behavior Major Program

Neurobiology, Physiology, & Behavior (NPB) is a major that emphasizes the understanding of vital functions common to all animals. All animals perform certain basic functions—they grow, reproduce, move, respond to stimuli, and maintain homeostasis. The physiological mechanisms upon which these functions depend are precisely regulated and highly integrated. Actions of the nervous and endocrine systems determine behavior and the interaction between organisms and their physical and social environments. Students in this major study functional mechanisms; the control, regulation, and integration of these mechanisms; and the behavior that relates to those mechanisms. They do so at the level of the cell, the organ system, and the organism.

### The Program

In the freshman and sophomore years, students majoring in Neurobiology, Physiology, & Behavior build a broad scientific background, taking courses in chemistry, biology, physics, and mathematics. As juniors or seniors, students can enroll in a variety of Neurobiology, Physiology, & Behavior courses and related upper division courses. The NPB major contains three tracks: the Neurobiology track, the Physiology track, and the Organism-Environmental Interactions track. If you wish to propose an alternative to these tracks for yourself, please meet with your Biology Academic Success Center (BASC) advisor who can approve such individualized plans. Students can also participate in a number of advanced laboratory courses or may design an individual, independent project guided by a member of the faculty.

Career Alternatives. Completion of the Neurobiology, Physiology, & Behavior major provides the foundation for advanced study leading to careers in high school teaching, college level teaching or research. It also serves as the basis for further training in the health professions, including but not limited to human and veterinary medicine, medical technology, physical therapy, pharmacy, nursing, dentistry, and optometry. The major

is also appropriate for those intending to seek careers in biotechnology or other biologically related industries.

## Graduate Study

Information on graduate study in neuroscience, physiology or behavior may be obtained by writing the Graduate Advisor, College of Biological Sciences, Graduate Academic Programs. See also the graduate course offerings listed under Animal Behavior (Graduate Group), Molecular, Cellular, & Integrative Physiology (Graduate Group), and Neuroscience. See also Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Faculty Advisors

William DeBello, Ph.D., Lee Miller, Ph.D.

## Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		15
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth  and Introduction to Biology: Principles of Ecology & Evolution  and Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry</i>		15
Choose the 002 series or 004 series: <sup>1</sup>		
CHE 002A & CHE 002B & CHE 002C	General Chemistry  and General Chemistry  and General Chemistry	
OR		
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering  and General Chemistry for the Physical Sciences & Engineering  and General Chemistry for the Physical Sciences & Engineering	
Choose the 008 series or 118 series or 128 series & 129 A-B: <sup>2</sup>		6-13
CHE 008A & CHE 008B	Organic Chemistry: Brief Course  and Organic Chemistry: Brief Course	
OR		
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences  and Organic Chemistry for Health & Life Sciences  and Organic Chemistry for Health & Life Sciences	
OR		
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry  and Organic Chemistry  and Organic Chemistry	
CHE 129A & CHE 129B	Organic Chemistry Laboratory  and Organic Chemistry Laboratory	
<i>Mathematics</i>		
Choose the 017 series or 021 series: <sup>3</sup>		8-12

MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B	Calculus and Calculus	
MAT 021C	Calculus (Recommended)	
<b>Physics</b>		
Choose the 007 series or 009 series:		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
<b>OR</b>		
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
Students may be able to complete their Physics requirement by blending the PHY 007 & PHY 009 series. For more details about how to do so and course placement, students will need to follow up with the PHY department. Students will also need to follow up with a BASC advisor to discuss their plans. <sup>4</sup>		
<b>Preparatory Subject Matter Subtotal</b>		
<b>Depth Subject Matter</b>		
<i>Biological Science</i>		
BIS 101	Genes & Gene Expression	4
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism  Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6
<i>Neurobiology, Physiology, &amp; Behavior</i>		
NPB 110A	Foundations 1: From Molecules to Individuals	5
NPB 110B	Foundations 2: Neurobiology	5
NPB 110C	Foundations 3: Physiology	5
<i>Statistics</i>		
STA 100	Applied Statistics for Biological Sciences	4
<b>Laboratory Requirements</b>		
Choose 3 units of laboratory work from the track-specific list:		3
<i>Neurobiology Track</i>		
NPB 100L	Neurobiology Laboratory	
<i>Physiology Track</i>		
NPB 101L	Systemic Physiology Laboratory	
<i>Organism-Environmental Interactions Track</i>		
NPB 101L	Systemic Physiology Laboratory	
<i>Integrative Principles Track</i>		
NPB 100L or NPB 101L	Neurobiology Laboratory Systemic Physiology Laboratory	
<b>Depth Electives</b>		
All students must do a minimum of four depth electives: three Track-Specific Depth Electives, and one Additional Depth Elective. At least two of these electives must be upper division NPB or EXB courses. <sup>5</sup>		
<b>Track-Specific Depth Electives</b>		
Choose three Track-Specific Depth Electives from one of the following:		9-13
Neurobiology Track (p. 351)		

<b>Physiology Track (p. 352)</b>		<b>NPB 152/PSC 123 Hormones &amp; Behavior</b>
Organism-Environmental Interactions Track (p. 352)		NPB/HPH 157 Advanced Physiology of Animal/Human Disease
<b>Integrative Principles Track (p. 352)</b>		NPB 159 Frontiers in Behavior
<b>Additional Depth Elective</b>		NPB 161 Developmental Neurobiology
Choose one Additional Depth Elective in addition to completing three Track-Specific Depth Electives. The course cannot have been used in satisfaction of any other major requirement.		NPB 162 Neural Mechanisms of Behavior
3-5		NPB 163 Systems Neuroscience
ANT 151 Primate Evolution		NPB 164 Mammalian Vision
ENT 104 Behavioral Ecology of Insects		NPB 165 Neurobiology of Speech Perception
ENT 153 Medical Entomology		NPB 168 Neurobiology of Addictive Drugs
EVE 100 Introduction to Evolution		NPB 169 Frontiers in Neurobiology
EXB 101 Exercise Physiology		NPB 171 Physiology of Neuroimmune Interactions
EXB 102 Introduction to Motor Learning & the Psychology of Sport & Exercise		NPB 172 Map Formation in the Brain
EXB 106/CHA 101 Human Gross Anatomy		NPB 173 Neurobiology of Brain Disorders
EXB 106L/CHA 101L Human Gross Anatomy Laboratory		<b>Depth Subject Matter Subtotal</b>
		41-50
<b>Total Units</b>		<b>97-120</b>
<sup>1</sup> With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units w/no lab)-CHE 002B-CHE 002C; CHE 004A, CHE 004B-CHE 002C.		
<sup>2</sup> With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 118A-CHE 008B; CHE 128A-CHE 128B-CHE 008B; CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C; CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128C-CHE 129B.		
<sup>3</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.		
<sup>4</sup> With BASC advisor approval, these combinations also satisfy the Physics requirement: PHY 007A-PHY 009A-PHY 049*-PHY 007C; PHY 009A-PHY 009B-PHY 049*-PHY 007C. *PHY 049 will require approval from the Physics Department to enroll.		
<sup>5</sup> 4 units of NPB 199 or NPB 194HB may be substituted for a single Track-Specific Depth Elective. Substitution must be pre-approved by Neurobiology, Physiology, & Behavior faculty advisor. Only one of the following courses can be used as a major depth elective: 4 units of NPB 199; NPB 194HB; NPB 106.		
<b>Neurobiology Track Depth Electives</b>		
Code	Title	Units
NPB 101L	Systemic Physiology Laboratory	3
NPB 106	Experiments in Neurobiology, Physiology, & Behavior: Design & Execution	3
NPB 107	Cell Signaling in Health & Disease	3
NPB/PSC 124	Comparative Neuroanatomy	3
NPB 136	Neural Networks & Machine Learning in Biology	4
NPB 162	Neural Mechanisms of Behavior	3
NPB 163	Systems Neuroscience	4
NPB 164	Mammalian Vision	4
NPB 165	Neurobiology of Speech Perception	3
NPB 168	Neurobiology of Addictive Drugs	4
NPB 169	Frontiers in Neurobiology	3
NPB 123/APC 100	Comparative Vertebrate Organology	
NPB 128	Comparative Physiology: Endocrinology	
NPB 130	Physiology of the Endocrine Glands	
NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health	
NPB 133	Genes & the Brain	
NPB 134	General Immunology for Physiologists	
NPB 139	Frontiers in Physiology	
NPB 140	Principles of Environmental Physiology	
NPB 141	(Discontinued)	
NPB 141P	(Discontinued)	
NPB 150/PSC 122	Advanced Animal Behavior	

NPB 171	Physiology of Neuroimmune Interactions	4
NPB 172	Map Formation in the Brain	3
NPB 173	Neurobiology of Brain Disorders	3
PSC 130	Human Learning & Memory	4
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind	4
PSC 137	Neurobiology of Learning & Memory	4

## Physiology Track Depth Electives

Code	Title	Units
ANS 123	Animal Growth & Development	4
EXB 106	Human Gross Anatomy	4
EXB 106L	Human Gross Anatomy Laboratory	3
EXB 101	Exercise Physiology	4
EXB 110	Exercise Metabolism	3
EXB 112	Clinical Exercise Physiology	4
EXB 117	Exercise & Aging in Health & Disease	3
EXB 124	Physiology of Maximal Human Performance	4
EXB 125	Neuromuscular & Behavioral Aspects of Motor Control	3
MMI 188A or MMI 188B	Human Immunology	3-4
PMI 126	Fundamentals of Immunology	3
MCB 150	Developmental Biology	4
NPB 106	Experiments in Neurobiology, Physiology, & Behavior: Design & Execution	3
NPB 107	Cell Signaling in Health & Disease	3
NPB 109	Kinesiology: Analysis & Control of Human Movement	4
NPB 113	Cardiovascular, Respiratory, & Renal Physiology	4
NPB 114	Gastrointestinal Physiology	3
NPB 116	Stress Physiology in Health & Disease	3
NPB 118	Comparative Biomechanics	3
NPB 121	Physiology of Reproduction	4
NPB 123	Comparative Vertebrate Organology	4
NPB 128	Comparative Physiology: Endocrinology	3
NPB 130	Physiology of the Endocrine Glands	4
NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health	3
NPB 134	General Immunology for Physiologists	3
NPB 139	Frontiers in Physiology	3
NPB 140	Principles of Environmental Physiology	3
NPB 141	(Discontinued)	3
NPB 141P	(Discontinued)	5
NPB 152/PSC 123	Hormones & Behavior	3
NPB/HPH 157	Advanced Physiology of Animal/Human Disease	3
NPB 168	Neurobiology of Addictive Drugs	4

## Organism-Environmental Interactions Track Depth Electives

Code	Title	Units
ANS 104	Principles & Applications of Domestic Animal Behavior	4
ANS 123	Animal Growth & Development	4
EVE 105	Phylogenetic Analysis of Vertebrate Structure	4
EVE 107	Animal Communication	4
EVE 147	Biogeography	4
NPB 100L	Neurobiology Laboratory	3
NPB 102	Animal Behavior	3
NPB 106	Experiments in Neurobiology, Physiology, & Behavior: Design & Execution	3
NPB 113	Cardiovascular, Respiratory, & Renal Physiology	4
NPB 117	Avian Physiology	3
NPB 118	Comparative Biomechanics	3
NPB 123	Comparative Vertebrate Organology	4
NPB 128	Comparative Physiology: Endocrinology	3
NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health	3
NPB 140	Principles of Environmental Physiology	3
NPB 141	(Discontinued)	3
NPB 141P	(Discontinued)	5
NPB 150/PSC 122	Advanced Animal Behavior	4
NPB 152/PSC 123	Hormones & Behavior	3
NPB 159	Frontiers in Behavior	3
NPB 162	Neural Mechanisms of Behavior	3
PMI 126	Fundamentals of Immunology	3
WFC 130	Physiological Ecology of Wildlife	4
WFC 141	Behavioral Ecology	4

## Integrative Principles Track Depth Electives

Needs to be approved by a BASC advisor. Any three courses from any of the three NPB tracks.

## Neuroscience, Minor

### College of Biological Sciences

This minor allows non-NPB majors to learn about the importance of the nervous system. The large breadth of neuroscience courses available includes molecular and cellular neurobiology, developmental neurobiology, neurobiology of addictive drugs and cell signaling in health and disease. Students who obtain a neuroscience minor will be able to demonstrate knowledge of the neurobiological processes in animals and humans.

### Faculty Advisors

William DeBello, Ph.D., Lee Miller, Ph.D.

## Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410.

Only one course used to satisfy a requirement for the minor may be applied toward a student's major.

Code	Title	Units
NPB 100	Neurobiology	4
Choose a minimum of 14 units:		14
NPB 100L	Neurobiology Laboratory	
NPB 107	Cell Signaling in Health & Disease	
NPB/PSC 124	Comparative Neuroanatomy	
NPB 136	Neural Networks & Machine Learning in Biology	
NPB 162	Neural Mechanisms of Behavior	
NPB 163	Systems Neuroscience	
NPB 164	Mammalian Vision	
NPB 165	Neurobiology of Speech Perception	
NPB 168	Neurobiology of Addictive Drugs	
NPB 171	Physiology of Neuroimmune Interactions	
NPB 172	Map Formation in the Brain	
NPB 173	Neurobiology of Brain Disorders	
One of the following may be completed to reach the unit requirement:		
PSC 113	Developmental Psychobiology	
PSC 121	Physiological Psychology	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind	
PSC 137	Neurobiology of Learning & Memory	
PHI 103	Philosophy on Mind	
HDE 163	Cognitive Neuropsychology in Adulthood & Aging	
Total Units		18

## Neuroscience (Graduate Group)

### Graduate Studies

Elva Diaz, Ph.D., Chairperson of the Group

### Group Office

146 Center for Neuroscience; 530-757-8520; Neuroscience Graduate Group (<https://grad.neuroscience.ucdavis.edu/>); Faculty (<https://grad.neuroscience.ucdavis.edu/faculty/>)

- Neuroscience, Doctor of Philosophy (p. 353)

## Neuroscience, Doctor of Philosophy

### Graduate Studies

### Graduate Study

The Graduate Group in Neuroscience offers programs of study leading to the Ph.D. degree. Neuroscience is a broad, interdepartmental program with faculty interests ranging from molecular biophysics of channels

to cortical organization and cognition. A major goal of the program is to prepare students for careers as research scientists. Details of the program may be obtained from the Group office.

The Master of Science degree is offered only en route to the Ph.D.

### Graduate Advisors

A. Nord (Med: Psychiatry & Behavioral Sciences), L. Borodinsky (Med: Physiology & Membrane Biology), R. Chaudhuri (Neurobiology, Physiology & Behavior), D. Fioravante (Neurobiology, Physiology & Behavior), T. Hanks (Med: Neurology), S. Noctor (Med: Psychiatry & Behavioral Sciences)

## Nursing Science & Health-Care Leadership

Stephen J. Cavanagh, Ph.D., M.P.A., R.N., F.A.C.H.E., F.A.A.N., Dean  
Piri Ackerman-Barger, Ph.D., R.N., C.N.E., F.A.A.N., Associate Dean for Health Equity, Diversity & Inclusion  
Deb Bakerjian, Ph.D., A.P.R.N., F.A.A.N., F.A.A.N.P., F.G.S.A., Interim Associate Dean for Practice  
Janice F. Bell, Ph.D., M.P.H., M.N., Associate Dean for Research, Doctor of Philosophy Program Director  
Amy Nichols, Ed.D., R.N., C.N.S., C.H.S.E., A.N.E.F., Associate Dean for Academics

## School of Nursing Dean's Office

Betty Irene Moore Hall, 2570 48th St., Sacramento, CA 95817; 916-734-2145; School of Nursing (<http://nursing.ucdavis.edu>); Faculty ([https://health.ucdavis.edu/nursing/ourteam/faculty/faculty\\_](https://health.ucdavis.edu/nursing/ourteam/faculty/faculty_)).

For program inquiries, contact [hs-BettyIreneMooreSON@ucdavis.edu](mailto:hs-BettyIreneMooreSON@ucdavis.edu).

- Doctor of Nursing Practice—Family Nurse Practitioner Degree Program (p. 353)
- Family Nurse Practitioner Program, Master of Science (p. 354)
- Master's Entry Program in Nursing (p. 354)
- Nursing Science & Health-Care Leadership, Doctor of Philosophy (p. 354)
- Physician Assistant Studies, Master of Health Services (p. 355)

## Doctor of Nursing Practice—Family Nurse Practitioner Degree Program

Kathryn Sexson, Ph.D., A.P.R.N., F.N.P.-B.C., Director for the D.N.P.-F.N.P. Program

### Mission Statement

Integrating the science and humanity of nursing and other health disciplines, the Betty Irene Moore School of Nursing leads innovative research, education and practice and prepares leaders who advance health, transform health care and ignite bold system change locally, nationally and globally.

## Nursing Science and Health-Care Leadership Graduate Degree Program

Hosted by the Betty Irene Moore School of Nursing at UC Davis, the Nursing Science and Health-Care Leadership Graduate Degree Programs prepare nurse leaders, physician assistants, nurse practitioners,

researchers and faculty in a unique interdisciplinary and interprofessional environment.

## Faculty

The UC Davis Nursing Science and Health-Care Leadership Graduate Group includes a wide cross-section of academic disciplines with faculty from the Betty Irene Moore School of Nursing as well as UC Davis Health System and other UC Davis schools, colleges, and departments. Within the graduate group faculty are experts in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields.

### **The Doctor of Nursing Practice—Family Nurse Practitioner Degree**

**Program** is a post-baccalaureate program at the Betty Irene Moore School of Nursing that prepares new family nurse practitioners. A three-year hybrid program that combines distanced-based education with four on-campus immersions, the D.N.P.-F.N.P. program prepares advanced practice providers to engage in patient- and family-centered, evidence-based primary care. Through reflective practice and interprofessional collaboration, students are prepared to be leaders who effect bold system change and promote health care innovation by informing and advancing health policy and health equity locally, nationally and globally.

## **Family Nurse Practitioner Program, Master of Science**

### Graduate Studies

Kathryn Sexson, Ph.D., A.P.R.N., F.N.P.-B.C., Director for the Family Nurse Practitioner Program

## **Mission Statement**

Integrating the science and humanity of nursing and other health disciplines, the Betty Irene Moore School of Nursing leads innovative research, education and practice and prepares leaders who advance health, transform health care and ignite bold system change locally, nationally and globally.

## **Nursing Science and Health-Care Leadership Graduate Degree Program**

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## Faculty

The UC Davis Nursing Science and Health-Care Leadership Graduate Group includes a wide cross-section of academic disciplines with faculty from the Betty Irene Moore School of Nursing as well as UC Davis Health System and other UC Davis schools, colleges, and departments. Within the graduate group faculty are experts in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields.

### **The Master of Science—Family Nurse Practitioner Degree Program**

prepares graduates to deliver care as family nurse practitioners (FNP). In alignment with the school's vision to advance health, the mission of the family nurse practitioner program is to educate health care professionals to lead clinical programs in collaborative teams and to improve the

availability of culturally relevant primary health care to underserved populations throughout California.

## **Master's Entry Program in Nursing**

### Graduate Studies

Shana L. Ruggenberg, Ed.D., R.N.C.-O.B., C.N.S., C.N.E.; Director for the Master's Entry Program in Nursing  
Charleen Singh, Ph.D., F.N.P.-B.C., CWOCN, R.N.; Assistant Director for the Master's Entry Program in Nursing

## **Mission Statement**

Integrating the science and humanity of nursing and other health disciplines, the Betty Irene Moore School of Nursing leads innovative research, education and practice and prepares leaders who advance health, transform health care and ignite bold system change locally, nationally and globally.

## **Nursing Science and Health-Care Leadership Graduate Degree Program**

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## Faculty

The UC Davis Nursing Science and Health-Care Leadership Graduate Group includes a wide cross-section of academic disciplines with faculty from the Betty Irene Moore School of Nursing as well as UC Davis Health System and other UC Davis schools, colleges, and departments. Within the graduate group faculty are experts in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields.

**The Master's Entry Program in Nursing** prepares new nurses as leaders in quality and safety, advocates for diverse patient populations and agents of change for healthier communities. Graduates of the program are qualified to take the national licensing examination (NCLEX) for registered nurses, eligible for certification as a Public Health Nurse and earn a Master of Science in Nursing Degree.

## **Nursing Science & Health-Care Leadership, Doctor of Philosophy**

### Graduate Studies

Janice F. Bell, Ph.D., M.P.H., M.N., F.A.A.N., Doctor of Philosophy Degree Program Director

## **Mission Statement**

Integrating the science and humanity of nursing and other health disciplines, the Betty Irene Moore School of Nursing leads innovative research, education and practice and prepares leaders who advance health, transform health care and ignite bold system change locally, nationally and globally.

## Nursing Science & Health-Care Leadership Graduate Degree Program

Hosted by the Betty Irene Moore School of Nursing at UC Davis, the Nursing Science and Health-Care Leadership Graduate Degree Programs prepare nurse leaders, physician assistants, nurse practitioners, researchers and faculty in a unique interdisciplinary and interprofessional environment.

### Faculty

The UC Davis Nursing Science and Health-Care Leadership Graduate Group includes a wide cross-section of academic disciplines with faculty from the Betty Irene Moore School of Nursing as well as UC Davis Health System and other UC Davis schools, colleges, and departments. Within the graduate group faculty are experts in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields.

**The Doctor of Philosophy Degree Program** prepares graduates as leaders in health care, health policy and education and research at the university level to conduct transformative research, educate health professionals and researchers, effect system change, influence and implement policy, and advance health from multiple settings.

## Physician Assistant Studies, Master of Health Services

### Graduate Studies

Teresa Thetford, D.H.Sc, M.S., P.A.-C., N.P., Director for the Physician Assistant Program

### Mission Statement

Integrating the science and humanity of nursing and other health disciplines, the Betty Irene Moore School of Nursing leads innovative research, education and practice and prepares leaders who advance health, transform health care and ignite bold system change locally, nationally and globally.

## Nursing Science and Health-Care Leadership Graduate Degree Programs

Hosted by the Betty Irene Moore School of Nursing at UC Davis, the Nursing Science and Health-Care Leadership Graduate Degree Programs prepare nurse leaders, physician assistants, nurse practitioners, researchers and faculty in a unique interdisciplinary and interprofessional environment.

### Faculty

The UC Davis Nursing Science and Health-Care Leadership Graduate Group includes a wide cross-section of academic disciplines with faculty from the Betty Irene Moore School of Nursing as well as UC Davis Health System and other UC Davis schools, colleges, and departments. Within the graduate group faculty are experts in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields.

**The Master of Health Services—Physician Assistant Studies Degree Program** prepares graduates to deliver care as physician assistants. In alignment with the school's vision to advance health, the mission of the physician assistant program is to educate health care professionals to deliver care as leaders and members of interprofessional health care

teams as well as to improve the availability of culturally relevant primary health care to underserved populations throughout California.

## Nutrition

### College of Agricultural & Environmental Sciences

Francene M. Steinberg, Ph.D., RD., Chair of the Department  
Fawaz G. Haj, Ph.D., Vice Chairperson of the Department

## Department Office

3135 Meyer Hall; 530-752-4630; Nutrition (<https://nutrition.ucdavis.edu/>); Faculty (<http://nutrition.ucdavis.edu/people/faculty/>)

## Undergraduates

3202 Meyer Hall; 530-752-4657; 530-752-2512; 530-752-7094; [nutritionadvising@ucdavis.edu](mailto:nutritionadvising@ucdavis.edu); Academic Advising (<https://nutrition.ucdavis.edu/academics/undergrad/advising/>)

## Graduates

### Graduate Group in Nutritional Biology

1249 Meyer Hall; 530-754-7684; [ggnb@ucdavis.edu](mailto:ggnb@ucdavis.edu); Program Information (<https://ggnb.ucdavis.edu/>)

### Designated Emphasis in Global Nutrition

3253 Meyer Hall; 530-752-1992; [globalnutrition@ucdavis.edu](mailto:globalnutrition@ucdavis.edu); Institute for Global Nutrition ([https://globalnutrition.ucdavis.edu/academics/designated\\_emphasis/](https://globalnutrition.ucdavis.edu/academics/designated_emphasis/))

### Master of Advanced Study in Maternal & Child Nutrition

3135 Meyer Hall; 530-752-4630; Program Information (<https://cpe.ucdavis.edu/maternal-and-child-nutrition/>)

- Clinical Nutrition, Bachelor of Science (p. 355)
- Community Nutrition, Minor (p. 356)
- Food Service Management, Minor (p. 357)
- Maternal & Child Nutrition, Master of Advanced Study (p. 357)
- Nutrition & Food, Minor (p. 357)
- Nutrition Science, Bachelor of Science (p. 358)
- Nutrition Science, Minor (p. 361)

## Clinical Nutrition, Bachelor of Science

### College of Agricultural & Environmental Sciences

## The Major Program

The Clinical Nutrition major provides students with training in normal and therapeutic nutrition, biological and social sciences, food science, communication, business management and food service management. This major fulfills the academic requirements for admission into a dietetics internship or the equivalent, which must be completed before qualifying for registration as a dietitian. Effective January 1, 2024, the Commission on Dietetic Registration (CDR) requires a minimum of a master's degree to be eligible to take the credentialing exam to become a registered dietitian.

## The Program

The Clinical Nutrition major includes the same basic core of nutrition classes as the Nutrition Science major, but includes additional courses such as food service management, education, sociology, and communication skills to prepare for work with the public. Clinical Nutrition students spend the first two years completing preparatory course work in the basic biological sciences, along with several of the social sciences. In the final two years, students take courses in normal and clinical nutrition, food science, biochemistry, and management techniques.

Entering freshman or transfer students are assumed to have basic computer skills and to demonstrate mathematics competency adequate to pass the Mathematics Placement Examination ([http://www.math.ucdavis.edu/undergrad/math\\_placement/](http://www.math.ucdavis.edu/undergrad/math_placement/)) with a minimum score of 25.

## Major Advisor

Francene Steinberg (Nutrition)

**Advising Center** for the major is located in 3202 Meyer Hall; 530-752-2512; 530-752-7094.

## Career Alternatives

The Clinical Nutrition major qualifies students to apply for a dietetic internship accredited by the Accreditation Council for Education in Nutrition and Dietetics enabling them to become a Registered Dietitian, the professional credential necessary to work in a clinical setting. Once dietitians are registered, they generally seek employment in administrative, therapeutic, teaching, research, or public health/public service positions in clinics, hospitals, schools, or other similar institutions. There is a growing role for dietitians working in settings outside of the traditional hospital (for example, in state and federal nutrition programs, nutrition education, Peace Corps and Cooperative Extension work). Students who complete the undergraduate preparation in clinical nutrition are also qualified to enter graduate programs in dietetics, nutrition science, public health nutrition, and food service management.

Code	Title	Units
<b>Written/Oral Expression</b>		
ENL 003 or UWP 001 or UWP 001V or UWP 001Y	Introduction to Literature Introduction to Academic Literacies Introduction to Academic Literacies: Online Introduction to Academic Literacies	4 4 4 4
CMN 001	Introduction to Public Speaking	4
<b>Written/Oral Expression Subtotal</b>		<b>8</b>
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
<i>Chemistry</i>		
CHE 002A CHE 002B CHE 002C CHE 008A CHE 008B	General Chemistry General Chemistry General Chemistry Organic Chemistry: Brief Course Organic Chemistry: Brief Course	5 5 5 2 4
<i>Economics</i>		
ECN 001A or ECN 001AV or ECN 001AY or ECN 001B or ECN 001BV	Principles of Microeconomics Principles of Microeconomics Principles of Microeconomics Principles of Macroeconomics Principles of Macroeconomics	4 4 4 4 4
<i>Psychology</i>		
PSC 001 or PSC 001Y	General Psychology General Psychology	4 4
<i>Choose one:</i>		
SOC 001 SOC 003 ANT 002	Introduction to Sociology Social Problems Cultural Anthropology	4-5 4 4
<i>Statistics</i>		
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	4 4
<b>Preparatory Subject Matter Subtotal</b>		<b>47-48</b>
<b>Depth Subject Matter</b>		
ARE 112	Fundamentals of Organization Management	4
ABI 102 ABI 103	Animal Biochemistry & Metabolism Animal Biochemistry & Metabolism	5 5
BIS 101	Genes & Gene Expression	4
FST 100A FST 100B	Food Chemistry Food Properties	4 4
FSM 120 FSM 120L	Principles of Quantity Food Production Quantity Food Production Laboratory	4 2
FSM 122	Food Service Systems Management	3
MIC 102 MIC 103L	Introductory Microbiology Introductory Microbiology Laboratory	3 2
NUT/FST 106 NUT 111AY	Food Chemistry for Clinical Nutrition Introduction to Nutrition & Metabolism	5 3
NUT 111B NUT 112	Recommendations & Standards for Human Nutrition Nutritional Assessment	2 4
NUT 116A NUT 116AL NUT 116B NUT 116BL	Clinical Nutrition Clinical Nutrition Practicum Clinical Nutrition Clinical Nutrition Practicum	3 3 3 3
NUT 118 NUT 190	Community Nutrition Proseminar in Nutrition	4 1
NPB 101 NPB 101L	Systemic Physiology Systemic Physiology Laboratory	5 3
Additional upper division Nutrition electives.		4
<b>Depth Subject Matter Subtotal</b>		<b>83</b>
<b>Total Units</b>		<b>138-139</b>

## Community Nutrition, Minor

College of Agricultural & Environmental Sciences

The Department of Nutrition offers three minor programs open to students majoring in other disciplines who wish to complement their study programs with a concentration in the area of food and nutrition.

## Minor Advisor

3202 Meyer Hall; 530-752-2512; 530-752-7094

Note: If the student's major program requires the same course in biochemistry and physiology, only one of the courses may duplicate credit toward the minor. The program lists replacement courses below which can be used to fulfill the minimum unit requirement.

Code	Title	Units
<b>Preparation</b>		
Plan in advance to include the required course prerequisites.		
NUT 111AY	Introduction to Nutrition & Metabolism	3
NUT 111B	Recommendations & Standards for Human Nutrition	2
NUT 118	Community Nutrition	4
NUT 192	Internship	2
NUT 120AN or NUT 120BN	Nutritional Anthropology Nutritional Geography	4
NPB 101	Systemic Physiology	5
<b>Replacement Courses</b>		
See note, above.		
NUT 114	Developmental Nutrition	
NUT 116A	Clinical Nutrition	
NUT 116B	Clinical Nutrition	
NUT 116AL	Clinical Nutrition Practicum	
NUT 116BL	Clinical Nutrition Practicum	
<b>Total Units</b>		<b>20</b>

## Food Service Management, Minor

College of Agricultural & Environmental Sciences

Food Service Management minor is discontinued as of spring 2023.

## Maternal & Child Nutrition, Master of Advanced Study

College of Agricultural & Environmental Sciences

Master of Advanced Study in Maternal & Child Nutrition (<https://cpe.ucdavis.edu/maternal-and-child-nutrition/>); Faculty (<https://cpe.ucdavis.edu/maternal-and-child-nutrition/general-information/faculty/>)

## Graduate Study

The Nutrition Department offers the degree of M.A.S. in Maternal & Child Nutrition. This program consists of four required 4- to 6-unit core courses (Nutrition During Pregnancy, Lactation & Infant Nutrition, and Child & Adolescent Nutrition), 6-8 units of special topics seminars, 2 units of electives, and a 6-unit student project (produced in consultation with a three-member guidance committee) for a total of 36 units. Most of the core courses will comprise 10 weeks of in-class instruction twice per week for two-and-a-half hours per meeting. Classes will also include online discussions of related material and readings. The program

includes an option for students to complete the didactic training and supervised clinical hours required to take the exam to be an International Board-Certified Lactation Consultant.

Each student will be assigned a three-member guidance committee consisting of two members of the teaching faculty and an additional qualified faculty member to advise the student in identifying a student capstone project.

## Preparation

Admission to the program requires a bachelor's degree with prior course work that includes (or is comparable to): one year of general chemistry, two quarters of organic chemistry, a course in statistics, one course in general physiology, and two quarters of the biochemistry of nutrition.

## Courses in Maternal & Child Nutrition

See courses under Maternal & Child Nutrition (MCN) (p. 1069).

## Graduate Advisors

Reina Engle-Stone, Ph.D., Asst. Professor (Nutrition), M. Jane Heinig, Ph.D., Academic Administrator (Nutrition)

## Nutrition & Food, Minor

College of Agricultural & Environmental Sciences

The Department of Nutrition offers three minor programs open to students majoring in other disciplines who wish to complement their study programs with a concentration in the area of food and nutrition.

## Graduate Study

Programs of study leading to M.S. and Ph.D. degrees are available in Nutritional Biology Graduate Group. For information on graduate study, contact the Nutritional Biology Graduate Group.

## Minor Advisor

3202 Meyer Hall; 530-752-2512; 530-752-7094

Code	Title	Units
Note: If the student's major program requires the same course in biochemistry and physiology, only one of the courses may duplicate credit toward the minor. The program lists replacement courses below which can be used to fulfill the minimum unit requirement.		
<b>Preparation</b>		
Plan in advance to include the required course prerequisites.		
<b>Nutrition</b>		
NUT 111AY	Introduction to Nutrition & Metabolism	3
NUT 111B	Recommendations & Standards for Human Nutrition	2
NUT 120AN or NUT 120BN	Nutritional Anthropology Nutritional Geography	4
<b>Food Science &amp; Technology</b>		
FST 100A	Food Chemistry	4
FST 100B	Food Properties	4
<b>Neurobiology, Physiology, &amp; Behavior</b>		
NPB 101	Systemic Physiology	5
<b>Replacement Courses</b>		

See note above	
NUT 114	Developmental Nutrition
NUT 116A	Clinical Nutrition
NUT 116B	Clinical Nutrition
NUT 116AL	Clinical Nutrition Practicum
NUT 116BL	Clinical Nutrition Practicum
<b>Total Units</b>	<b>22</b>

**Advising Center** for the major is located in 3202 Meyer Hall; 530-752-2512; 530-752-7094.

## Graduate Study

The Department of Nutrition offers programs of study and research leading to M.S. and Ph.D. degrees in Nutrition. For information on graduate study contact the graduate advisor. See Graduate Studies (<http://gradstudies.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
CHE 002C	General Chemistry	5
Choose a series:		6-8
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
<b>OR</b>		
CHE 118A & CHE 118B	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<b>OR</b>		
CHE 128A & CHE 128B & CHE 129A	Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory	
<i>Nutrition</i>		
NUT 010 or NUT 010V or NUT 010Y	Discoveries & Concepts in Nutrition Discoveries & Concepts in Nutrition Discoveries & Concepts in Nutrition	3
<i>Statistics</i>		
Choose one:		4
PLS 120	Applied Statistics in Agricultural Sciences	
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 100	Applied Statistics for Biological Sciences	
<i>Research Methods</i>		
SOC 046 or PSC 041	Introduction to Social Research Methods Research Methods in Psychology	4
The remaining preparatory subject matter is based on which major option you choose:		15-21
Nutritional Biology Option (p. 359)		
Nutrition in Public Health Option (p. 359)		
Preparatory Subject Matter Subtotal		62-70
<b>Depth Subject Matter</b>		
<i>Biochemistry</i>		
Choose a series:		6-10

# Nutrition Science, Bachelor of Science

## College of Agricultural & Environmental Sciences

The study of nutrition encompasses all aspects of the consumption and utilization of food and its constituents. Key areas of study include: the biochemical reactions important to the utilization of nutrients and food constituents; the impact of diet on health and disease; and, nutrition-related policy and public health issues. The nutrition science major includes two options for studying these areas: nutritional biology and nutrition in public health.

## The Program

Nutrition, as it is taught on the Davis campus, is a biological science and requires a complete background in chemistry and biology, along with calculus and physics (nutritional biology option) or economics (nutrition in public health option). These courses are generally completed during the first two years, and along with biochemistry, must be completed before most nutrition classes can be taken. During their junior and senior years, students in the nutritional biology option take additional course work in biochemistry, physiology, and toxicology. Students in the nutrition in public health option take additional course work in social and health-related sciences.

## Career Alternatives

Both options are excellent preparation for professional or graduate training in medicine, public health, or other health sciences. The nutritional biology option also provides preparation for technical work in nutrition in the animal, food, and pharmaceutical industries. The nutrition in public health option prepares students for jobs in administrative, teaching, or public health/public service positions.

## Dietetics Internship

To fulfill the academic requirements for an internship in Dietetics, students are strongly advised to declare the Clinical Nutrition major. Within the Nutrition in Public Health option, students should also take: ENL 003 or UWP 001 & CMN 001. The following courses must also be added (some of which may meet restricted elective requirements): ARE 112; NUT 116B, NUT 116AL-NUT 116BL; FSM 120, FSM 120L, FSM 122. Students intending to apply for admission to a dietetic internship should contact the Advising Center no later than the first quarter of the junior year for information on procedures. Effective January 1, 2024, the Commission on Dietetic Registration (CDR) will require a minimum of a master's degree to be eligible to take the credentialing exam to become a registered dietitian.

## Major Advisor

Gerardo Mackenzie

ABI 102 & ABI 103	Animal Biochemistry & Metabolism and Animal Biochemistry & Metabolism	PHY 007A & PHY 007B	General Physics and General Physics
<b>OR</b>	<b>Total Units</b> 16-21		
BIS 102 & BIS 103	Structure & Function of Biomolecules and Bioenergetics & Metabolism		
<i>Biological Science</i>			
BIS 101	Genes & Gene Expression	4	Choose one: 4-5
<i>Food Science &amp; Technology</i>			
FST 100A	Food Chemistry	4	ANT 002 Cultural Anthropology
FST 100B	Food Properties	4	SOC 001 Introduction to Sociology
<i>Microbiology</i>			SOC 003 Social Problems
MIC 102	Introductory Microbiology	3	ECN 001A Principles of Microeconomics
MIC 103L	Introductory Microbiology Laboratory	2	or ECN 001AV Principles of Microeconomics
<i>Neurobiology, Physiology, &amp; Behavior</i>			or ECN 001AY Principles of Microeconomics
NPB 101	Systemic Physiology	5	PSC 001 General Psychology 4
NPB 101L	Systemic Physiology Laboratory	3	Choose 3-5 units from: 3-5
<i>Nutrition</i>			AMS/FST 055 Food in American Culture
NUT 111AY	Introduction to Nutrition & Metabolism	3	CHI 010 Introduction to Chicana/o Studies
NUT 111B	Recommendations & Standards for Human Nutrition	2	CHI 021 Chicana/o & Latina/o Health Care Issues
NUT 112	Nutritional Assessment	4	CHI 040 Comparative Health: Top Leading Causes of Death
NUT 116A	Clinical Nutrition	3	CHI 042 Food Justice: Chicana/o & Indigenous Communities
The remaining depth subject matter is based on which major option you chose when completing your preparatory courses:	33	CRD 020 Food Systems	
Nutritional Biology Option (p. 359)		ECN 001B Principles of Macroeconomics	
Nutrition in Public Health Option (p. 360)		or ECN 001BV Principles of Macroeconomics	
<b>Depth Subject Matter Subtotal</b>	76-80	ETX 010 Introduction to Environmental Toxicology	
<b>Total Units</b>	138-150	FST 010 Food Science, Folklore & Health	
<b>Focus Area</b>	<b>Units</b>	GSW 050 Introduction to Critical Gender Studies	
<b>Nutritional Biology Option</b>	139-150	HDE 012 Human Sexuality	
<b>Nutrition in Public Health Option</b>	138-147	IAD 010 Introduction to International Agricultural Development	

## Preparatory Subject Matter

### Nutritional Biology Option

Code	Title	Units	
Choose one:		4-5	
ANT 002	Cultural Anthropology		
PSC 001 or PSC 001Y	General Psychology General Psychology		
SOC 001	Introduction to Sociology		
SOC 003	Social Problems		
Choose a series:		6-8	
MAT 016A & MAT 016B	Short Calculus and Short Calculus		
<b>OR</b>			
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine		
Choose a series:		6-8	
PHY 001A & PHY 001B	Principles of Physics and Principles of Physics		
<b>OR</b>			
NPB 114	Gastrointestinal Physiology	3	

## Depth Subject Matter

### Nutritional Biology Option

Code	Title	Units
Requirements		

NUT/ETX 104	Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants	4	MMI 188B	Human Immunology
NUT 117	Experimental Nutrition	6	NPB 110A	Foundations 1: From Molecules to Individuals
<b>Restricted Electives</b>		<b>20</b>	NPB 116	Stress Physiology in Health & Disease
Choose at least 9 units from Nutrition:			NPB 128	Comparative Physiology: Endocrinology
NUT 105	Nutrition through the Life Cycle		NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health
NUT 113	Principles of Epidemiology in Nutrition		NPB 134	General Immunology for Physiologists
NUT 114	Developmental Nutrition		PLB/PLP 148	Introductory Mycology
NUT 115	Animal Nutrition		PMI 126	Fundamentals of Immunology
NUT 116B	Clinical Nutrition		PMI 127	Medical Bacteria & Fungi
NUT 118	Community Nutrition		PMI 129Y	One Health: Human, Animal & Environment Interfaces
NUT 119A	Global Nutrition		UWP 102B	Writing in the Disciplines: Biology
NUT 120AN	Nutritional Anthropology		UWP 104F	Writing in the Professions: Health
NUT/ETX 127	Environmental Stress & Development in Marine Organisms		or UWP 104FY	Writing in the Professions: Health
NUT 129	Journalistic Practicum in Nutrition			
NUT 130	Experiments in Nutrition: Design & Execution			
NUT 141	Comparative Animal Nutrition & Metabolism			
NUT 190	Proseminar in Nutrition			
NUT 192	Internship			
NUT 199	Special Study for Advanced Undergraduates			
The remaining balance of restricted elective units may be chosen from any of the following courses:				
BIM 152	Molecular Control of Biosystems			
BIS 104	Cell Biology			
CHA 101/EXB 106	Human Gross Anatomy			
CHA 101L/EXB 106L	Human Gross Anatomy Laboratory			
CHE 130A	Principles of Medicinal Chemistry			
CHE 130B	Computational Drug Design			
ENT 156	Biology of Parasitism			
ENT 156L	Biology of Parasitism Laboratory			
ETX/FST 128	Food Toxicology			
ETX 140	Genes & the Environment			
EXB 110	Exercise Metabolism			
EXB 116	Nutrition for Physically Active Persons			
FST 104	Food Microbiology			
GDB 103	Microbiome of People, Animals, & Plants			
HDE 100A	Infancy & Early Childhood			
or HDE 100AV	Infancy & Early Childhood			
HDE 100B	Middle Childhood & Adolescence			
HDE 100C	Adulthood & Aging			
MCB 120	Molecular Biology & Biochemistry Laboratory Associated Lecture			
MCB 120L	Molecular Biology & Biochemistry Laboratory			
MCB 162	Human Genetics & Genomics			
MIC 111	Human Microbiology			
MIC 162	General Virology			
MMI 130	Medical Mycology			
MMI 188A	Human Immunology			
				<b>Total Units</b>
				<b>33</b>
<b>Nutrition in Public Health Option</b>				
<b>Code</b>	<b>Title</b>	<b>Units</b>		
<b>Requirements</b>				
NUT 113	Principles of Epidemiology in Nutrition	4		
NUT 118	Community Nutrition	4		
SPH 101	Introduction to Public Health	3		
<b>Restricted Electives</b>		<b>22</b>		
Choose at least 9 units from Nutrition:				
NUT/ETX 104	Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants			
NUT 105	Nutrition through the Life Cycle			
NUT 114	Developmental Nutrition			
NUT 116B	Clinical Nutrition			
NUT 117	Experimental Nutrition			
NUT 119A	Global Nutrition			
NUT 120AN	Nutritional Anthropology			
NUT 129	Journalistic Practicum in Nutrition			
NUT 130	Experiments in Nutrition: Design & Execution			
NUT 190	Proseminar in Nutrition			
NUT 192	Internship			
NUT 199	Special Study for Advanced Undergraduates			
The remaining balance of restricted elective units may be chosen from any of the following courses:				
<i>Community Health &amp; Education</i>				
CMN 165	Media & Health			
EDU 110	Educational Psychology: General			
EDU 120	Philosophical & Social Foundations of Education			
HDE 135	Health Behaviors Across the Lifespan			
PLS 193	Garden & Farm-Based Experiential Education Methods			
PSC 126	Health Psychology			
PSC 130	Human Learning & Memory			

<b>Cultural Diversity &amp; Community Change</b>	
AAS 100	Survey of Ethnicity in the US
ARE 112	Fundamentals of Organization Management
CMN 136	Organizational Communication
CRD 152	Community Development
CRD 176	Comparative Ethnicity
IAD 103	Social Change & Agricultural Development
SAS 130	Contemporary Leadership
<b>Health Policy</b>	
ARE 120	Agricultural Policy
POL 109	Public Policy & the Governmental Process
<b>Human &amp; Applied Sciences</b>	
CHA 101/EXB 106	Human Gross Anatomy
CHA 101L/ EXB 106L	Human Gross Anatomy Laboratory
CHI 140A	Quantitative Methods: Chicano/Latino Health Research
EXB 101	Exercise Physiology
EXB 102	Introduction to Motor Learning & the Psychology of Sport & Exercise
EXB 110	Exercise Metabolism
EXB 117	Exercise & Aging in Health & Disease
HDE 100A or HDE 100AV	Infancy & Early Childhood
HDE 100B	Middle Childhood & Adolescence
HDE 100C	Adulthood & Aging
<b>Physiology &amp; Applied Sciences</b>	
ETX 101	Principles of Environmental Toxicology
FST/ETX 128	Food Toxicology
NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health
<b>Public Health Sciences</b>	
SPH 103	Introduction to Health Economics, Services, Policy, Administration & Management
SPH 104	Globalization & Health: Evidence & Policies
SPH 106	Intermediate Human Epidemiology
SPH 108	Introduction to Program Planning & Evaluation
SPH 109	History of Epidemiology in Public Health
SPH 113	Health Disparities in the U.S.
SPH 120	Introduction to Health Informatics
<b>Total Units</b>	<b>33</b>

## Nutrition Science, Minor

The Department of Nutrition offers three minor programs open to students majoring in other disciplines who wish to complement their study programs with a concentration in the area of food and nutrition.

### Minor Advisor

3202 Meyer Hall; 530-752-2512; 530-752-7094

If the student's major program requires the same course in biochemistry and physiology, only one of the courses may duplicate credit toward the minor which must total 20 units.

Code	Title	Units
<i>Preparation</i>		
Plan in advance to include the required course prerequisites.		
<i>Biochemistry</i>		
Choose a series:		6-10
ABI 102 & ABI 103 Animal Biochemistry & Metabolism and Animal Biochemistry & Metabolism		
<b>OR</b>		
BIS 102 & BIS 103	Structure & Function of Biomolecules and Bioenergetics & Metabolism	
<i>Nutrition</i>		
NUT 111AY	Introduction to Nutrition & Metabolism	3
NUT 111B	Recommendations & Standards for Human Nutrition	2
<i>Neurobiology, Physiology, &amp; Behavior</i>		
NPB 101	Systemic Physiology	5
<i>Restricted Electives</i>		
NUT 105	Nutrition through the Life Cycle	0-6
NUT 114	Developmental Nutrition	
NUT 115	Animal Nutrition	
NUT 116A	Clinical Nutrition	
NUT 116B	Clinical Nutrition	
NUT 117	Experimental Nutrition	
NUT 120AN	Nutritional Anthropology	
NUT 141	Comparative Animal Nutrition & Metabolism	
<b>Total Units</b>		<b>20</b>

## Nutritional Biology (Graduate Group)

### Graduate Studies

Jon Ramsey, Ph.D., Chairperson of the Group

### Graduate Group Office

1249 Meyer Hall; 530-754-7684; Nutritional Biology Graduate Group (<http://nutritionalbiology.ucdavis.edu/>); Faculty (<http://ggnb.ucdavis.edu/people/faculty/>)

- Nutritional Biology, Master of Science (p. 361)
- Nutritional Biology, Doctor of Philosophy (p. 362)

## Nutritional Biology, Master of Science

### Graduate Studies

### Graduate Study

The Graduate Group in Nutritional Biology offers programs of study and research leading to M.S. and Ph.D. degrees. The great diversity of research interests represented by the faculty members allows students to choose from a wide variety of themes: nutritional biochemistry,

animal nutrition, nutrition and development, nutrient bioavailability, human/clinical nutrition, nutrition and behavior, nutritional energetics, community nutrition, community health, maternal and child nutrition, nutrition and endocrinology, international nutrition, obesity/body composition, physiology of digestion, nutrition and chronic disease, culture and nutrition, nutrition and gene expression, nutrition and aging, food preferences, nutrition and immunity, diet and exercise, dietary assessment, protein and lipid metabolism, food intake regulation, nutrition education, and more.

### **Graduate Advisors**

Consult the Nutritional Biology Graduate Group (<http://nutritionalbiology.ucdavis.edu/>) office.

## **Nutritional Biology, Doctor of Philosophy**

### **Graduate Studies**

### **Graduate Study**

The Graduate Group in Nutritional Biology offers programs of study and research leading to M.S. and Ph.D. degrees. The great diversity of research interests represented by the faculty members allows students to choose from a wide variety of themes: nutritional biochemistry, animal nutrition, nutrition and development, nutrient bioavailability, human/clinical nutrition, nutrition and behavior, nutritional energetics, community nutrition, community health, maternal and child nutrition, nutrition and endocrinology, international nutrition, obesity/body composition, physiology of digestion, nutrition and chronic disease, culture and nutrition, nutrition and gene expression, nutrition and aging, food preferences, nutrition and immunity, diet and exercise, dietary assessment, protein and lipid metabolism, food intake regulation, nutrition education, and more.

### **Graduate Advisors**

Consult the Nutritional Biology Graduate Group (<http://nutritionalbiology.ucdavis.edu/>) office.

## **Performance Studies (Graduate Group)**

### **Graduate Studies**

Joseph Dumit, Chair  
Marian Bilheimer, Graduate Coordinator

### **Arts Group Graduate Office**

216B Art Building; 530-754-6973; Marian Bilheimer ([mlbilheimer@ucdavis.edu](mailto:mlbilheimer@ucdavis.edu)); Performance Studies Graduate Group (<https://arts.ucdavis.edu/performancestudies/>); Faculty (<http://arts.ucdavis.edu/theatre-dance-faculty/>)

There are over 45 affiliated faculty in departments throughout HArCS and other faculty, all of whom offer courses relevant to the discipline.

- Performance Studies, Doctor of Philosophy (p. 362)

## **Performance Studies, Doctor of Philosophy**

### **College of Letters & Science**

### **Graduate Study**

The Ph.D. in Performance Studies is a four-year program. In the first two years of study, students develop an understanding of performance by drawing from a range of regular course offerings in the field to identify, explore, and define a field or fields of research. Students are required to complete four core courses out of five in performance studies, and one colloquium course. Each individual program is then built from seminar and/or practice as research courses, as well as independent or group studies, developing one or more of the four strands of the program: Comparative Medias, Embodiments, Cultures/Ecologies, and History/Text. A wide range of affiliated faculty offer courses throughout the HArCS faculty, and Designated Emphases are available in Studies in Performance & Practice, African American & African Studies, Critical Theory, Feminist Theory & Research, Native American Studies, Religious Studies, Science & Technology Studies, and Writing, Rhetoric & Composition Studies. Students are required to complete a minimum of 60 units before taking the qualifying examination. No more than 12 units may be taken below the graduate level unless specifically approved by the Ph.D. graduate program advisor.

### **Main Program Advisor**

Kris Fallon ([kfallon@ucdavis.edu](mailto:kfallon@ucdavis.edu)), Cinema & Digital Media

### **Graduate Advisors**

Moradewun Adejunmobi (African American & African Studies), Emily Albu (Spanish & Classics), Susan Avila (Design), Gina Bloom (English), Maxine Craig (Gender, Sexuality, & Women's Studies), Henry Spiller (Music), Archana Venkatesan (Comparative Literature, Religious Studies), Hegnar Watenpaugh (Art, Art History)

## **Pharmacology & Toxicology (Graduate Group)**

### **College of Agricultural & Environmental Sciences**

Laura S. Van Winkle, Chairperson of the Group

### **Group Office**

Department of Environmental Toxicology, 4139 Meyer Hall; 530-752-4516; Pharmacology & Toxicology Graduate Group (<http://ptx.ucdavis.edu/>); Faculty (<https://ptx.ucdavis.edu/people/>)

### **Faculty**

The more than 90 faculty in the graduate group represent at least 25 academic departments and organized research units within the College of Agricultural & Environmental Sciences, the College of Biological Sciences, the School of Medicine and the School of Veterinary Medicine.

- Pharmacology & Toxicology, Master of Science (p. 363)
- Pharmacology & Toxicology, Doctor of Philosophy (p. 363)

# Pharmacology & Toxicology, Master of Science

College of Agricultural & Environmental Sciences

## Graduate Study

The program, which offers both M.S. and Ph.D. degrees, emphasizes an interdisciplinary approach that combines coursework and experimental training in modern approaches to pharmacological and toxicological problems. Areas of research span fundamental and translational research in a broad spectrum of areas within pharmacology and toxicology, including cardiovascular pharmacology, cancer therapeutics, neuropharmacology, drug discovery and design, neurotoxicology, pulmonary toxicology and environmental toxicology. Students complete core courses in pharmacology and toxicology. Both Plan I and Plan II MS is offered. For detailed information on the program, contact the Group office, graduate advisors, or the Group chairperson.

## Graduate Advisors

K. Carraway (Biochemistry & Molecular Medicine), X. Chen (Surgical & Radiological Sciences ), E. Diaz (Pharmacology), H. Knych (Molecular Biosciences), P. Lein (Molecular Biosciences), L. Miller (Anatomy, Physiology & Cell Biology), R. Poppenga (Molecular Biosciences), C. Sweeney (Biochemistry & Molecular Medicine), L. Van Winkle (Anatomy, Physiology & Cell Biology), H. Wulff (Pharmacology), A. Yu (Biochemistry & Molecular Medicine)

# Pharmacology & Toxicology, Doctor of Philosophy

College of Agricultural & Environmental Sciences

## Graduate Study

The program, which offers both M.S. and Ph.D. degrees, emphasizes an interdisciplinary approach that combines coursework and experimental training in modern approaches to pharmacological and toxicological problems. Areas of research span fundamental and translational research in a broad spectrum of areas within pharmacology and toxicology, including cardiovascular pharmacology, cancer therapeutics, neuropharmacology, drug discovery and design, neurotoxicology, pulmonary toxicology and environmental toxicology. Students complete core courses in pharmacology and toxicology and carry out research rotations during their first year of study. All Ph.D. students receive financial support. For detailed information on the program, contact the Group office, graduate advisors, or the Group chairperson.

## Graduate Advisors

K. Carraway (Biochemistry & Molecular Medicine), X. Chen (Surgical & Radiological Sciences ), E. Diaz (Pharmacology), H. Knych (Molecular Biosciences), P. Lein (Molecular Biosciences), L. Miller (Anatomy, Physiology & Cell Biology), R. Poppenga (Molecular Biosciences), C. Sweeney (Biochemistry & Molecular Medicine), L. Van Winkle (Anatomy, Physiology & Cell Biology), H. Wulff (Pharmacology), A. Yu (Biochemistry & Molecular Medicine)

# Philosophy

College of Letters & Science

Cody Gilmore, Ph.D., Chairperson of the Department; term ends June 30, 2023

## Department Office

1240 Social Sciences & Humanities; Admin ([philadmin@ucdavis.edu](mailto:philadmin@ucdavis.edu)); Philosophy (<http://philosophy.ucdavis.edu>); Faculty ([http://philosophy.ucdavis.edu/directory-of-people/phi-faculty/#c4=all&b\\_start=0](http://philosophy.ucdavis.edu/directory-of-people/phi-faculty/#c4=all&b_start=0))

## Advising

Staff advisors are located in Young Hall; [philadvising@ucdavis.edu](mailto:philadvising@ucdavis.edu). For more information on how to make an appointment or join Drop-In Advising hours, see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

- Philosophy, Bachelor of Arts (p. 363)
- Philosophy, Minor (p. 366)
- Philosophy, Master of Arts (p. 366)
- Philosophy, Doctor of Philosophy (p. 367)

# Philosophy, Bachelor of Arts

College of Letters & Science

## The Major Program

Philosophy addresses problems and questions that arise in all areas of human thought and experience and in all disciplines. Recurring questions about the nature of value, the good life, right conduct, knowledge, truth, language, mind, and reality are central to philosophical study. Philosophy also investigates the methodologies and assumptions of the major disciplines in the university in order to deepen our understanding of the sciences, of mathematics, art, literature, and history, and of religion and morality. It leads us to address issues about the nature of these subjects, about the methods of reasoning characteristic of them, and about the contributions they make to our understanding of ourselves and our world.

Philosophy contributes to the liberal education of its students. The department emphasizes an analytic approach to philosophical questions, which trains students to understand and evaluate arguments and to think and write precisely and clearly. These skills are of immense value in a variety of careers.

## The Program

The Department of Philosophy offers its majors a choice among three options. The General Emphasis provides a broad view of the field of philosophy. It includes a breadth requirement at the lower division level while providing students wide choice in more advanced courses. The Pre-Law and Pre-Med Emphases include courses that provide philosophical perspectives on law and medicine respectively and that also provide important preparation for professional school.

The Department offers courses in most areas of contemporary analytic philosophy including the theory of knowledge, metaphysics, logic, ethics, and political philosophy. In addition, upper division courses are offered in oral and political philosophy, and aesthetics, and in the philosophy of religion, of mind, of language, of mathematics, of law, and of the physical, biological and social sciences. The problems of philosophy have important roots in past. The history of philosophy is important not only as part of the heritage of educated persons, but also because it is relevant to contemporary issues. For these reasons, the department places great

emphasis on the history of philosophy, providing courses on the major figures and traditions of western philosophy.

## Faculty Advisor & Advising

Hanti Lin, Ph.D.; Yellow Cluster Undergraduate Advising Center

## Career Alternatives

Students of philosophy learn to understand and evaluate arguments and to think and write precisely and clearly. These analytical skills are assets in any career. Many of our majors have pursued graduate study in philosophy and have become philosophers in their own right. Others have pursued academic careers in related disciplines in the humanities and social sciences. Philosophy majors are well prepared for law, business, or other professional schools and have found careers in computer programming, government service, teaching, the ministry, and social work. Those wishing to attend law school or medical school should consider pursuing the Pre-Law and Pre-Med emphases, respectively.

## Honors Program

The department offers an honors program, which gives qualifying majors the opportunity to work closely with faculty and graduate students. Information can be obtained on the department website.

## Courses for Non-Majors

Students majoring in most disciplines in the university will find courses relevant to their educational or career goals. PHI 001 is the introductory course for both majors and non-majors. PHI 005 teaches critical thinking. The following PHI courses are recommended:

Code	Title	Units
<b>(1) Pre-Law</b>		
PHI 012	Introduction to Symbolic Logic	4
PHI 014	Ethical & Social Problems in Contemporary Society	4
PHI 024	Introduction to Ethics	4
PHI 030	Introduction to Philosophy of Science	4
PHI 102	Theory of Knowledge	4
PHI 112	Intermediate Symbolic Logic	4
PHI 115	Problems in Normative Ethics	4
PHI 116	Ethical Theories	4
PHI 118	Political Philosophy	4
PHI 119	Philosophy of Law (especially)	4
<b>(2) Pre-Medical</b>		
PHI 014	Ethical & Social Problems in Contemporary Society	4
PHI 015	Introduction to Bioethics	4
PHI 030	Introduction to Philosophy of Science	4
PHI 038	Introduction to Philosophy of Biology	4
PHI 108	Philosophy of the Biological Sciences	4
PHI 114	History of Ethics	4
PHI 115	Problems in Normative Ethics	4
PHI 116	Ethical Theories	4
<b>(3) Business</b>		
PHI 014	Ethical & Social Problems in Contemporary Society	4
PHI 102	Theory of Knowledge	4
PHI 112	Intermediate Symbolic Logic	4

PHI 114	History of Ethics	4
PHI 115	Problems in Normative Ethics	4
PHI 116	Ethical Theories	4
PHI 117	Foundations of Ethics	4
PHI 118	Political Philosophy	4
PHI 119	Philosophy of Law	4
<b>(4) Social Policy</b>		
PHI 014	Ethical & Social Problems in Contemporary Society	4
PHI 024	Introduction to Ethics	4
PHI 101	Metaphysics	4
PHI 102	Theory of Knowledge	4
PHI 114	History of Ethics	4
PHI 115	Problems in Normative Ethics	4
PHI 116	Ethical Theories	4
PHI 117	Foundations of Ethics	4
PHI 118	Political Philosophy	4
PHI 119	Philosophy of Law	4
PHI 120	Environmental Ethics	4
<b>(5) Social Sciences</b>		
PHI 012	Introduction to Symbolic Logic	4
PHI 030	Introduction to Philosophy of Science	4
PHI 031	Appraising Scientific Reasoning	4
PHI 032	Understanding Scientific Change	4
PHI 101	Metaphysics	4
PHI 102	Theory of Knowledge	4
PHI 103	Philosophy on Mind	4
PHI 109	Philosophy of the Social Sciences	4
PHI 118	Political Philosophy	4
PHI 131	Philosophy of Logic & Mathematics	4
<b>(6) Physical Sciences</b>		
PHI 012	Introduction to Symbolic Logic	4
PHI 030	Introduction to Philosophy of Science	4
PHI 031	Appraising Scientific Reasoning	4
PHI 032	Understanding Scientific Change	4
PHI 101	Metaphysics	4
PHI 102	Theory of Knowledge	4
PHI 107	Philosophy of the Physical Sciences	4
PHI 112	Intermediate Symbolic Logic	4
PHI 131	Philosophy of Logic & Mathematics	4
<b>(7) Biological Sciences</b>		
PHI 030	Introduction to Philosophy of Science	4
PHI 031	Appraising Scientific Reasoning	4
PHI 032	Understanding Scientific Change	4
PHI 038	Introduction to Philosophy of Biology	4
PHI 101	Metaphysics	4
PHI 102	Theory of Knowledge	4
PHI 108	Philosophy of the Biological Sciences	4
PHI 120	Environmental Ethics	4
<b>(8) Humanities &amp; the Arts</b>		
PHI 014	Ethical & Social Problems in Contemporary Society	4

PHI 021	Philosophical Classics of the Ancient Era	4	PHI 013G	Minds, Brains, & Computers with Discussion
PHI 022	Philosophical Classics of the Modern Era	4	(e) Ethics	
PHI 024	Introduction to Ethics	4	PHI 014	Ethical & Social Problems in Contemporary Society
PHI 101	Metaphysics	4	PHI 015	Introduction to Bioethics
PHI 102	Theory of Knowledge	4	PHI 024	Introduction to Ethics
PHI 103	Philosophy on Mind	4	(f) Philosophy of Science	
PHI 105	Philosophy of Religion	4	PHI 030	Introduction to Philosophy of Science
PHI 114	History of Ethics	4	PHI 031	Appraising Scientific Reasoning
PHI 116	Ethical Theories	4	PHI 032	Understanding Scientific Change
PHI 118	Political Philosophy	4	PHI 038	Introduction to Philosophy of Biology
PHI 123	Aesthetics	4	(g) Philosophy of Language	
PHI 141-PHI 175		4	PHI 017	Language, Thought, & World
<b>(9) Agricultural &amp; Environmental Science &amp; Policy</b>				
PHI 005	Critical Reasoning	4	(h) Metaphysics	
PHI 014	Ethical & Social Problems in Contemporary Society	4	PHI 101	Metaphysics <sup>1</sup>
PHI 024	Introduction to Ethics	4	(i) Theory of Knowledge	
PHI 030	Introduction to Philosophy of Science	4	PHI 102	Theory of Knowledge <sup>1</sup>
PHI 031	Appraising Scientific Reasoning	4	Preparatory Subject Matter Subtotal	16
PHI 114	History of Ethics	4	<b>Depth Subject Matter</b>	
PHI 115	Problems in Normative Ethics	4	Upper division units in Philosophy	36
PHI 116	Ethical Theories	4	Depth Subject Matter Subtotal	36
PHI 118	Political Philosophy	4	<b>Total Units</b>	<b>52</b>
PHI 120	Environmental Ethics	4		

## Department Activities

The Philosophy department sponsors a lecture series with well-known philosophers who present papers in their fields of expertise. The department also operates ongoing faculty and graduate student workshops. Undergraduate students are welcome to attend and join these discussions. Information can be obtained on the department website.

## Graduate Study

The Department of Philosophy offers programs of study leading to M.A. and Ph.D. degrees. Detailed information is available on our website (<https://philosophy.ucdavis.edu/graduate/graduate-program-overview/>), and may also be obtained by writing to the Graduate Advisor.

### Graduate Advisor

Alyssa Ney, Ph.D.

## General Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
PHI 012	Introduction to Symbolic Logic	4
Choose one course each from any three areas:		12
<i>(a) General Philosophy</i>		
PHI 001	Introduction to Philosophy	
<i>(b) Ancient Philosophy</i>		
PHI 021	Philosophical Classics of the Ancient Era	
<i>(c) Early Modern Philosophy</i>		
PHI 022	Philosophical Classics of the Modern Era	
<i>(d) Philosophy of Mind</i>		

<sup>1</sup> Note: PHI 101 and PHI 102 may not be counted toward both preparatory and depth subject matter units.

## Pre-Law Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
PHI 005	Critical Reasoning	4
PHI 012	Introduction to Symbolic Logic	4
PHI 024	Introduction to Ethics	4
Choose one:		4
PHI 014	Ethical & Social Problems in Contemporary Society	
PHI 015	Introduction to Bioethics	
PHI 016	Philosophical Foundations of American Democracy	
Preparatory Subject Matter Subtotal		16
<b>Depth Subject Matter</b>		
PHI 112	Intermediate Symbolic Logic	4
PHI 119	Philosophy of Law	4
<i>Philosophy of Law</i>		
Choose two courses from the following "Philosophy of Law" Group		8
PHI 102	Theory of Knowledge	
PHI 116	Ethical Theories	
PHI 118	Political Philosophy	
PHI 121	Bioethics	
PHI 128	Rationality	
PHI 189F	Special Topics in Philosophy: Philosophy of Law	

***History of Philosophy***

Choose one course from the following "History of Philosophy" Group		4
PHI 114	History of Ethics	
PHI 141	Socrates & the Socratic Dialogue	
PHI 143	Hellenistic Philosophy	
PHI 145	Christian, Islamic, & Jewish Philosophers of the Middle Ages	
PHI 161	Plato	
PHI 162	Aristotle	
PHI 168	Descartes	
PHI 170	Spinoza & Leibniz	
PHI 174	Hume	
PHI 175	Kant	
PHI 189A	Special Topics in Philosophy: History of Philosophy	
Additional upper division elective units in philosophy.		16
Depth Subject Matter Subtotal		36
Total Units		52

**Pre-Med Emphasis**

Code	Title	Units
<b>Preparatory Subject Matter</b>		
PHI 012	Introduction to Symbolic Logic	4
PHI 015	Introduction to Bioethics	4
PHI 038	Introduction to Philosophy of Biology	4
Choose one:		4
PHI 024	Introduction to Ethics	
PHI 030	Introduction to Philosophy of Science	
PHI 031	Appraising Scientific Reasoning	
PHI 032	Understanding Scientific Change	
Preparatory Subject Matter Subtotal		16
<b>Depth Subject Matter</b>		
PHI 112	Intermediate Symbolic Logic	4
PHI 121	Bioethics	4
<b>Philosophy of Science</b>		
Choose one course from the following "Philosophy of Science" Group		4
PHI 107	Philosophy of the Physical Sciences	
PHI 108	Philosophy of the Biological Sciences	
PHI 128	Rationality	
PHI 189I	Special Topics in Philosophy: Philosophy of Science	
Additional upper division elective units in Philosophy.		24
Note: Admission to medical schools requires additional coursework not included in the Pre-Med Emphasis.		
Depth Subject Matter Subtotal		36
Total Units		52

**Philosophy, Minor**

College of Letters &amp; Science

**Advising Office**

Staff advisors are located in Young Hall; philadvising@ucdavis.edu.

For more information on how to make an appointment or join Drop-In Advising hours, see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

Students wishing to minor in Philosophy may choose a general minor or a minor specializing in logic. There are no specific courses required for the general minor, so students may create a program to suit their own interests. The range of choice in the logic specialization is limited to the courses listed.

**Minor Advisor**

Hanti Lin, Ph.D.

**Philosophy—General**

Code	Title	Units
	Upper division units in philosophy. <sup>1</sup>	20
<b>Total Units</b>		<b>20</b>

<sup>1</sup> PHI 012 may be substituted for four of the upper division units.**Philosophy—Logic**

Code	Title	Units
PHI 012	Introduction to Symbolic Logic	4
or MAT 108	Introduction to Abstract Mathematics	
PHI 112	Intermediate Symbolic Logic	4
Choose three:		
PHI 113	Metalogic	
PHI 131	Philosophy of Logic & Mathematics	
PHI 134	Modal Logic	
PHI 135	Alternative Logics	
PHI 189K	Special Topics in Philosophy: Logic	
<b>Total Units</b>		<b>20</b>

**Philosophy, Master of Arts**

College of Letters &amp; Science

**Graduate Advising Office**1241 Social Sciences & Humanities; Philosophy (<https://philosophy.ucdavis.edu/graduate/graduate-program-overview/>)**Graduate Study**

The Department of Philosophy graduate program has both M.A. and Ph.D. "tracks." The M.A. track is designed for students who do not intend to pursue a Ph.D. in philosophy or who would benefit from enrolling first in a master's degree program. Students who enroll in the M.A. track may, however, later petition for admission to the Ph.D. track if they so desire.

**Graduate Advisor**

Alyssa Ney, Ph.D.

# Philosophy, Doctor of Philosophy

College of Letters & Science

## Graduate Advising Office

1241 Social Sciences & Humanities; Philosophy (<https://philosophy.ucdavis.edu/graduate/graduate-program-overview/>)

### Graduate Study

The Department of Philosophy graduate program has both M.A. and Ph.D. "tracks." Students who aim to complete a Ph.D. should apply directly to the Ph.D. track, even if they have not yet earned an M.A. in philosophy. Ph.D. students may earn the M.A. while progressing toward completion of the Ph.D. requirements.

### Graduate Advisor

Alyssa Ney, Ph.D.

# Physics & Astronomy

College of Letters & Science

Richard Scalettar, Ph.D., Chairperson of the Department; term ends June 30, 2024

Michael Mulhearn, Ph.D., Vice Chairperson of the Department—Administration & Undergraduate Matters

Shirley Chiang, Ph.D., Vice Chairperson of the Department—Administration & Undergraduate Matters

Rajiv Singh, Ph.D., Vice Chairperson of the Department—Graduate Matters

## Department Office

174 Physics Building; 530-752-1500; Physics & Astronomy (<http://www.physics.ucdavis.edu>); Faculty (<http://physics.ucdavis.edu/people/faculty/>)

- Applied Physics, Bachelor of Science (p. 367)
- Physics, Bachelor of Arts (p. 372)
- Physics, Bachelor of Science (p. 373)
- Physics, Minor (p. 375)
- Physics, Master of Science (p. 375)
- Physics, Doctor of Philosophy (p. 375)

# Applied Physics, Bachelor of Science

College of Letters & Science

## The Major Program

From the smallest subatomic particles to atoms, molecules, stars, and galaxies, the study of physics is the study of what makes the universe work. Knowledge gained using atomic-scale microscopes and high-energy particle accelerators and nuclear reactors teaches us not only what holds the atomic nucleus together but also how proteins function and why stars shine.

### The Program

The Department of Physics & Astronomy (p. 367) offers a Bachelor of Arts in Physics and two Bachelor of Science degree programs: in Physics (which also offers an emphasis in Astrophysics), and in Applied Physics. The A.B. degree provides broad coverage of classical and modern physics

while permitting a broader liberal arts education than is possible with the other two programs. The B.S. degree in either Physics or Applied Physics should be followed by the student who plans to enter physics as a profession, and also provides excellent training for a wide variety of technical career options. The B.S. in Applied Physics provides the student with a solid introduction to a particular applied physics specialty. For the student who plans to enter the job market upon completing a B.S. degree, the applied physics orientation would be an asset. Either B.S. program provides a solid foundation in physics for the student interested in graduate work in either pure or applied physics.

### Career Alternatives

Careers in physics and applied physics include research and development, either in universities, government laboratories, or industry; teaching in high schools, junior colleges, and universities; management and administration in industrial laboratories and in government agencies; and in production and sales in industry. A major in physics also provides a strong base for graduate-level work in such interdisciplinary areas as chemical physics, biophysics and medical physics, geophysics and environmental physics, astrophysics and astronomy, computer science, and materials science.

### Graduate Study

The Department of Physics & Astronomy (p. 367) offers programs of study and research leading to M.S. and Ph.D. degrees. Further information regarding requirements for these degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616.

## Applied Physics—Atmospheric Physics Concentration

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Physics</i>		
Choose a series:		19-25
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics	
PHY 009HA & PHY 009HB & PHY 009HC & PHY 009HD & PHY 009HE	Honors Physics and Honors Physics and Honors Physics and Honors Physics and Honors Physics	
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3
MAT 022B	Differential Equations	3
<i>Physics</i>		
PHY 040	Introduction to Computational Physics	3
<b>Preparatory Subject Matter Subtotal</b>		44-50
<b>Depth Subject Matter</b>		
<i>Physics</i>		



## Applied Physics—Computational Physics Concentration

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>Physics</i>			
Choose a series:			19-25
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics		
PHY 009HA & PHY 009HB & PHY 009HC & PHY 009HD & PHY 009HE	Honors Physics and Honors Physics and Honors Physics and Honors Physics and Honors Physics		
<i>Mathematics</i>			
MAT 021A	Calculus	4	
MAT 021B	Calculus	4	
MAT 021C	Calculus	4	
MAT 021D	Vector Analysis	4	
MAT 022A	Linear Algebra	3	
MAT 022B	Differential Equations	3	
<i>Computer Science Engineering</i>			
ECS 036A	Programming & Problem Solving	4	
ECS 036B	Software Development & Object-Oriented Programming in C++	4	
Preparatory Subject Matter Subtotal			49-55
<b>Depth Subject Matter</b>			
<i>Physics</i>			
PHY 104A	Introduction to Mathematical Methods in Physics	4	
PHY 105A	Classical Mechanics	4	
PHY 110A	Electricity & Magnetism	4	
PHY 110B	Electricity & Magnetism	4	
PHY 112	Thermodynamics & Statistical Mechanics	4	
PHY 115A	Foundation of Quantum Mechanics	4	
PHY 116A	Electronic Instrumentation	4	
PHY 116B	Electronic Instrumentation	4	
<i>Concentration Courses</i>			
PHY 104B	Computational Methods of Mathematical Physics	4	
PHY 116C	Introduction to Computer-Based Experiments in Physics	4	
ECS 036C	Data Structures, Algorithms, & Programming	4	
ECS 122A	Algorithm Design & Analysis	4	
<i>Additional Electives</i>			
Choose one each from Computer Science (ECS), Mathematics (MAT), and Physics (PHY):			12
<i>Computer Science</i>			
ECS 120	Theory of Computation		
ECS 122B	Algorithm Design & Analysis		
ECS 130	Scientific Computation		
<i>Mathematics</i>			
MAT 128A	Numerical Analysis		
MAT 128B	Numerical Analysis in Solution of Equations		
MAT 128C	Numerical Analysis in Differential Equations		
<i>Physics</i>			
PHY 105C	Continuum Mechanics		
PHY 115B	Applications of Quantum Mechanics		
PHY 140A	Introduction to Solid State Physics		
<i>Program Variance</i>			
Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.			
Depth Subject Matter Subtotal			60
<b>Total Units</b>			109-115

## Applied Physics—Physical Electronics Concentration

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>Physics</i>			
Choose a series:		19-25	
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics		
PHY 009HA & PHY 009HB & PHY 009HC & PHY 009HD & PHY 009HE	Honors Physics and Honors Physics and Honors Physics and Honors Physics and Honors Physics		
PHY 040	Introduction to Computational Physics	3	
PHY 080	Experimental Techniques	4	
<i>Mathematics</i>			
MAT 021A	Calculus	4	
MAT 021B	Calculus	4	
MAT 021C	Calculus	4	
MAT 021D	Vector Analysis	4	
MAT 022A	Linear Algebra	3	
MAT 022B	Differential Equations	3	
<i>Engineering</i>			
ENG 017 or ENG 017V	Circuits I Circuits I	4	
Preparatory Subject Matter Subtotal			52-58
<b>Depth Subject Matter</b>			
<i>Physics</i>			
PHY 102	Computational Laboratory in Physics	1	
PHY 104A	Introduction to Mathematical Methods in Physics	4	
PHY 105A	Classical Mechanics	4	
PHY 110A	Electricity & Magnetism	4	
PHY 110B	Electricity & Magnetism	4	

PHY 112	Thermodynamics & Statistical Mechanics	4	PHY 105A	Classical Mechanics	4			
PHY 115A	Foundation of Quantum Mechanics	4	PHY 110A	Electricity & Magnetism	4			
<i>Laboratory Requirement</i>								
PHY 122A	Advanced Laboratory in Condensed Matter Physics	4	PHY 112	Thermodynamics & Statistical Mechanics	4			
or PHY 122B	Advanced Laboratory in Particle Physics		PHY 115A	Foundation of Quantum Mechanics	4			
<i>Concentration Courses</i>								
PHY 110C	Electricity & Magnetism	4	PHY 116A	Electronic Instrumentation	4			
PHY 140A	Introduction to Solid State Physics	4	PHY 116B	Electronic Instrumentation	4			
EEC 100	Circuits II	5	<i>Laboratory Requirement</i>					
<i>Additional Concentration Electives</i>								
Choose four:		16	Choose one:		4			
EEC 110A	Electronic Circuits I		PHY 116C	Introduction to Computer-Based Experiments in Physics				
EEC 110B	Electronic Circuits II		PHY 122A	Advanced Laboratory in Condensed Matter Physics				
EEC 140A	Principles of Device Physics I		PHY 122B	Advanced Laboratory in Particle Physics				
or EEC 140AV	Principles of Device Physics I		<i>Concentration Courses</i>					
EEC 140B	Principles of Device Physics II		PHY 104B	Computational Methods of Mathematical Physics	4			
<i>Program Variance</i>			GEL 161	Geophysical Field Methods	3			
Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.			GEL 162	Geophysics of the Solid Earth	3			
Depth Subject Matter Subtotal								
Total Units		58	Choose three:					
		110-116	Choose one:		10-12			

## Applied Physics—Geophysics Concentration

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Physics</i>		
Choose a series:		
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics	19-25
PHY 009HA & PHY 009HB & PHY 009HC & PHY 009HD & PHY 009HE	Honors Physics and Honors Physics and Honors Physics and Honors Physics and Honors Physics	
PHY 040	Introduction to Computational Physics	3
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3
MAT 022B	Differential Equations	3
Preparatory Subject Matter Subtotal		
		44-50
<b>Depth Subject Matter</b>		
<i>Physics</i>		
PHY 104A	Introduction to Mathematical Methods in Physics	4
Depth Subject Matter Subtotal		
		56-58
Total Units		100-108

## Applied Physics—Materials Science Concentration

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Physics</i>		
Choose a series:		
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics	19-25

PHY 009HA	Honors Physics		Choose a series:		19-25
& PHY 009HB	and Honors Physics		PHY 009A	Classical Physics	
& PHY 009HC	and Honors Physics		& PHY 009B	and Classical Physics	
& PHY 009HD	and Honors Physics		& PHY 009C	and Classical Physics	
& PHY 009HE	and Honors Physics		& PHY 009D	and Modern Physics	
PHY 040	Introduction to Computational Physics	3	PHY 009HA	Honors Physics	
<i>Mathematics</i>			& PHY 009HB	and Honors Physics	
MAT 021A	Calculus	4	& PHY 009HC	and Honors Physics	
MAT 021B	Calculus	4	& PHY 009HD	and Honors Physics	
MAT 021C	Calculus	4	& PHY 009HE	and Honors Physics	
MAT 021D	Vector Analysis	4	PHY 040	Introduction to Computational Physics	3
MAT 022A	Linear Algebra	3	<i>Mathematics</i>		
MAT 022B	Differential Equations	3	MAT 021A	Calculus	4
Preparatory Subject Matter Subtotal		44-50	MAT 021B	Calculus	4
<b>Depth Subject Matter</b>			MAT 021C	Calculus	4
<i>Physics</i>			MAT 021D	Vector Analysis	4
PHY 104A	Introduction to Mathematical Methods in Physics	4	MAT 022A	Linear Algebra	3
PHY 105A	Classical Mechanics	4	MAT 022B	Differential Equations	3
PHY 110A	Electricity & Magnetism	4	Preparatory Subject Matter Subtotal		44-50
PHY 110B	Electricity & Magnetism	4	<b>Depth Subject Matter</b>		
PHY 112	Thermodynamics & Statistical Mechanics	4	<i>Physics</i>		
PHY 115A	Foundation of Quantum Mechanics	4	PHY 102	Computational Laboratory in Physics	1
PHY 116A	Electronic Instrumentation	4	PHY 104A	Introduction to Mathematical Methods in Physics	4
PHY 116B	Electronic Instrumentation	4	PHY 105A	Classical Mechanics	4
PHY 102	Computational Laboratory in Physics	1-4	PHY 110A	Electricity & Magnetism	4
or PHY 104B	Computational Methods of Mathematical Physics		PHY 110B	Electricity & Magnetism	4
<i>Laboratory Requirement</i>			PHY 115A	Foundation of Quantum Mechanics	4
Choose one:		4	PHY 116A	Electronic Instrumentation	4
PHY 116C	Introduction to Computer-Based Experiments in Physics		PHY 116B	Electronic Instrumentation	4
PHY 122A	Advanced Laboratory in Condensed Matter Physics		<i>Laboratory Requirement</i>		
PHY 122B	Advanced Laboratory in Particle Physics		Choose one:		4
<i>Concentration Courses</i>			PHY 116C	Introduction to Computer-Based Experiments in Physics	
PHY 115B	Applications of Quantum Mechanics	4	PHY 122A	Advanced Laboratory in Condensed Matter Physics	
PHY 140A	Introduction to Solid State Physics	4	PHY 122B	Advanced Laboratory in Particle Physics	
PHY 140B	Introduction to Solid State Physics	4	<i>Concentration Courses</i>		
EMS 174	Mechanical Behavior of Materials	4	PHY 105C	Continuum Mechanics	4
EMS 180	Materials in Engineering Design	4	ATM 120	Atmospheric Thermodynamics & Cloud Physics	4
<i>Program Variance</i>			ATM 121A	Atmospheric Dynamics	4
Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.			ATM 121B	Atmospheric Dynamics	4
Depth Subject Matter Subtotal		57-60	GEL/ESP 116N	Oceanography	3
<b>Total Units</b>		<b>101-110</b>	GEL/ESP 150A	Physical & Chemical Oceanography	4

## Applied Physics—Physical Oceanography Concentration

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Physics</i>		

PHY 112	Thermodynamics & Statistical Mechanics
PHY 116C	Introduction to Computer-Based Experiments in Physics

MAT 118A	Partial Differential Equations: Elementary Methods
or MAT 118B	Partial Differential Equations: Eigenfunction Expansions

**Program Variance**

Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

Depth Subject Matter Subtotal	60
Total Units	<b>104-110</b>

## Physics, Bachelor of Arts

**College of Letters & Science**

### The Major Program

From the smallest subatomic particles to atoms, molecules, stars, and galaxies, the study of physics is the study of what makes the universe work. Knowledge gained using atomic-scale microscopes and high-energy particle accelerators and nuclear reactors teaches us not only what holds the atomic nucleus together but also how proteins function and why stars shine.

### The Program

The Department of Physics & Astronomy offers a Bachelor of Arts in Physics and two Bachelor of Science degree programs: in Physics (which also offers an emphasis in Astrophysics), and in Applied Physics. The A.B. degree provides broad coverage of classical and modern physics while permitting a broader liberal arts education than is possible with the other two programs. The B.S. degree in either Physics or Applied Physics should be followed by the student who plans to enter physics as a profession, and also provides excellent training for a wide variety of technical career options. The B.S. in Applied Physics provides the student with a solid introduction to a particular applied physics specialty. For the student who plans to enter the job market upon completing a B.S. degree, the applied physics orientation would be an asset. Either B.S. program provides a solid foundation in physics for the student interested in graduate work in either pure or applied physics.

### Career Alternatives

Careers in physics and applied physics include research and development, either in universities, government laboratories, or industry; teaching in high schools, junior colleges, and universities; management and administration in industrial laboratories and in government agencies; and in production and sales in industry. A major in physics also provides a strong base for graduate-level work in such interdisciplinary areas as chemical physics, biophysics and medical physics, geophysics and environmental physics, astrophysics and astronomy, computer science, and materials science.

### Program Variance

Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

## Astronomy

In addition to the introductory Astronomy courses listed, upper division and graduate courses in Astronomy, Astrophysics and Cosmology are listed under Physics.

## Graduate Study

The Department of Physics & Astronomy offers programs of study and research leading to M.S. and Ph.D. degrees. Further information regarding requirements for these three degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Physics</i>		
Choose a series:		
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics	19-25
PHY 009HA & PHY 009HB & PHY 009HC & PHY 009HD & PHY 009HE	Honors Physics and Honors Physics and Honors Physics and Honors Physics and Honors Physics	
PHY 080	Experimental Techniques	4
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3
MAT 022B	Differential Equations	3
Preparatory Subject Matter Subtotal		45-51
<b>Depth Subject Matter</b>		
<i>Physics</i>		
PHY 104A	Introduction to Mathematical Methods in Physics	4
PHY 105A	Classical Mechanics	4
PHY 110A	Electricity & Magnetism	4
PHY 110B	Electricity & Magnetism	4
PHY 112	Thermodynamics & Statistical Mechanics	4
PHY 115A	Foundation of Quantum Mechanics	4
PHY 122A	Advanced Laboratory in Condensed Matter Physics	4
or PHY 122B	Advanced Laboratory in Particle Physics	
Choose at least one:		4
PHY 129A	Introduction to Nuclear Physics	
PHY 130A	Elementary Particle Physics	
PHY 140A	Introduction to Solid State Physics	
PHY 151	Stellar Structure & Evolution	
PHY 152	Galactic Structure & the Interstellar Medium	
PHY 153	Extragalactic Astrophysics	

PHY 102	Computational Laboratory in Physics <sup>1</sup>	1
Choose at least one additional fixed-unit upper division Physics course. <sup>2</sup>		3-4
Depth Subject Matter Subtotal	36-37	
<b>Total Units</b>	<b>81-88</b>	

<sup>1</sup> PHY 102 waived if PHY 040 taken.

<sup>2</sup> Excluding PHY 160.

## Physics, Bachelor of Science

College of Letters & Science

### The Major Program

From the smallest subatomic particles to atoms, molecules, stars, and galaxies, the study of physics is the study of what makes the universe work. Knowledge gained using atomic-scale microscopes and high-energy particle accelerators and nuclear reactors teaches us not only what holds the atomic nucleus together but also how proteins function and why stars shine.

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### Career Alternatives

Careers in physics and applied physics include research and development, either in universities, government laboratories, or industry; teaching in high schools, junior colleges, and universities; management and administration in industrial laboratories and in government agencies; and in production and sales in industry. A major in physics also provides a strong base for graduate-level work in such interdisciplinary areas as chemical physics, biophysics and medical physics, geophysics and environmental physics, astrophysics and astronomy, computer science, and materials science.

### Program Variance

Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.

### Astronomy

In addition to the introductory Astronomy courses listed, upper division and graduate courses in Astronomy, Astrophysics and Cosmology are listed under Physics.

## Graduate Study

The Department of Physics & Astronomy offers programs of study and research leading to M.S. and Ph.D. degrees. Further information regarding requirements for these three degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616

## Physics

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<b>Physics</b>		
Choose a series:		19-25
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics	
PHY 009HA & PHY 009HB & PHY 009HC & PHY 009HD & PHY 009HE	Honors Physics and Honors Physics and Honors Physics and Honors Physics and Honors Physics	
PHY 040	Introduction to Computational Physics	3
PHY 080	Experimental Techniques	4
<b>Mathematics</b>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3
MAT 022B	Differential Equations	3
Preparatory Subject Matter Subtotal		48-54
<b>Depth Subject Matter</b>		
<b>Physics</b>		
PHY 104A	Introduction to Mathematical Methods in Physics	4
PHY 105A	Classical Mechanics	4
PHY 105B	Analytical Mechanics	4
PHY 110A	Electricity & Magnetism	4
PHY 110B	Electricity & Magnetism	4
PHY 110C	Electricity & Magnetism	4
PHY 112	Thermodynamics & Statistical Mechanics	4
PHY 115A	Foundation of Quantum Mechanics	4
PHY 115B	Applications of Quantum Mechanics	4
PHY 102	Computational Laboratory in Physics (1 unit)	1-4
or PHY 104B	Computational Methods of Mathematical Physics	
<b>Laboratory Requirement</b>		
Choose PHY 122A or 122B or 116 series:		4-12
PHY 122A	Advanced Laboratory in Condensed Matter Physics	
<b>OR</b>		
PHY 122B	Advanced Laboratory in Particle Physics	
<b>OR</b>		

PHY 116A & PHY 116B & PHY 116C	Electronic Instrumentation and Electronic Instrumentation and Introduction to Computer-Based Experiments in Physics		MAT 021C MAT 021D MAT 022A MAT 022B	Calculus Vector Analysis Linear Algebra Differential Equations	4 4 3 3
<i>Concentration Courses</i>			Preparatory Subject Matter Subtotal		48-54
Choose two courses from one specialty and one course from a different specialty:		12			
General Relativity/Astrophysical Applications			<b>Depth Subject Matter</b>		
PHY 154	Astrophysical Applications of Physics		PHY 104A	Introduction to Mathematical Methods in Physics	4
PHY 155	General Relativity		PHY 105A	Classical Mechanics	4
<i>Condensed Matter</i>			PHY 108	Optics	3
PHY 140A	Introduction to Solid State Physics		PHY 108L	Optics Laboratory	1
PHY 140B	Introduction to Solid State Physics		PHY 110A	Electricity & Magnetism	4
<i>Nuclear/Particle Physics</i>			PHY 110B	Electricity & Magnetism	4
PHY 129A	Introduction to Nuclear Physics		PHY 112	Thermodynamics & Statistical Mechanics	4
PHY 130A	Elementary Particle Physics		PHY 115A	Foundation of Quantum Mechanics	4
PHY 130B	Elementary Particle Physics		PHY 115B	Applications of Quantum Mechanics	4
<i>Additional Upper Division Physics Courses</i>			PHY 102	Computational Laboratory in Physics	1-4
Additional upper division Physics courses <sup>1</sup> , for a total of 15 upper-division Physics courses of 3 or more units each. With prior departmental approval, one course from mathematics, engineering, or natural science may be used to meet this requirement. May include only one from:		0-12	or PHY 104B Computational Methods of Mathematical Physics		
PHY 194HA & PHY 194HB	Special Study for Honors Students and Special Study for Honors Students		PHY 151	Stellar Structure & Evolution	4
PHY 195	Senior Thesis		PHY 152	Galactic Structure & the Interstellar Medium	4
PHY 198	Directed Group Study (Must be taken for at least 3 units to count as an elective.)		PHY 153	Extragalactic Astrophysics	4
PHY 199	Special Study for Advanced Undergraduates (Must be taken for at least 3 units to count as an elective.)		PHY 156	Introduction to Cosmology	4
<i>Depth Subject Matter Subtotal</i>		53-76	<i>Laboratory Requirement</i>		
<b>Total Units</b>		<b>101-130</b>	Choose one:		4
Choose one:					
PHY 122A	Advanced Laboratory in Condensed Matter Physics		PHY 122B	Advanced Laboratory in Particle Physics	
			PHY 157	Astronomy Instrumentation & Data Analysis Laboratory	
<i>Electives</i>					
Choose two:			Choose two:		6-12
PHY 105B	Analytical Mechanics		PHY 105B	Analytical Mechanics	
PHY 110C	Electricity & Magnetism		PHY 110C	Electricity & Magnetism	
PHY 116A	Electronic Instrumentation		PHY 116A	Electronic Instrumentation	
PHY 129A	Introduction to Nuclear Physics		PHY 129A	Introduction to Nuclear Physics	
PHY 130A	Elementary Particle Physics		PHY 130A	Elementary Particle Physics	
PHY 130B	Elementary Particle Physics		PHY 130B	Elementary Particle Physics	
PHY 150	Special Topics in Physics		PHY 150	Special Topics in Physics	
PHY 154	Astrophysical Applications of Physics		PHY 154	Astrophysical Applications of Physics	
PHY 155	General Relativity		PHY 155	General Relativity	
GEL 163	Planetary Geology & Geophysics		GEL 163	Planetary Geology & Geophysics	
May include only one from:			May include only one from:		
PHY 194HA & PHY 194HB	Special Study for Honors Students and Special Study for Honors Students		PHY 194HA & PHY 194HB	Special Study for Honors Students and Special Study for Honors Students	
PHY 195	Senior Thesis		PHY 195	Senior Thesis	
PHY 198	Directed Group Study (Must be taken for at least 3 units to count as an elective.)		PHY 198	Directed Group Study (Must be taken for at least 3 units to count as an elective.)	
PHY 199	Special Study for Advanced Undergraduates (Must be taken for at least 3 units to count as an elective.)		PHY 199	Special Study for Advanced Undergraduates (Must be taken for at least 3 units to count as an elective.)	
<i>Depth Subject Matter Subtotal</i>			Depth Subject Matter Subtotal		59-68

<sup>1</sup> Excluding PHY 160

## Astrophysics Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Physics</i>		
Choose a series:		
PHY 009A & PHY 009B & PHY 009C & PHY 009D	Classical Physics and Classical Physics and Classical Physics and Modern Physics	19-25
PHY 009HA & PHY 009HB & PHY 009HC & PHY 009HD & PHY 009HE	Honors Physics and Honors Physics and Honors Physics and Honors Physics and Honors Physics	
PHY 040	Introduction to Computational Physics	3
PHY 080	Experimental Techniques	4
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4

**Recommended**

AST 025	Introduction to Modern Astronomy & Astrophysics
<b>Total Units</b>	<b>107-122</b>

## Physics, Minor

**College of Letters & Science**

All courses in the minor have prerequisites equivalent to MAT 021A-MAT 021B-MAT 021C-MAT 021D and MAT 022A-MAT 022B and PHY 009A-PHY 009B-PHY 009C-PHY 009D. Students considering the possibility of a minor should consult with a Physics major advisor before beginning course work in the minor program.

Code	Title	Units
Choose at least six upper division courses in Physics; excluding:		24
Physics (PHY) courses. (p. 1217)		
PHY/ENG 160	Environmental Physics & Society	
PHY 197T	Tutoring in Physics & Astronomy	
PHY 199	Special Study for Advanced Undergraduates	
<b>Total Units</b>		<b>24</b>

## Physics, Master of Science

**College of Letters & Science**

### Graduate Study

The Department of Physics & Astronomy offers programs of study and research leading to M.S. and Ph.D. degrees. Further information regarding requirements for these three degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616.

## Physics, Doctor of Philosophy

**College of Letters & Science**

### Graduate Study

The Department of Physics & Astronomy offers programs of study and research leading to M.S. and Ph.D. degrees. Further information regarding requirements for these three degrees, graduate research, teaching assistantships, and research assistantships may be obtained by writing to the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616.

## Plant Biology

**College of Biological Sciences**

Savithramma P. Dinesh-Kumar, Ph.D., Chairperson of the Department  
Steven Theg, Ph.D., Vice Chairperson of the Department

## Department Office

1002 Life Sciences; 530-752-0617; Plant Biology (<http://www.plb.ucdavis.edu>); Faculty (<https://www-plb.ucdavis.edu/people/>)

## Advising

1023 Katherine Esau Science Hall (formerly Sciences Lab Building); 530-752-0410; Biology Academic Success Center (BASC) (<http://basc.ucdavis.edu/>)

## Graduate Program

See Plant Biology (Graduate Group) (p. 380).

- Plant Biology, Bachelor of Arts (p. 375)
- Plant Biology, Bachelor of Science (p. 376)
- Plant Biology, Minor (p. 378)
- Systems & Synthetic Biology, Bachelor of Science (p. 378)

## Plant Biology, Bachelor of Arts

**College of Biological Sciences**

### The Major Program

As organisms that sequester carbon and convert solar energy into oxygen, sugar and other usable forms, plants are a primary source of food and myriad biomaterials on the planet, and function as an important buffer against climate change. The Plant Biology major focuses on fundamental aspects of how plants function as organisms, interact with their environment, and the use of this knowledge to address global challenges. A wide variety of scientific disciplines are integrated within the Plant Biology major, including physiology, cell and molecular biology, development, biochemistry and metabolism, genetics and genomics.

### The Program

The Plant Biology Bachelor of Arts major consists of a biological sciences core covering the general principles of biology plus five plant-specific classes dealing with advanced aspects of plant biology including physiology, development, and anatomy. Electives allow students to tailor the degree to suit their interests. Independent research in a laboratory setting is a requirement, and majors in Plant Biology are guaranteed this opportunity. Because of the value of plants as a model system for research in molecular genetics, cell biology, and biochemistry, Plant Biology also can make an excellent minor or second major for students in these fields.

### Career Alternatives

A degree in Plant Biology serves as an excellent launching point for a wide range of career options, including domestic and international opportunities in business, research, management, and teaching in both governmental and private sectors. The program is excellent preparation for students wishing to enter graduate or other professional schools, including medicine, law (particularly environmental or patent law) or journalism. Plant biologists can work in the laboratory, in the field, in the forest, in botanical gardens or nurseries, in agricultural companies, or in biotechnology, pharmaceutical, energy or chemical industries, or in the area of environmental protection.

### Honors & Honors Programs

Students on the honors list may elect to include a maximum of 5 units of 194H in their major programs. For Dean's Honors List information, see the Honors & Prizes (p. 34) for the appropriate College section.

### Faculty Advisor

Philipp Zerbe, Ph.D.

## Graduate Study

Consult Plant Biology (Graduate Group) (p. 380).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		15
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	
<i>Chemistry</i>		10
Choose the 002 series or 004 series:		
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
OR		
CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
008 series:		6
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
Choose one:		
STA 013 or STA 013Y	Elementary Statistics	
STA 100	Applied Statistics for Biological Sciences	
PLS 120	Applied Statistics in Agricultural Sciences	
<i>Recommended</i>		
CHE 002C	General Chemistry	
OR		
CHE 004C	General Chemistry for the Physical Sciences & Engineering	
Preparatory Subject Matter Subtotal		35
<b>Depth Subject Matter</b>		
<i>Biological Science</i>		
BIS 101	Genes & Gene Expression	4
<i>Plant Biology</i>		
PLB/PLS 102 or PLB 108 or EVE 108	California Floristics Systematics & Evolution of Angiosperms Systematics & Evolution of Angiosperms	5
PLB 105	Developmental Plant Anatomy	5
PLB 111	Plant Physiology	3
PLB 112	Plant Growth & Development	3
PLB 117	Plant Ecology	4
EVE 140 or PLB/PLS 116	Paleobotany Plant Morphology & Evolution	4-5
<i>Restricted Electives</i>		
Choose additional upper division units in Plant Biology or related natural science courses from elective list via Plant Biology Bachelors of Science. Courses in other departments may be allowed upon prior consultation with a PLB faculty advisor.		13
Plant Biology Bachelors of Science Electives list (p. 376)		
<i>Recommended</i>		
EVE 100	Introduction to Evolution	
PLB/PLP 148	Introductory Mycology	
Depth Subject Matter Subtotal		41-42
Total Units		76-77

## Plant Biology, Bachelor of Science

### College of Biological Sciences

### The Major Program

As organisms that sequester carbon and convert solar energy into oxygen, sugar and other usable forms, plant are a primary source of food and myriad biomaterials on the planet and function as an important buffer against climate change. The Plant Biology major focuses on fundamental aspects of how plants function as organisms and interact with their environment, and the use of this knowledge to address global challenges. A wide variety of scientific disciplines are integrated within the Plant Biology major, including physiology, cell and molecular biology, development, genetics and genomics.

### The Program

The Plant Biology major consists of a biological sciences core covering the general principles of biology plus three plant-specific classes dealing with advanced aspects of plant biology including physiology, development, and anatomy. Electives allow students to tailor the degree to suit their interests. Independent research in a laboratory setting is a requirement, and students in the Plant Biology B.S. major are guaranteed this opportunity. Because of the value of plants as a model system for research in molecular genetics, cell biology, and biochemistry, Plant Biology also can make an excellent minor or second major for student in these fields.

### Career Alternatives

A degree in Plant Biology serves as an excellent launching point for a wide range of career options, including domestic and international opportunities in business, research, management, and teaching in both governmental and private sectors. The program is excellent preparation for students wishing to enter graduate or other professional schools, including medicine, law (particularly environmental or patent law) or journalism. Plant biologists can work in the laboratory, in the field, in the forest, in botanical gardens or nurseries, in agricultural companies, or in biotechnology, pharmaceutical, energy or chemical industries, or in the area of environmental protection.

### Honors & Honors Programs

Students on the honors list may elect to include a maximum of 5 units of 194H in their major programs. For Dean's Honors List information, see the Honors & Prizes (p. 34) for the appropriate College section.

### Faculty Advisor

Philipp Zerbe, Ph.D.

## Graduate Study

Consult Plant Biology (Graduate Group) (p. 380).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		

BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	<i>Research Internship</i> Choose 3 units: PLB 092 Internship PLB 099 Special Study for Undergraduates PLB 192 Internship PLB 199 Special Study for Advanced Undergraduates
<b>Chemistry</b>		<b>OR Equivalent</b>
Choose the 002 series or 004 series:	15	<i>Restricted Electives</i>
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	Upper division courses in plant biology or other fields relevant to the student's interest chosen from the course lists below. Course in other departments may be allowed upon prior consultation with a PLB faculty advisor.
<b>OR</b>		Depth Subject Matter Subtotal
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	43-46
Choose the 008 or 118 series: <sup>1</sup>	6-12	<b>Course Lists</b>
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	Ecology (p. 377) Evolution & Diversity (p. 378) Plant Genetics (p. 378) Plant Physiology, Development, & Molecular Biology (p. 378)
<b>OR</b>		<b>Total Units</b>
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	99-112
<b>Mathematics</b>		
Choose the 017 series or 021 series: <sup>2</sup>	8-12	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	<sup>1</sup> With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: <ul style="list-style-type: none"><li>• CHE 118A-CHE 008B.</li><li>• CHE 128A-CHE 128B-CHE 008B.</li><li>• CHE 128A-CHE 118B-CHE 118C.</li><li>• CHE 128A-CHE 128B-CHE 129A-CHE 118C.</li><li>• CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B.</li><li>• CHE 118A-CHE 118B-CHE 128C-CHE 129B.</li></ul>
<b>OR</b>		<sup>2</sup> With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C.
MAT 021A & MAT 021B	Calculus and Calculus	
<b>Recommended</b>		
MAT 021C	Calculus	
<b>Physics</b>	12	
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
Preparatory Subject Matter Subtotal	56-66	
<b>Depth Subject Matter</b>		
<i>Biological Sciences</i>		
BIS 101	Genes & Gene Expression	4
BIS 104	Cell Biology	3
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6
<i>Statistics</i>		
STA 100	Applied Statistics for Biological Sciences	4
<i>Plant Biology</i>		
PLB 105	Developmental Plant Anatomy	5
PLB 111	Plant Physiology	3
PLB 112	Plant Growth & Development	3

PLS 131	(Discontinued)	2
PLS/ESM 144	Trees & Forests	4

## Evolution & Diversity

Code	Title	Units
BIS 180L	Genomics Laboratory	5
BIS 181	Comparative Genomics	3
EVE 100	Introduction to Evolution	4
EVE 102	Population & Quantitative Genetics	4
EVE/PLB 108	Systematics & Evolution of Angiosperms	5
EVE 140	Paleobotany	4
EVE 149	Evolution of Ecological Systems	4
PLB/PLS 102	California Floristics	5
PLB/EVE 108	Systematics & Evolution of Angiosperms	5
PLB/PLS 116	Plant Morphology & Evolution	5
PLB 143	Evolution of Crop Plants	4
PLB/PLP 148	Introductory Mycology	4
PLS 131	(Discontinued)	2

## Plant Genetics

Code	Title	Units
BIS 180L	Genomics Laboratory	5
BIS 181	Comparative Genomics	3
BIS 183	Functional Genomics	3
EVE 100	Introduction to Evolution	4
EVE 102	Population & Quantitative Genetics	4
MCB 164	Advanced Eukaryotic Genetics	3
PLB 113	Molecular & Cellular Biology of Plants	3
PLP/ENT/PLB 123	Plant-Virus-Vector Interaction	3
PLS 152	Plant Genetics	4

## Plant Physiology, Development, & Molecular Biology

Code	Title	Units
BIS 180L	Genomics Laboratory	5
BIS 181	Comparative Genomics	3
BIS 183	Functional Genomics	3
BIT 160	Principles of Plant Biotechnology	3
BIT 161A	Genetics & Biotechnology Laboratory	6
BIT 161B	Plant Genetics & Biotechnology Laboratory	4
MCB/PLB 126	Plant Biochemistry	3
PLB 113	Molecular & Cellular Biology of Plants	3
PLB/MCB 126	Plant Biochemistry	3
PLP/ENT/PLB 123	Plant-Virus-Vector Interaction	3
PLP 130	Fungal Biology & Disease	3
PLS 157	Physiology of Environmental Stresses in Plants	4
PLS 158	Mineral Nutrition of Plants	4

## Plant Biology, Minor

College of Biological Sciences

The Plant Biology minor explores plants and their dynamic means of interacting with the environment. The Plant Biology minor has an 18 unit minimum requirement. Four areas of specialization are offered—(a) Anatomy & Morphology, (b) Physiology & Development, (c) Evolution & Ecology, and (d) Biochemistry & Molecular Genetics—with a small, strategic course selection per area.

## Faculty Advisor

Philipp Zerbe, Ph.D.

## Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building; 530-752-0410).

Code	Title	Units
	Only one course used to satisfy a requirement for the minor may be applied toward a student's major.	
	Upper division units, including at least one course from each of the following four groups:	18
	(a) Anatomy & Morphology	
EVE 140	Paleobotany	
PLB 105	Developmental Plant Anatomy	
PLB/PLS 116	Plant Morphology & Evolution	
	(b) Physiology & Development	
PLB 111	Plant Physiology	
PLB 112	Plant Growth & Development	
PLB/ENT/PLP 123	Plant-Virus-Vector Interaction	
PLP 130	Fungal Biology & Disease	
	(c) Evolution & Ecology	
EVE 100	Introduction to Evolution	
PLB/PLS 102	California Floristics	
PLB/EVE 108	Systematics & Evolution of Angiosperms	
PLB/EVE 117	Plant Ecology	
PLB 143	Evolution of Crop Plants	
	(d) Biochemistry & Molecular Genetics	
BIT 160	Principles of Plant Biotechnology	
PLB 113	Molecular & Cellular Biology of Plants	
PLB/MCB 126	Plant Biochemistry	
PLS 152	Plant Genetics	
PLS 154	Introduction to Plant Breeding	
PLS 171	Principles & Practices of Plant Propagation	
PLS 172	Biology and Quality of Harvested Crops	
	Total Units	18

## Systems & Synthetic Biology, Bachelor of Science

College of Biological Sciences

## The Major Program

The Systems & Synthetic Biology major provides students with a broad understanding of these two related and interdisciplinary fields. Systems Biology aims to understand how complex organismal properties and structures arise from simple components and interactions, and to

identify design principles common to many types of biological regulation. Synthetic Biology focuses on the modification (or, ultimately, de novo construction) of organisms to generate novel pathways and processes. This major emphasizes integrative, computational and quantitative approaches to solving biological problems and engineering new biological outcomes.

## The Program

In the freshman and sophomore years, students majoring in Systems & Synthetic Biology build a broad scientific background, taking courses in chemistry, biology, physics, and mathematics as well as an introduction course to computing for biologists. As juniors or seniors, students can enroll in courses that introduce them to the fundamental principles in mathematics, computer science, systems theory and application, and biological engineering.

## Career Alternatives

The biotech workforce has a growing demand for biologists that are fluent in different merging disciplines that are covered by the Systems and Synthetic Biology Major. This combination of skills will allow graduates to work at the interface between biologists and engineers found in new emerging industries related to the pharmaceutical, biomedical, bioenergy, agricultural, nutrition, and microbiome industries. The program is also an excellent background for students wishing to enter graduate or other professional schools, including medicine, law, journalism or policy Honors & Honors Programs. Refer to the Academic Information section and the appropriate College section for Dean's Honors List information.

## Faculty Advisor

Siobhan Brady, Ph.D.

Code	Title	Units
<i>Preparatory Subject Matter</i>		
Biological Sciences		17
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	
BIS 015L	Introduction to Data Science for Biologists	
Chemistry		21-27
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
<b>OR</b>		
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
<b>AND</b>		
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
<b>OR</b>		

CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
Mathematics		8-12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B	Calculus and Calculus	
<i>Recommended</i>		
MAT 021C	Calculus	
Physics		12
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
<b>Preparatory Subject Matter Subtotal</b>		
<i>Depth Subject Matter</i>		
Statistics		8
STA 100	Applied Statistics for Biological Sciences	
STA 101	Advanced Applied Statistics for the Biological Sciences	
Genetics		4
BIS 101	Genes & Gene Expression	
<b>Biochemistry, Bioenergetics, &amp; Metabolism</b>		
BIS 102 & BIS 103 or BIS 105	Structure & Function of Biomolecules and Bioenergetics & Metabolism Biomolecules & Metabolism	3-6
Cell Biology		3
BIS 104	Cell Biology	
<b>Systems Biology</b>		
BIS 134	Systems Biology: From Biological Circuits to Biological Systems	2
<b>Biomolecular Systems Engineering</b>		
BIM 143	Biomolecular Systems Engineering: Synthetic Biology	4
<b>Systems &amp; Synthetic Biology</b>		
BIS 185L	Systems & Synthetic Biology Lab	5
<i>Restricted Electives</i>		
Choose three or more upper division courses not used to satisfy another requirement; 9 unit minimum:		
BIS/MAT 107	Probability & Stochastic Processes with Applications to Biology	
BIS 180L	Genomics Laboratory	
BIS 183	Functional Genomics	
MIC 102	Introductory Microbiology	
MIC 103L	Introductory Microbiology Laboratory	
MIC 115	Recombinant DNA Cloning & Analysis	
MIC 117	Analysis of Molecular Genetic Circuits	
MIC 170	Yeast Molecular Genetics	
MCB 120	Molecular Biology & Biochemistry Laboratory Associated Lecture	

MCB 120L	Molecular Biology & Biochemistry Laboratory
MCB 121	Advanced Molecular Biology
MCB 123	Behavior & Analysis of Enzyme & Receptor Systems
MCB 124	Macromolecular Structure & Function
MCB/PLB 126	Plant Biochemistry
MCB 160L	Principles of Genetics Laboratory
MCB 164	Advanced Eukaryotic Genetics
MCB 182	Principles of Genomics
EBS 161	Kinetics & Bioreactor Design
BIM 105	Probability & Data Science for Biomedical Engineers
BIM 117	Modeling Strategies for Biomedical Engineering
BIM 140	Protein Engineering
BIM 140L	Protein Engineering Laboratory
BIM 152	Molecular Control of Biosystems
BIT 150	Applied Bioinformatics
BIT 160	Principles of Plant Biotechnology
BIT 161B	Plant Genetics & Biotechnology Laboratory
Depth Subject Matter Total	38-41
Total Units	96-109

## Plant Biology (Graduate Group)

### Graduate Studies

Stacey Harmer, Ph.D., Chairperson of the Group

### Group Office

227A Green Hall (formerly Life Sciences); 530-752-2981; Fax 530-752-8822; Plant Biology Graduate Group (<http://pbi.ucdavis.edu/>)

- Plant Biology, Master of Science (p. 380)
- Plant Biology, Doctor of Philosophy (p. 380)

## Plant Biology, Master of Science

### Graduate Studies

### Graduate Study

The Graduate Group in Plant Biology offers programs of study and research leading to M.S. and Ph.D. degrees. The program prepares students for careers in teaching and research at universities and colleges, government and industrial laboratories. The graduate curriculum provides both breadth in the discipline and in-depth study and research in one of four areas of specialization: cell and developmental biology; environmental and integrative biology; molecular biology, biochemistry and genomics; and systematics and evolutionary biology. These areas of specialization permit individual study and research into diverse aspects of plant biology, including anatomy, biochemistry, biotechnology, cell biology, cytology, developmental biology, ecology, genetics, genomics, molecular biology, morphology, paleo-botany, physiology, population biology, systematics, and weed science. The graduate advisor, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations.

### Preparation

For both the M.S. and Ph.D. programs, a level of scholastic development equivalent to a Bachelor's degree in biological sciences from a recognized college or university is required. Courses in the following areas are considered to be prerequisites to the advanced degrees in Plant Biology: biology, inorganic chemistry, organic chemistry, introductory physics, genetics, plant development and structure, biochemistry, introductory plant physiology, calculus, introductory statistics, ecology/systematics/evolution, and cell/molecular biology. Limited deficiencies can be made up after admission.

### Graduate Advisor

Contact the Group office.

## Plant Biology, Doctor of Philosophy

### Graduate Studies

### Graduate Study

The Graduate Group in Plant Biology offers programs of study and research leading to M.S. and Ph.D. degrees. The program prepares students for careers in teaching and research at universities and colleges, government and industrial laboratories. The graduate curriculum provides both breadth in the discipline and in-depth study and research in one of four areas of specialization: cell and developmental biology; environmental and integrative biology; molecular biology, biochemistry and genomics; and systematics and evolutionary biology. These areas of specialization permit individual study and research into diverse aspects of plant biology, including anatomy, biochemistry, biotechnology, cell biology, cytology, developmental biology, ecology, genetics, genomics, molecular biology, morphology, paleo-botany, physiology, population biology, systematics, and weed science. The graduate advisor, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations.

### Preparation

For both the M.S. and Ph.D. programs, a level of scholastic development equivalent to a Bachelor's degree in biological sciences from a recognized college or university is required. Courses in the following areas are considered to be prerequisites to the advanced degrees in Plant Biology: biology, inorganic chemistry, organic chemistry, introductory physics, genetics, plant development and structure, biochemistry, introductory plant physiology, calculus, introductory statistics, ecology/systematics/evolution, and cell/molecular biology. Limited deficiencies can be made up after admission.

### Graduate Advisor

Contact the Group office.

## Plant Pathology

### College of Agricultural & Environmental Sciences

### Graduate Program

Gitta L. Coaker, Ph.D., Chairperson of the Graduate Group  
Theresa Garcia, Graduate Program Coordinator

### Graduate Program Office

354 Hutchison Hall; 530-754-9506; Plant Pathology (<http://plantpathology.ucdavis.edu/>); Faculty

([https://plantpathology.ucdavis.edu/people/?first=&last=&title=&unit=&field\\_sf\\_person\\_type\\_target\\_id%5B0%5D=26](https://plantpathology.ucdavis.edu/people/?first=&last=&title=&unit=&field_sf_person_type_target_id%5B0%5D=26))

## Undergraduate Program

Johan Leveau, Lead Faculty Advisor  
 Bianca Radut, Undergraduate Advisor

### Undergraduate Program Office

150 Hutchison Hall; 530-754-4131; Global Disease Biology (<https://gdb.ucdavis.edu/>)

- Fungal Biology & Ecology, Minor (p. 381)
- Global Disease Biology, Bachelor of Science (p. 381)
- Global Disease Biology, Minor (p. 383)
- Plant Pathology, Master of Science (p. 383)
- Plant Pathology, Doctor of Philosophy (p. 383)

## Fungal Biology & Ecology, Minor

### College of Agricultural & Environmental Sciences

The Fungal Biology & Ecology minor is being discontinued. Contact the minor advisor for current class availability.

The minor in Fungal Biology & Ecology is for students interested in a concentrated exposure to and knowledge of the fungi and allied organisms.

The minor is sponsored by the Plant Pathology Department (p. 380).

### Minor Advisor

Bianca Radut (<https://gdb.ucdavis.edu/people/bianca-radut/>)

Code	Title	Units
<i>Plant Pathology</i>		
PLP 130	Fungal Biology & Disease	3
PLP/PLB 148	Introductory Mycology	4
PLP 150	Fungal Ecology	3
Choose 7-9 units:		7-9
FST 104	Food Microbiology	
PLP 040	Edible Mushroom Cultivation	
PLP 135	Field Identification of Mushrooms	
PLP 185	Advanced Mushroom Taxonomy	
PLP 224	Advanced Mycology (available to advanced students with consent of instructor)	
SAS 030	Mushrooms, Molds, & Society	
SSC 111	Soil Microbiology	
<b>Total Units</b>		<b>17-19</b>

## Global Disease Biology, Bachelor of Science

### College of Agricultural & Environmental Sciences

### Program Office

150 Hutchison Hall; 530-754-4131; [gdb-advise@ucdavis.edu](mailto:gdb-advise@ucdavis.edu); Global Disease Biology (<http://gdb.ucdavis.edu/>)

**Advisor.** Bianca Radut (<https://gdb.ucdavis.edu/people/bianca-radut/>)

## Major Program Approach

The Global Disease Biology (GDB) major offers students the opportunity to study disease and its relationship to the health of people, animals, plants, and the environment. The program uses an integrated approach to advance student understanding of the concept(s) of disease, the societal and personal impacts of past, present and future diseases, and the science behind disease discoveries, causes, evolution, diagnosis, treatment, and prevention. The program recognizes the interconnectedness of people, animals, plants, and the environment and aims to identify and address the fundamental causes of poor health around the world. Managing global disease problems requires a multifaceted, holistic approach to address the full spectrum of human, animal, plant, and environmental health risks (also known as a One Health approach). Throughout a series of core courses, issues related to human, animal, and plant health, along with tools available to solve these problems, will be introduced to provide students with real-world scenarios in which they can apply and advance their creative and critical thinking skills. The major prepares graduates with the knowledge, leadership skills and experiences required to excel in professions associated with global health, the environment, food safety and security, biological safety and security, and health policy. For more information, see Global Disease Biology (<http://gdb.ucdavis.edu/>).

### Program

The Global Disease Biology major provides students with broad preparatory scientific course work, global disease biology core classes, flexibility in upper division electives, and a strong research experience.

**Global Disease Biology core classes** are intended to be transdisciplinary and focus on concepts that cut across human, animal, and plant diseases offering a unifying ecological and quantitative perspective on disease.

**Flexible upper division electives are known as Restricted Electives**, which allow students to plan their chosen emphasis of study as part of a required discussion course (GDB 187) and in consultation with their advisor. Students will draw from many undergraduate courses currently offered on disease and health in a way that complements the core courses required for the Global Disease Biology major. You can read more about these electives in the Guide to Restricted Electives from our website (<https://gdb.ucdavis.edu/important-documents/>).

**Strong research experience** is acquired in a senior research project, called the GDB Practicum, which each student designs to bridge the disciplines of the major. You can learn more about the Practicum project requirement by reading the Guide to Practicum from our website (<https://gdb.ucdavis.edu/important-documents/>).

### Internships and Careers

The program and interests of each student in solving societal problems guides students to a range of internship and career choices. On and off-campus internship opportunities are available in research laboratories, in field situations, with governmental agencies, with private industry, and in international programs. A degree in Global Disease Biology prepares graduates with the knowledge, leadership skills and experiences required to excel in a vast array of professions associated with areas such as healthcare, medicine, public health, health policy, food safety and security, and nature conservation, as each relates to disease and health of people,

animals, plants and the environment in developing and developed countries.

Learn more about our alumni on our GDB Blog (<https://gdb.ucdavis.edu/blog/>) and Facebook page (<https://www.facebook.com/UCD.GDB>)!

## Faculty

Includes members of the Departments of Plant Pathology in the College of Agricultural & Environmental Sciences, School of Veterinary Medicine, and School of Medicine.

### Lead Faculty Advisor

Johan H.J. Leveau, Ph.D., Professor (Plant Pathology)

Code	Title	Units		
<b>Preparatory Subject Matter</b>				
<i>Global Disease Biology</i>				
GDB 090	Introduction to Global Disease Biology	1	GDB 101 Epidemiology	
<i>Science &amp; Society</i>			GDB 102 Disease Intervention & Policy	
SAS 013	Disease & Society	3	GDB 187 Global Disease Biology Seminar <sup>1</sup>	
<i>Biological Sciences</i>			GDB 189 Global Disease Biology Senior Research <sup>2</sup>	
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5	GDB 189D Global Disease Biology Research Discussion <sup>3</sup>	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5	<i>Pathogen/Disease Courses; choose two:</i>	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5	ENT 153 Medical Entomology	
<i>Chemistry</i>			ENT 156 Biology of Parasitism	
CHE 002A	General Chemistry	5	GDB 103 Microbiome of People, Animals, & Plants	
CHE 002B	General Chemistry	5	MIC 162 General Virology	
CHE 002C	General Chemistry	5	or PMI 128 Biology of Animal Viruses	
<b>AND</b>			PLP 120 Introduction to Plant Pathology	
Choose a series:			PMI 127 Medical Bacteria & Fungi	
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	6-8	Depth Subject Matter Subtotal	43-45
CHE 118A & CHE 118B	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	4	<b>Restricted Electives</b>	
Focused specialty upper division courses as outlined in the latest version of the "Guide to the GDB Restricted Electives" and with approval of an advisor; 25 units is the minimum.				25
Guide to GDB Restricted Electives ( <a href="https://gdb.ucdavis.edu/important-documents/">https://gdb.ucdavis.edu/important-documents/</a> )				
Restricted Electives Subtotal			Total Units	132-136
<b>Physics</b>				
PHY 007A	General Physics	4	<sup>1</sup> GDB 187 provides details about the practicum requirement.	
PHY 007B	General Physics	4	<sup>2</sup> GDB 189 provides research units for the practicum project.	
<i>Calculus</i>				<sup>3</sup> GDB 189D provides time to write the practicum report.
MAT 017A	Calculus for Biology & Medicine	4	<b>Global Disease Biology Core Competencies</b>	
MAT 017B	Calculus for Biology & Medicine	4	Read the Core Competencies for the Global Disease Biology major ( <a href="https://gdb.ucdavis.edu/competencies/">https://gdb.ucdavis.edu/competencies/</a> ).	
MAT 017C	Calculus for Biology & Medicine	4		
Statistics; choose one:			<b>First Year High School Admits</b>	
STA 013 or STA 013Y	Elementary Statistics	4	Your first quarter at UC Davis will be personalized to you, according to your Placement Exam scores for both Math ( <a href="https://www.math.ucdavis.edu/undergrad/math_placement/">https://www.math.ucdavis.edu/undergrad/math_placement/</a> ) and Chemistry ( <a href="https://chemistry.ucdavis.edu/undergraduate/general-chemistry-series/chemistry-placement-requirements/">https://chemistry.ucdavis.edu/undergraduate/general-chemistry-series/chemistry-placement-requirements/</a> ). Please see an advisor to make sure you register for the appropriate courses.	
STA 100	Applied Statistics for Biological Sciences	4		
PLS 120	Applied Statistics in Agricultural Sciences	4		
Preparatory Subject Matter Subtotal				
64-66				
<b>Depth Subject Matter</b>				
<i>Biological Sciences</i>				
BIS 101	Genes & Gene Expression	4		
<i>Biochemistry</i>				

Course	Title	Units
<b>First Year</b>		
<b>Fall</b>		
	This is a SAMPLE schedule—see advisor to confirm your own plan.	
SAS 013	Disease & Society	3
CHE 002A	General Chemistry	5
MAT 017A	Calculus for Biology & Medicine	4
SAS 006A	Introduction to Career Discovery Groups (Optional program for career exploration.)	1
	<b>Units</b>	<b>13</b>
	<b>Total Units</b>	<b>13</b>
To make a 4-year plan, please see the GDB Advising team—you are welcome to talk to your academic advisor or peer advisors! Email us at <a href="mailto:gdb-advise@ucdavis.edu">gdb-advise@ucdavis.edu</a> .		
<b>First Year Transfers</b>		
Your first quarter plan will be personalized to you, according to how your courses have articulated from your previous institution to UC Davis. <i>Please see an advisor to make sure you register for the appropriate classes!</i>		
Course	Title	Units
<b>Third Year</b>		
<b>Fall</b>		
	This is a SAMPLE schedule—see advisor to confirm your own plan.	
SAS 013	Disease & Society	3
GDB 090	Introduction to Global Disease Biology	1
BIS 101	Genes & Gene Expression	4
SAS 106	Career Discovery Groups for Transfer Students (Optional program for career exploration.)	1
Restricted Elective <sup>1</sup>		4
	<b>Units</b>	<b>13</b>
	<b>Total Units</b>	<b>13</b>

<sup>1</sup> Restricted Electives make up 25 (or more) units of a student's GDB major requirements. Read more about them in the Guide to Restricted Electives, which you can download from our website (<https://gdb.ucdavis.edu/important-documents/>).

To make a full plan for graduation, please see the GDB Advising team—you are welcome to talk to your academic advisor or peer advisors! Email us at [gdb-advise@ucdavis.edu](mailto:gdb-advise@ucdavis.edu).

## Global Disease Biology, Minor

College of Agricultural & Environmental Sciences

### Program Office

150 Hutchison Hall; 530-754-4131; [gdb-advise@ucdavis.edu](mailto:gdb-advise@ucdavis.edu); Global Disease Biology (<http://gdb.ucdavis.edu/>)

## The Minor

A minor in Global Disease Biology may complement a student's major program. Note that some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

If you plan to declare the GDB minor, you MUST meet with our office to set up an academic plan *before your last year* at UC Davis. If you do not, you may not be able to declare GDB as a minor.

Our faculty includes members of the Departments of Plant Pathology from the College of Agricultural & Environmental, School of Veterinary Medicine, School of Medicine.

Code	Title	Units
<i>Science &amp; Society</i>		
SAS 013	Disease & Society	3
<i>Pathology, Microbiology &amp; Immunology</i>		
PMI 129Y	One Health: Human, Animal & Environment Interfaces	3
<i>Medicine &amp; Epidemiology</i>		
VME 158	Infectious Disease in Ecology & Conservation	3
<i>Global Disease Biology</i>		
GDB 101	Epidemiology	4
GDB 102	Disease Intervention & Policy	4
<i>Pathogen/Disease Course; choose one:</i>		
ENT 153	Medical Entomology	
ENT 156	Biology of Parasitism	
GDB 103	Microbiome of People, Animals, & Plants	
MIC 162	General Virology	
or PMI 128	Biology of Animal Viruses	
PLP 120	Introduction to Plant Pathology	
PMI 127	Medical Bacteria & Fungi	
	<b>Total Units</b>	<b>20-21</b>

## Plant Pathology, Master of Science

College of Agricultural & Environmental Sciences

### Graduate Study

The Department of Plant Pathology offers programs of study and research leading to M.S. and Ph.D. degrees. Information can be obtained from the graduate advisor. See also the Graduate Studies (<http://gradstudies.ucdavis.edu/>).

### Graduate Advisors

Plant Pathology Advising (<https://plantpathology.ucdavis.edu/advising/>)

## Plant Pathology, Doctor of Philosophy

College of Agricultural & Environmental Sciences

### Graduate Study

The Department of Plant Pathology offers programs of study and research leading to M.S. and Ph.D. degrees. Information can be obtained

from the graduate advisor. See also the Graduate Studies (<http://gradstudies.ucdavis.edu/>).

## Graduate Advisors

Plant Pathology Advising (<https://plantpathology.ucdavis.edu/advising/>)

# Plant Sciences

## College of Agricultural & Environmental Sciences

Gail Taylor, Ph.D., Chairperson of the Department

## Department Office

Advising Center (<https://www.plantsciences.ucdavis.edu/undergraduate/>) is located in 1220 Plant & Environmental Sciences. For more information, see Plant Sciences (<https://www.plantsciences.ucdavis.edu/undergraduate/>).

## Major Programs

- Biotechnology (p. 385)
- International Agricultural Development (p. 392)
- Plant Sciences (p. 396)

## Related Courses

See the Biotechnology (BIT) (p. 594), Environmental Horticulture (ENH) (p. 806), Horticulture (HRT) (p. 922), International Agricultural Development (IAD) (p. 947), and Plant Sciences (PLS) (p. 1236) course listings.

## Graduate Study

For related graduate study, see the M.S. degree program in International Agricultural Development, the M.S. and Ph.D. degree programs in the graduate groups of Horticulture & Agronomy, Plant Biology, Ecology, Genetics, Geography, and Soils & Biogeochemistry.

- Agricultural Systems & Environment, Minor (p. 384)
- Biotechnology, Bachelor of Science (p. 385)
- Ecological Management & Restoration, Bachelor of Science (p. 389)
- Environmental Horticulture & Urban Forestry, Bachelor of Science (p. 390)
- Environmental Horticulture, Minor (p. 392)
- International Agricultural Development, Bachelor of Science (p. 392)
- International Agricultural Development, Minor (p. 395)
- Landscape Restoration, Minor (p. 395)
- Plant Sciences, Bachelor of Science (p. 396)

# Agricultural Systems & Environment, Minor

## College of Agricultural & Environmental Sciences

**Advising** is located in 1220 Plant & Environmental Sciences; Undergraduate Minors (<https://www.plantsciences.ucdavis.edu/undergraduate/undergraduate-minors/>)

## Minor Advisor

Plant Sciences Advising (<https://www.plantsciences.ucdavis.edu/undergraduate/undergraduate-minors/>); [plsadvising@ucdavis.edu](mailto:plsadvising@ucdavis.edu)

Code	Title	Units
<b>Preparatory Material</b>		
<i>Statistics</i>		
Choose one:		4-5
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
PLS 120	Applied Statistics in Agricultural Sciences	
<i>Plant Science</i>		
Choose one:		4
PLS 002	Botany & Physiology of Cultivated Plants	
Completion of BIS requirement. <sup>1</sup>		
<b>Total Units</b>		<b>8-9</b>

<sup>1</sup> Completion of the following fulfills this requirement:  

- BIS 002A
- BIS 002B
- BIS 002C

Code	Title	Units
<b>Agricultural Systems &amp; Environment Minor</b>		
Choose one of the two following tracks:		
Sustainable Agriculture Track (p. 384)		18-20
Range & Natural Resources Track (p. 385)		
<b>Total Units</b>		<b>18-20</b>

## Sustainable Agriculture Track

Code	Title	Units
PLS 150	Sustainability & Agroecosystem Management	4
SSC 100	Principles of Soil Science	5
Choose one:		3-5
PLS 105	Concepts in Pest Management	
PLS 176	Introduction to Weed Science	
ENT 110	Arthropod Pest Management	
Choose a minimum of 6 units:		6
PLS 112	Forage Crop Production	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS 170A	Fruit & Nut Cropping Systems	
PLS 170B	Fruit & Nut Cropping Systems	
<b>Total Units</b>		<b>18-20</b>

## Range & Natural Resources Track

Code	Title	Units
PLS 130	Grassland Ecology	3
Choose a minimum of 15 units:		15
PLS 112	Forage Crop Production	
PLS 131	(Discontinued)	
PLS 135	Ecology & Community Structure of Grassland & Savannah Herbivores	
PLS 150	Sustainability & Agroecosystem Management	
PLS 163	Ecosystem & Landscape Ecology	
ESP 123	Introduction to Field & Laboratory Methods in Ecology	
ESP 172	Public Lands Management	
WFC 110	Biology & Conservation of Wild Mammals	
WFC 151	Wildlife Ecology	
<b>Total Units</b>		<b>18</b>

## Biotechnology, Bachelor of Science

College of Agricultural & Environmental Sciences

### Faculty

Faculty includes members of the Departments of Animal Science; Engineering: Chemical Engineering & Materials Science; Computer Science; Engineering: Biological & Agricultural; Food Science & Technology; Land, Air, & Water Resources; Plant Pathology; Plant Sciences; Viticulture & Enology; and the College of Biological Sciences.

### The Major Program

Every living organism, from the smallest and most primitive bacteria to every plant, insect, animal or human being, contains DNA as the primary genetic material. DNA directs all cellular processes, creating the incredible variety and diversity of living organisms in the biosphere. Biotechnology focuses on the mechanics of life processes and their application. Biotechnology means "life technology" and represents an integrated, multidisciplinary field, with a profound impact today on almost every aspect of human endeavor.

### Preparatory Requirements

UC Davis students who wish to change their major to Biotechnology must complete the following courses (representing the subject areas of Biological Sciences, Chemistry, and Mathematics) with a grade point average of at least 2.500 in each subject area. All of these courses must be taken for a letter grade:

Code	Title	Units
<b>Biological Sciences</b>		
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	15
<b>Chemistry</b>		
One series:		15
<b>Mathematics</b>		
One series:		6-8
MAT 016A & MAT 016B	Short Calculus and Short Calculus	
MAT 071A & MAT 017B	Explorations in Elementary Mathematics and Calculus for Biology & Medicine	
MAT 021A & MAT 021B	Calculus and Calculus	

### The Program

In the first two years, students develop a strong and general background in biological science with an emphasis on fundamental concepts and basic principles of genetics, molecular biology and cell biology. Four options, Animal Biotechnology, Plant Biotechnology, Fermentation/Microbial Biotechnology, and Bioinformatics, provide in-depth training and specialized knowledge in an aspect of biotechnology. Each option has a strong laboratory component to reinforce the theoretical concepts. Students also do an internship in a biotechnology company or university or government laboratory.

### Internships & Career Opportunities

In the last decade, more industries are turning to biotechnology to solve problems and improve products, creating a growing job market for individuals trained in biotechnology in the agricultural, food and beverage, health care, chemical, pharmaceutical and biochemical, and environmental and bioremediation industries.

Graduates trained in the technologies designed for biotechnology will find their training applicable to advanced research in molecular biology, genetics, biochemistry, and the plant and animal sciences.

### Lead Faculty Advisor

Diane Beckles in 133 Asmundson Hall (<https://www.plantsciences.ucdavis.edu/people/diane-beckles/>)

### Major Advisor

Advising Center for the major is located in 1220 Plant & Environmental Sciences; [plsadvising@ucdavis.edu](mailto:plsadvising@ucdavis.edu).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
<i>Biotechnology</i>		
		5

BIT 001Y	Introduction to Biotechnology	UWP 104C	Writing in the Professions: Journalism
BIT 091	Undergraduate Seminars in Biotechnology	UWP 104D	Writing in the Professions: Elementary & Secondary Education
<i>Chemistry</i>		UWP 104E	Writing in the Professions: Science
21-27		UWP 104F	Writing in the Professions: Health or UWP 104FY Writing in the Professions: Health
002 series:		UWP 104T	Writing in the Professions: Technical Writing
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	Preparatory Subject Matter Subtotal	63-71
Choose CHE 008 series or 118 series or 128 series & 129A:		<b>Depth Subject Matter</b>	
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	<i>Biological Science</i>	10-17
<b>OR</b>		BIS 101	Genes & Gene Expression
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	BIS 104	Cell Biology
Choose BIS 105, or BIS 102 & BIS 103, or ABI 102 & ABI 103:		BIS 105	Biomolecules & Metabolism
<b>OR</b>		BIS 102 & BIS 103	Structure & Function of Biomolecules and Bioenergetics & Metabolism
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry and Organic Chemistry and Organic Chemistry	<b>OR</b>	
CHE 129A	Organic Chemistry Laboratory	ABI 102 & ABI 103	Animal Biochemistry & Metabolism and Animal Biochemistry & Metabolism
<i>Mathematics</i>		<i>Biotechnology</i>	3
Choose a series:	6-8	BIT 171	Professionalism & Ethics in Genomics & Biotechnology
MAT 016A & MAT 016B	Short Calculus and Short Calculus	<i>Microbiology</i>	3
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	MIC 102	Introductory Microbiology
MAT 021A & MAT 021B	Calculus and Calculus	<i>Molecular &amp; Cellular Biology</i>	3
<b>Physics</b>	8	MCB 121	Advanced Molecular Biology
PHY 007A	General Physics	<i>Internship or Independent Research</i>	
PHY 007B	General Physics	Must be approved by major advisor	
Choose one:	4	Choose one:	3
PLS 120	Applied Statistics in Agricultural Sciences	BIT 189L	Laboratory Research in Genomics & Biotechnology
STA 100	Applied Statistics for Biological Sciences	BIT 192	Internship in Biotechnology
Choose one:	4	BIT 199	Special Study for Advanced Undergraduates
May overlap with the English Composition Requirement; may be waived by passing the upper division composition exam.		The following two courses are optional:	
UWP 101 or UWP 101V or UWP 101Y	Advanced Composition Advanced Composition Advanced Composition	BIT/PLS 188	Undergraduate Research Proposal
UWP 102A	Writing in the Disciplines: Special Topics	BIT 194H	Honors Thesis in Biotechnology
UWP 102B	Writing in the Disciplines: Biology	Depth Subject Matter Subtotal	22-29
UWP 102D	Writing in the Disciplines: International Relations	<b>Areas of Specialization</b>	
UWP 102E	Writing in the Disciplines: Engineering	Choose one:	29-31
UWP 102F	Writing in the Disciplines: Food Science & Technology	Fermentation/Microbiology Biotechnology Option (p. 387)	
UWP 102G	Writing in the Disciplines: Environmental Writing	Plant Biotechnology Option (p. 387)	
UWP 104A or UWP 104AY	Writing in the Professions: Business Writing Writing in the Professions: Business Writing	Animal Biotechnology Option (p. 388)	
UWP 104B	Writing in the Professions: Law	Bioinformatics Option (p. 388)	
Total Units		Areas of Specialization Subtotal	29-31
			114-131

## Fermentation/Microbiology Biotechnology Option

Code	Title	Units
<b>Fermentation/Microbiology Biotechnology Option</b>		
BIT 161A or MCB 160L	Genetics & Biotechnology Laboratory Principles of Genetics Laboratory	5-6
FST 104L or MIC 104L	Food Microbiology Laboratory General Microbiology Laboratory	3-4
Choose one:		3
MIC 115	Recombinant DNA Cloning & Analysis	
MIC 120	Microbial Ecology	
MIC 140	Bacterial Physiology	
MIC 150	Genomes of Pathogenic Bacteria	
MIC 170	Yeast Molecular Genetics	
PLP 130	Fungal Biology & Disease	

AND

Choose one from the previous list or below:	3
BIS 181	Comparative Genomics
BIS 183	Functional Genomics
MCB 182	Principles of Genomics
<i>Restricted Electives</i>	
Choose 15 units:	15
BIS 132	(Discontinued)
BIS 181	Comparative Genomics
BIS 183	Functional Genomics
BIT 150	Applied Bioinformatics
BIT 161B	Plant Genetics & Biotechnology Laboratory
BIT 188	Undergraduate Research Proposal
CHE 107A	Physical Chemistry for the Life Sciences
CHE 107B	Physical Chemistry for the Life Sciences
CHE 130A	Principles of Medicinal Chemistry
CHE 130B	Computational Drug Design
ECH 161C	Biotechnology Facility Design & Regulatory Compliance
ECH 161L	Bioprocess Engineering Laboratory
ECS 124	Theory & Practice of Bioinformatics
ECS 129	Computational Structural Bioinformatics
EVE 100	Introduction to Evolution
FST 102A	Malting & Brewing Science
FST 102B	Practical Malting & Brewing
FST 104	Food Microbiology
FST 104L	Food Microbiology Laboratory
FST 110	Food Processing
FST/VEN 114	Fermented Foods
FST 123	Introduction to Enzymology
FST 123L	Enzymology Laboratory
MIC 105	Microbial Diversity
MIC 105L	Microbial Diversity Laboratory
MIC 115	Recombinant DNA Cloning & Analysis
MIC 120	Microbial Ecology
MIC 140	Bacterial Physiology

MIC 150	Genomes of Pathogenic Bacteria
MIC 155L	Bacterial Physiology Lab
MIC 162	General Virology
MIC 170	Yeast Molecular Genetics
MCB 120L	Molecular Biology & Biochemistry Laboratory
MCB 164	Advanced Eukaryotic Genetics
MCB 182	Principles of Genomics
PLP 130	Fungal Biology & Disease
PLP 140	(Discontinued)
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables
VEN 124	Wine Production
VEN 124L	Wine Production Laboratory
VEN 128	Wine Microbiology
VEN 135	Wine Technology & Winery Systems

Total Units 29-31

## Plant Biotechnology Option

Code	Title	Units
<b>Plant Biotechnology Option</b>		
Biotechnology		13
BIT 160	Principles of Plant Biotechnology	
BIT 161A	Genetics & Biotechnology Laboratory	
BIT 161B	Plant Genetics & Biotechnology Laboratory	
Microbiology		2
MIC 103L	Introductory Microbiology Laboratory	
<i>Molecular &amp; Cellular Biology</i>		3
MCB/PLB 126	Plant Biochemistry	
Plant Science		4
PLS 152	Plant Genetics	
<i>Restricted Electives</i>		
Choose 9 units:		9
BIS 181	Comparative Genomics	
BIS 183	Functional Genomics	
BIT 150	Applied Bioinformatics	
BIT 188	Undergraduate Research Proposal	
CHE 130A	Principles of Medicinal Chemistry	
CHE 130B	Computational Drug Design	
EBS 075	Properties of Materials in Biological Systems	
EBS 289G	Selected Topics in Biological Systems Engineering: Forest Engineering	
EBS 289I	Selected Topics in Biological Systems Engineering: Plant Production & Harvest	
EBS 289J	Selected Topics in Biological Systems Engineering: Postharvest Engineering	
ECS 124	Theory & Practice of Bioinformatics	
ECS 129	Computational Structural Bioinformatics	
ENT 110	Arthropod Pest Management	
EVE 100	Introduction to Evolution	
FST 104	Food Microbiology	
FST 104L	Food Microbiology Laboratory	

FST 110	Food Processing		or MCB 163	Developmental Genetics
FST 123	Introduction to Enzymology		MCB 182	Principles of Genomics
FST 123L	Enzymology Laboratory		<i>Neurobiology, Physiology, &amp; Behavior</i>	5
MCB 120L	Molecular Biology & Biochemistry Laboratory		NPB 101	Systemic Physiology
MCB 164	Advanced Eukaryotic Genetics		<i>Restricted Electives</i>	
MCB 182	Principles of Genomics		Choose 9 units:	9
MIC 115	Recombinant DNA Cloning & Analysis		ANG 101	Animal Cytogenetics
MIC 162	General Virology		ANG 107	Genetics & Animal Breeding
NEM 100	Plant Nematology		ANS 131	Reproduction & Early Development in Aquatic Animals
or NEM 110	Introduction to Nematology		ANS 140	Management of Laboratory Animals
PLB 105	Developmental Plant Anatomy		AVS 103	Avian Development & Genomics
PLB 111	Plant Physiology		AVS 121	Avian Reproduction
PLB 112	Plant Growth & Development		BIS 181	Comparative Genomics
PLB 113	Molecular & Cellular Biology of Plants		BIS 183	Functional Genomics
PLB 143	Evolution of Crop Plants		BIT 150	Applied Bioinformatics
PLP 120	Introduction to Plant Pathology		BIT 161A	Genetics & Biotechnology Laboratory
PLP/ENT/PLB 123	Plant-Virus-Vector Interaction		BIT 161B	Plant Genetics & Biotechnology Laboratory
PLP 130	Fungal Biology & Disease		BIT 188	Undergraduate Research Proposal
PLP 140	(Discontinued)		EVE 100	Introduction to Evolution
PLS 100A	Metabolic Processes of Cultivated Plants		EVE 102	Population & Quantitative Genetics
PLS 100AL	Metabolic Processes of Cultivated Plants Laboratory		MCB 120	Molecular Biology & Biochemistry Laboratory Associated Lecture
PLS 100B	Growth & Yield of Cultivated Plants		MCB 160L	Principles of Genetics Laboratory
PLS 100BL	Growth & Yield of Cultivated Plants Laboratory		MCB 164	Advanced Eukaryotic Genetics
PLS 100C	Environmental Interactions of Cultivated Plants		MCP 200L	Animal Cell Culture Laboratory
PLS 100CL	Environmental Interactions of Cultivated Plants Laboratory		MIC 115	Recombinant DNA Cloning & Analysis
PLS 153	Plant, Cell, Tissue & Organ Culture		MIC 162	General Virology
PLS 154	Introduction to Plant Breeding		MMI 188	(Discontinued)
PLS 157	Physiology of Environmental Stresses in Plants		NPB 121	Physiology of Reproduction
PLS 158	Mineral Nutrition of Plants		NPB 121L	Physiology of Reproduction Laboratory
PLS 172	Biology and Quality of Harvested Crops		NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health
PLS 173	Molecular & Cellular Aspects of Postharvest Biology (Discontinued)		PLP 140	(Discontinued)
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables		PMI 126	Fundamentals of Immunology
<b>Total Units</b>		31	PMI 126L	Immunology Laboratory
			PMI 127	Medical Bacteria & Fungi
			PMI 128	Biology of Animal Viruses
			<b>Total Units</b>	<b>30-31</b>

## Animal Biotechnology Option

Code	Title	Units
<b>Animal Biotechnology Option</b>		
<i>Animal Genetics</i>		4
ANG 111	Molecular Biology Laboratory Techniques	
<i>Animal Science</i>		4
ANS 170	Ethics of Animal Use	
<i>Microbiology</i>		2
MIC 103L	Introductory Microbiology Laboratory	
<i>Molecular &amp; Cellular Biology</i>		6-7
MCB 150	Developmental Biology	

Code	Title	Units
<b>Bioinformatics Option</b>		
<i>Biological Science</i>		3
BIS 181	Comparative Genomics	
or BIS 183	Functional Genomics	
<i>Biotechnology</i>		4
BIT 150	Applied Bioinformatics	
<i>Choose one:</i>		4-5
BIS 180L	Genomics Laboratory	
ECS 124	Theory & Practice of Bioinformatics	
ECS 129	Computational Structural Bioinformatics	

<i>Computer Science Engineering</i>		4
ECS 032A	Introduction to Programming	
<i>Microbiology</i>		2
MIC 103L	Introductory Microbiology Laboratory	
<i>Molecular &amp; Cellular Biology</i>		3
MCB 182	Principles of Genomics	
<i>Restricted Electives</i>		
Choose 9 units:		9
ANG 212	Sequence Analysis in Molecular Genetics	
BIS 132	(Discontinued)	
BIS 134	Systems Biology: From Biological Circuits to Biological Systems	
BIS 181	Comparative Genomics	
BIS 183	Functional Genomics	
BIT 188	Undergraduate Research Proposal	
EAD 289D	Special Topics in Applied Science: Biophotonics/Biotechnology	
ECS 020	Discrete Mathematics For Computer Science	
ECS 032B	Introduction to Data Structures	
ECS 034	Software Development in UNIX & C++	
ECS 050	Computer Organization & Machine-Dependent Programming	
ECS 122A	Algorithm Design & Analysis	
ECS 124	Theory & Practice of Bioinformatics	
ECS 129	Computational Structural Bioinformatics	
ECS 140A	Programming Languages	
ECS 150	Operating Systems & System Programming	
ECS 154A	Computer Architecture	
EVE 100	Introduction to Evolution	
EVE 102	Population & Quantitative Genetics	
EVE 103	Phylogeny, Speciation & Macroevolution	
EVE 131	Human Genetic Variation & Evolution	
EVE 161	Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes	
MAT 124	Mathematical Biology	
MCB 162	Human Genetics & Genomics	
MIC 115	Recombinant DNA Cloning & Analysis	
NPB 132	Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health	
STA 130A	Mathematical Statistics: Brief Course	
STA 130B	Mathematical Statistics: Brief Course	
STA 131A	Introduction to Probability Theory	
STA 131B	Introduction to Mathematical Statistics	
STA 141A	Fundamentals of Statistical Data Science	
<b>Total Units</b>		<b>29-30</b>

**As of Fall 2022, the Ecological Management & Restoration major is no longer accepting new students. It has been absorbed into the Plant Sciences major (p. 396) as an area of specialization.**

## The Major Program

This major is designed for students who are interested in understanding how to manage and restore wildland and rangeland plant communities. Courses are selected to provide an interdisciplinary background that encompasses ecology, applied plant biology, and the social sciences. Students will acquire a core understanding of natural and managed ecosystems and how they function, interact with the natural environment, are connected with human society and social change, and are restored and managed.

## The Program

The curriculum provides depth in the ecological and botanical sciences directed toward an integrated understanding of how communities and ecosystems function and how this knowledge can assist in their management and restoration. Courses in environmental policy and law expose the students to the social drivers and constraints of ecosystem management. All students gain practical experience through practical field courses and a required internship. Students may also pursue an Honors thesis in their senior year.

## Major Advisor

Advising Center for the major is located in 1220 Plant & Environmental Sciences; [plsadvising@ucdavis.edu](mailto:plsadvising@ucdavis.edu)

## Career Alternatives

Graduates from this program are prepared to pursue a wide range of careers, including positions in ecological restoration and ecosystem management; rangeland and reserve management; environmental consulting; public, private, or non-profit agencies concerned with restoration and natural resource management; Cooperative Extension; teaching; information and communication services. Graduates are qualified to pursue advanced studies in fields such as ecology, agroecology, environmental studies, geography or weed science.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
<i>Physics</i>		
Choose a series:		6-12
PHY 001A & PHY 001B	Principles of Physics and Principles of Physics	
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
<i>Mathematics</i>		

# Ecological Management & Restoration, Bachelor of Science

College of Agricultural & Environmental Sciences

Choose a series:		6-8	WFC 154	Conservation Biology
MAT 016A & MAT 016B		Short Calculus and Short Calculus	WFC 155	Wildlife Space Use & Habitat Conservation
MAT 017A & MAT 017B		Calculus for Biology & Medicine and Calculus for Biology & Medicine	WFC 155L	Habitat Conservation & Restoration Laboratory
MAT 021A & MAT 021B		Calculus and Calculus	Choose one:	3-4
<i>Plant Science</i>			ESM 100	Principles of Hydrologic Science
PLS 120	Applied Statistics in Agricultural Sciences	4	HYD 143	Ecohydrology
<i>Soil Science</i>			HYD/EBS 147	Runoff, Erosion & Water Quality Management
SSC 100	Principles of Soil Science	5	HYD 151	Field Methods in Hydrology
PLS 101 or ESP 001	Agriculture & the Environment Environmental Analysis	3-4	PLS 171 or ENH 120	Principles & Practices of Plant Propagation Management of Container Media
Preparatory Subject Matter Subtotal		49-58	PLS 100C	Environmental Interactions of Cultivated Plants
<b>Depth Subject Matter</b>			or PLS 163	Ecosystem & Landscape Ecology
<i>Environmental Horticulture</i>			PLB 111 or PLS 100A	Plant Physiology Metabolic Processes of Cultivated Plants
ENH 160	Restoration Ecology	4	Choose one:	4
ENH 160L	Restoration Ecology Laboratory	1	ESP 160	The Policy Process
<i>Plant Science</i>			ESP 161	Environmental Law
PLS 176	Introduction to Weed Science	4	ESP 171	Urban & Regional Planning
<i>Soil Science</i>			ESP 172	Public Lands Management
Choose one:		3-5	ESP 179	Environmental Impact Assessment
SSC 102	Environmental Soil Chemistry		<i>Internship</i>	
SSC 105	Field Studies of Soils in California Ecosystems		Must be selected in consultation with master advisor.	
SSC 111	Soil Microbiology		PLS 164	(Discontinued)
SSC 118	Soils in Land Use & the Environment		PLS 192	Internship
SSC 120	Soil Genesis, Morphology, & Classification		In addition to the required coursework listed above, students might consider taking some of the following courses:	
PLS 152 or ENH 150	Plant Genetics Genetics & Plant Conservation: The Biodiversity Crisis	3-4	ENT 107	California Insect Diversity
Choose two ecology courses:		5-8	HYD 124	Plant-Water-Soil Relationships
ESP 155	Wetland Ecology		LDA/ABT 150	Introduction to Geographic Information Systems
PLB/EVE 117	Plant Ecology		PLS 135	Ecology & Community Structure of Grassland & Savannah Herbivores
PLS 131	(Discontinued)		PLS 141	Ethnobotany
PLS/ESM 144	Trees & Forests		PLS 158	Mineral Nutrition of Plants
PLS 147	California Plant Communities		PLS 162	Urban Ecology
WFC 156	Plant Geography		SAS 018	GIS & Society
WFC 157	Coastal Ecosystems		SSC 109	Sustainable Nutrient Management
Choose one:		4-5	Depth Subject Matter Subtotal	
EVE 100	Introduction to Evolution		Total Units	53-68
PLB/EVE 108	Systematics & Evolution of Angiosperms			102-126
PLS/PLB 102	California Floristics			
PLS/PLB 116	Plant Morphology & Evolution			
Choose four restoration/conservation courses:		11-16		
PLS 130	Grassland Ecology			
PLS 135	Ecology & Community Structure of Grassland & Savannah Herbivores			
PLS 150	Sustainability & Agroecosystem Management			
ESM 141	Role of Fire in Natural Ecosystems			
ESP 127	Plant Conservation Biology			
ESP 155L	Wetland Ecology Laboratory			

## Environmental Horticulture & Urban Forestry, Bachelor of Science

College of Agricultural & Environmental Sciences

As of Fall 2022, the Environmental Horticulture & Urban Forestry major is no longer accepting new students. It has been absorbed into the Plant Sciences major (p. 396) as an area of specialization.

## The Major Program

Students majoring in Environmental Horticulture & Urban Forestry learn how plants improve the environment and the quality of our lives. The major focuses on the biological and physical concepts and horticultural principles of plant production, management of plants and plant ecosystems in landscape settings and sociological aspects of plant/people interactions in the urban environment. Plants are used to revegetate and restore disturbed landscapes, control erosion and reduce energy and water consumption. The ornamental use of plants to improve the aesthetic quality of urban and rural landscapes, recreational areas, interiorscapes and commercial sites is an important aspect of this major. Students may select one or more of the following three areas of specialization: Floriculture/Nursery, Plant Biodiversity/Restoration, or Urban Landscape Management.

## Internships & Career Opportunities

Students are encouraged to develop internships on or off campus to augment their activities in the classroom and laboratory. Internships are available with the department's greenhouse facility, the UC Davis Arboretum, landscape designers, local nurseries, government agencies, regional non-profits, and restoration firms. Career opportunities in this field include growing and/or managing plants in a variety of settings, including nurseries & arboreta, consulting as an arborist, or as an urban, landscape, or restoration horticulturist; business ownership; park management and landscape contracting; working in the public or private sector, or for non-profit organizations.

## Major Advisor

**Advising Center** for the major is located in 1220 Plant & Environmental Sciences; [plsadvising@ucdavis.edu](mailto:plsadvising@ucdavis.edu).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Recommended as part of the College English Composition Requirement or the Words & Images Core Literacy Component:		
CMN 001	Introduction to Public Speaking	
<i>Environmental Horticulture</i>		
ENH 001	(Discontinued)	3
ENH 006	Introduction to Environmental Plants	4
<i>Landscape Architecture</i>		
LDA 030	History of Environmental Design	4
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
<i>Plant Science</i>		
PLS 002	Botany & Physiology of Cultivated Plants	4
PLS 021 or PLS 021V	Application of Computers in Technology Application of Computers in Technology	3
<i>Chemistry</i>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
<i>Environmental Science &amp; Policy</i>		
ESP 001 or ESP 010	Environmental Analysis Current Issues in the Environment	3-4
<i>Physics</i>		

PHY 001A	Principles of Physics	3
PHY 001B	Principles of Physics	3
Choose one:		3-4
MAT 016A or STA 013 or STA 013Y	Short Calculus Elementary Statistics Elementary Statistics	
Choose one:		3-4
UWP 102B UWP 102G UWP 104E	Writing in the Disciplines: Biology Writing in the Disciplines: Environmental Writing Writing in the Professions: Science	
Other upper division composition course. May overlap with college composition requirement; may be satisfied by passing the English Composition Exam.		
<i>Lower Division Restricted Electives</i>		
Choose one lower division resource science course and one lower division social science/humanities course in consultation with advisor; minimum 6 units.		6
Sample List of Lower Division Restricted Electives PDF ( <a href="https://www.plantsciences.ucdavis.edu/sites/g/files/dgvnsk1736/files/page/EHUFRestElec.pdf">https://www.plantsciences.ucdavis.edu/sites/g/files/dgvnsk1736/files/page/EHUFRestElec.pdf</a> )		
Preparatory Subject Matter Subtotal		59-62
<b>Depth Subject Matter</b>		
ENH 102 or PLS 100A	Physiological Principles in Environmental Horticulture (Discontinued) Metabolic Processes of Cultivated Plants	3-4
Choose one:		4-5
ENH 105 PLS/PLB 102 PLB/EVE 108 PLB/EVE 117 or PLS 150	Taxonomy & Ecology of Environmental Plant Families California Floristics Systematics & Evolution of Angiosperms Plant Ecology Sustainability & Agroecosystem Management	
PLS 171	Principles & Practices of Plant Propagation	4
<i>Soil Science</i>		
SSC 100	Principles of Soil Science	5
Choose two		7-9
ENT 110 NEM 100 PLP 120 PLS 105 PLS 176	Arthropod Pest Management Plant Nematology Introduction to Plant Pathology Concepts in Pest Management Introduction to Weed Science	
Internship or research; must be approved by major advisor.		3
<i>Upper Division Restricted Electives</i>		
In consultation with an advisor, choose three upper division courses in the areas of resource sciences and social sciences/humanities; at least one course must come from each of these two areas; minimum 9 units.		9
Sample List of Upper Division Restricted Electives PDF ( <a href="https://www.plantsciences.ucdavis.edu/sites/g/files/dgvnsk1736/files/page/EHUFRestElec.pdf">https://www.plantsciences.ucdavis.edu/sites/g/files/dgvnsk1736/files/page/EHUFRestElec.pdf</a> )		
Depth Subject Matter Subtotal		39-43
<b>Areas of Specialization</b>		

Choose one:	16-24	WFC 157	Coastal Ecosystems
No course may be used to satisfy more than one requirement.			
Floriculture/Nursery Option (p. 392)			
Plant Biodiversity/Restoration Option (p. 392)			
Urban Landscape Management Option (p. 392)			
Areas of Specialization Subtotal	16-24		
<b>Total Units</b>	<b>114-129</b>		

## Floriculture/Nursery Option

Code	Title	Units
ENH 120	Management of Container Media	3
ENH 125	Greenhouse & Nursery Crop Production	5
ABT/SAF 165	Irrigation Practices for an Urban Environment	3
ENT 135	Introduction to Biological Control	4
Choose one:		3-4
PLS 100C	Environmental Interactions of Cultivated Plants	
PLS 158	Mineral Nutrition of Plants	
SSC 109	Sustainable Nutrient Management	
<b>Total Units</b>		<b>18-19</b>

## Plant Biodiversity/Restoration Option

Code	Title	Units
ENH 160	Restoration Ecology	4
ENH 160L	Restoration Ecology Laboratory	1
Choose one:		3-5
ENH 150	Genetics & Plant Conservation: The Biodiversity Crisis	
EVE 100	Introduction to Evolution	
PLB/PLS 116	Plant Morphology & Evolution	
(a) Choose one:		3-4
ESM 141	Role of Fire in Natural Ecosystems	
ESP 127	Plant Conservation Biology	
ESP 155L	Wetland Ecology Laboratory	
PLS 130	Grassland Ecology	
PLS 150	Sustainability & Agroecosystem Management	
WFC 155	Wildlife Space Use & Habitat Conservation	
(b) Choose one:		3-5
ESP 155	Wetland Ecology	
PLB/EVE 108	Systematics & Evolution of Angiosperms	
PLB/EVE 117	Plant Ecology	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
PLS 102	California Floristics	
PLS/ESM 144	Trees & Forests	
PLS 147 & 147L	California Plant Communities and California Plant Communities Field Study	
PLS 163	Ecosystem & Landscape Ecology	
PLS 176	Introduction to Weed Science	
WFC 156	Plant Geography	

## Urban Landscape Management Option

Code	Title	Units
ENH 100	Urban Forestry	4
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	4
ABT/SAF 165	Irrigation Practices for an Urban Environment	3
PLS 162	Urban Ecology	3
SAS 018 or LDA 150 or ABT 150	GIS & Society Introduction to Geographic Information Systems Introduction to Geographic Information Systems	3-4
<b>Total Units</b>		<b>17-18</b>

## Environmental Horticulture, Minor

College of Agricultural & Environmental Sciences

### Related Undergraduate Programs

See the undergraduate majors in Plant Biology (p. 375) & Plant Sciences (p. 384).

### Related Courses

See Plant Biology (PLB) (p. 472) & Plant Sciences (PLS) (p. 472).

### Minor Advisor

Plant Sciences Advising (<https://www.plantsciences.ucdavis.edu/undergraduate/undergraduate-minors/>); [plsadvising@ucdavis.edu](mailto:plsadvising@ucdavis.edu)

Code	Title	Units
ENH 006	Introduction to Environmental Plants	4
ENH 105	Taxonomy & Ecology of Environmental Plant Families	4
PLS 171	Principles & Practices of Plant Propagation	4
Choose three:		11-13
ENH 100	Urban Forestry	
ENH 120	Management of Container Media	
ENH 125	Greenhouse & Nursery Crop Production	
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	
<b>Total Units</b>		<b>23-25</b>

## International Agricultural Development, Bachelor of Science

College of Agricultural & Environmental Sciences

International Agricultural Development is an interdisciplinary major housed in the Plant Sciences department. Students learn to apply existing and emerging agricultural technologies and strategies to address global poverty. Students can choose to focus on social sciences or natural sciences. This interdisciplinary program includes courses in animal and plant sciences, soil and environmental sciences, sociology

and economics, community development and Native American studies. There are four areas of specialization: Agricultural Production, Trade & Economic Development, Environmental Issues, and Rural Communities. Students participate in internships or study abroad to round out their education. Graduates move on to serve in the Peace Corps, work for governmental or non-governmental organizations, or work in international trade.

## Faculty

Includes members from various departments across colleges.

## Advisors

**Staff Advisor.** Honora Knopp; hmknopp@ucdavis.edu

**Faculty Advisor.** Amanda Crump; acrump@ucdavis.edu

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
CRD 001	The Community	4	
IAD 010	Introduction to International Agricultural Development	4	
MAT 016A	Short Calculus	3	
PLS 002	Botany & Physiology of Cultivated Plants	4	
<i>Soil Science</i>			
SSC 010 or SSC 100	Soils in Our Environment Principles of Soil Science	3-5	
<i>Economics</i>			
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics	4	
ECN 001B or ECN 001BV	Principles of Macroeconomics	4	
Choose one:		4-5	
STA 013 or STA 013Y	Elementary Statistics		
SOC 046	Introduction to Social Research Methods		
PLS 120	Applied Statistics in Agricultural Sciences		
Choose 6 units:		6	
ARE 015	Population, Environment & World Agriculture		
ANS 041	Domestic Animal Production		
ANS 041L	Domestic Animal Production Laboratory		
CRD 020	Food Systems		
NUT 010 or NUT 010V or NUT 010Y	Discoveries & Concepts in Nutrition		
PLS 001	Agriculture, Nature & Society		
PLS 015	Introduction to Sustainable Agriculture		
PLS 049	Organic Crop Production Practices		
Preparatory Subject Matter Subtotal		36-39	
<b>Depth Subject Matter</b>			
ECN/ARE 115A	Economic Development	4	
IAD 103	Social Change & Agricultural Development	4	
IAD 170	Program Development for International Agriculture	4	
ARE 147 or PLS 101	Resource & Environment Policy Analysis Agriculture & the Environment		3
Choose a minimum of 5 units:			
IAD 142	Equipment & Technology for Small Farms		
IAD/PLS 160	Agroforestry: Global & Local Perspectives		
PLS 110	Crop Management Systems for Vegetable Production		
PLS 111	Principles of Agronomic Crop Production Systems		
PLS 112	Forage Crop Production		
PLS 130	Grassland Ecology		
Choose a minimum of 4 units:			
SOC 170	Population		
CRD 141	Organization of Economic Space		
CRD 162	People, Work & Technology		
Choose 4 units:			
CRD 142	Rural Change in the Industrialized World		
CRD 149	Community Development Perspectives on Environmental Justice		
CRD 152	Community Development		
Choose 4 units:			
POL 123	The Politics of Interdependence		
POL 124	The Politics of Global Inequality		
SOC 145A	Sociology of Third World Development		
ANT 126A	Anthropology of Development		
ANT 126B	Women & Development		
ANT 131	Ecology & Politics		
Depth Subject Matter Subtotal			32
<b>Foreign Language Requirement</b>			
Students must complete:			
Three sequenced quarters (15 units) of courses in one foreign language; e.g., SPA 001, SPA 002, SPA 003 or FRE 001, FRE 002, FRE 003 or CHN 001, CHN 002, CHN 003 or POR 001, POR 002, POR 003, etc.			
Or passing a foreign language proficiency examination			
Or received a score of 5, 4, or 3 on a foreign language Advanced Placement examination (except Latin)			
Or received a score of 550 on the SATII: Subject Test will also satisfy this requirement.			
Foreign Language Requirement Subtotal			0-15
<b>Internship Requirement</b>			
Students must complete at least 4 units of internship. Internships can be chosen in consultation with an advisor. Internship requirement waived for students enrolled in the UC Education Abroad Program.			
Internship Requirement Subtotal			4
<b>Areas of Specialization</b>			
Choose one:			
Agricultural Production Option (p. 394)			
Trade & Economic Development Option (p. 394)			
Environmental Issues Option (p. 394)			
Rural Communities Option (p. 395)			
Subtotal			45-46
<b>International Agricultural Development Abroad</b>			

Choose 0-40 units:	0-40
International Agricultural Development Abroad Subtotal	0-40
<b>Total Units</b>	<b>117-176</b>

## Areas of Specialization

### Agricultural Production Option

Code	Title	Units
<b>Agricultural Production Option</b>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
Choose 15 units:		15
ANS 118	Fish Production	
ANS 124	Lactation	
ANS 143	Pig & Poultry Care & Management	
ANS 144	Beef Cattle & Sheep Production	
ANS 145	Meat Processing & Marketing	
ANS 146	Dairy Cattle Production	
AVS 121	Avian Reproduction	
ENT 110	Arthropod Pest Management	
ENT 135	Introduction to Biological Control	
ENH 100	Urban Forestry	
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	
ESM 100	Principles of Hydrologic Science	
HYD 124	Plant-Water-Soil Relationships	
IAD 142	Equipment & Technology for Small Farms	
IAD/PLS 160	Agroforestry: Global & Local Perspectives	
PLP 120	Introduction to Plant Pathology	
PLS 110	Crop Management Systems for Vegetable Production	
PLS 111	Principles of Agronomic Crop Production Systems	
PLS 112	Forage Crop Production	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS 130	Grassland Ecology	
PLS 150	Sustainability & Agroecosystem Management	
PLS 170A	Fruit & Nut Cropping Systems	
PLS 170B	Fruit & Nut Cropping Systems	
PLS 172	Biology and Quality of Harvested Crops	
PLS 176	Introduction to Weed Science	
SSC 109	Sustainable Nutrient Management	
SSC 118	Soils in Land Use & the Environment	
<i>Restricted Electives</i>		
Courses selected in consultation with an advisor.		10
<b>Total Units</b>	<b>45</b>	

### Trade & Economic Development Option

Code	Title	Units
<b>Trade &amp; Economic Development Option</b>		
MAT 016B	Short Calculus	3
SOC 001 or ANT 002	Introduction to Sociology Cultural Anthropology	5
Choose 20 units:		20
ARE 015	Population, Environment & World Agriculture	
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption	
ARE 100B	Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics	
ARE 115B/115BY/ ECN 115B/115BY	Economic Development	
ARE 120	Agricultural Policy	
ARE 121	Economics of Agricultural Sustainability	
ARE 130	Agricultural Markets	
ARE 136	Managerial Marketing	
ARE 138	International Commodity & Resource Markets	
ARE 139	Futures & Options Markets	
ARE 175	Natural Resource Economics	
ARE 176	Environmental Economics	
CRD 141	Organization of Economic Space	
ECN 160A	International Microeconomics	
ECN 160B	International Macroeconomics	
<i>Restricted Electives</i>		
Courses selected in consultation with an advisor.		17
<b>Total Units</b>	<b>45</b>	

### Environmental Issues Option

Code	Title	Units
<b>Environmental Issues Option</b>		
ESP 001	Environmental Analysis	4
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
Choose 16 units:		16
ARE 147	Resource & Environment Policy Analysis	
ARE 175	Natural Resource Economics	
ARE 176	Environmental Economics	
ESP 100	General Ecology	
ESP/ANT 101	Ecology, Nature, & Society	
ESP 110	Principles of Environmental Science	
ESP 160	The Policy Process	
ESP 161	Environmental Law	
ESP 170	Conservation Biology Policy	
ESP 171	Urban & Regional Planning	
ESP 172	Public Lands Management	
ESP 175	Natural Resource Economics	

PLS 101	Agriculture & the Environment
PLS 147	California Plant Communities
PLS 147L	California Plant Communities Field Study
PLS 150	Sustainability & Agroecosystem Management
ENH 150	Genetics & Plant Conservation: The Biodiversity Crisis
ENH 160	Restoration Ecology
ENH 160L	Restoration Ecology Laboratory

**Restricted Electives**

Courses selected in consultation with an advisor.	15
<b>Total Units</b>	<b>45</b>

**Rural Communities Option**

Code	Title	Units
<b>Rural Communities Option</b>		
SOC 001	Introduction to Sociology	5
ANT 002	Cultural Anthropology	5
Choose 16 units:		16
CRD 140	Dynamics of Regional Development	
CRD 147	Community Youth Development	
CRD 149	Community Development Perspectives on Environmental Justice	
CRD 151	Community Field Research: Theory & Analysis	
CRD 152	Community Development	
CRD 153A	International Community Development: Asia	
CRD 153B	International Community Development: Europe	
CRD 154	Social Theory & Community Change	
CRD 164	Theories of Organizations & Their Role in Community Change	
CRD 172	Social Inequality: Issues & Innovations	
CRD 176	Comparative Ethnicity	
CRD 180	Transnational Community Development	

**Restricted Electives**

Courses selected in consultation with an advisor.	20
<b>Total Units</b>	<b>46</b>

**International Agricultural Development, Minor****College of Agricultural & Environmental Sciences**

International Agricultural Development is an interdisciplinary major housed in the Plant Sciences department. Students learn to apply existing and emerging agricultural technologies and strategies to address global poverty. Students can choose to focus on social sciences or natural sciences. This interdisciplinary program includes courses in animal and plant sciences, soil and environmental sciences, sociology and economics, community development and Native American studies. There are four areas of specialization: Agricultural Production, Trade & Economic Development, Environmental Issues, and Rural Communities. Students participate in internships or study abroad to round out their

education. Graduates move on to serve in the Peace Corps, work for governmental or non-governmental organizations, or work in international trade.

**Faculty**

Includes members from various departments across colleges.

**Advisors**

**Staff Advisor.** Honora Knopp; [hmknopp@ucdavis.edu](mailto:hmknopp@ucdavis.edu)

**Faculty Advisor.** Amanda Crump; [acrump@ucdavis.edu](mailto:acrump@ucdavis.edu)

Code	Title	Units
IAD 010	Introduction to International Agricultural Development	4
ARE/ECN 115A	Economic Development	4
Choose 6-7 units		6-7
PLS 101	Agriculture & the Environment	
PLS 110	Crop Management Systems for Vegetable Production	
PLS 111	Principles of Agronomic Crop Production Systems	
PLS 112	Forage Crop Production	
Choose 7-8 units:		7-8
IAD 103	Social Change & Agricultural Development	
IAD 170	Program Development for International Agriculture	
CRD 142	Rural Change in the Industrialized World	
<b>Total Units</b>		<b>21-23</b>

**Landscape Restoration, Minor****College of Agricultural & Environmental Sciences**

This minor is of particular interest to students majoring in Wildlife, Fish, & Conservation Biology, Environmental Science & Management, Landscape Architecture, Biological Sciences, Evolution & Ecology, Plant Biology, and Sustainable Environmental Design. BIS 002C or PLS 002 is a prerequisite to most courses in the minor. The minor is sponsored by the Department of Plant Sciences (p. 396).

**Minor Advisor**

Plant Sciences Advising (<https://www.plantsciences.ucdavis.edu/undergraduate/undergraduate-minors/>); [plsadvising@ucdavis.edu](mailto:plsadvising@ucdavis.edu)

Code	Title	Units
Choose one:		3-5
ESP 155	Wetland Ecology	
PLB/PLS 102	California Floristics	
PLB/EVE 117	Plant Ecology	
PLS 147	California Plant Communities	
PLS/ESM 144	Trees & Forests	
Choose one:		3-4
ENH 100	Urban Forestry	
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	

PLS 176	Introduction to Weed Science	
<i>Soil Sciences</i>		
SSC 010 or SSC 100	Soils in Our Environment Principles of Soil Science	3-5
Choose one:		3
ENH 150	Genetics & Plant Conservation: The Biodiversity Crisis	
ESP 155L	Wetland Ecology Laboratory	
PLS 130	Grassland Ecology	
WFC 155	Wildlife Space Use & Habitat Conservation	
ENH 160	Restoration Ecology	4
ENH 160L	Restoration Ecology Laboratory	1
PLS 192	Internship (3 units required.)	1-12
Total Units		20-25

services. Graduates are qualified to pursue graduate studies in the natural and agricultural sciences, such as plant biology, genetics, breeding, horticulture, agronomy, biotechnology, ecology, environmental studies, pest management, education, or business management.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		10
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
<i>Plant Sciences &amp; Statistics</i>		
PLS 002	Botany & Physiology of Cultivated Plants	12
PLS 003	Seminar: Overview of the Plant Sciences Major	
PLS 021 or PLS 021V	Application of Computers in Technology	
PLS 120	Applied Statistics in Agricultural Sciences	
<i>Chemistry</i>		
CHE 002A	General Chemistry	16-22
CHE 002B	General Chemistry	
Choose a series:		
CHE 008A	Organic Chemistry: Brief Course	
CHE 008B	Organic Chemistry: Brief Course	
<b>OR</b>		
CHE 118A	Organic Chemistry for Health & Life Sciences	
CHE 118B	Organic Chemistry for Health & Life Sciences	
CHE 118C	Organic Chemistry for Health & Life Sciences	
<i>Physics</i>		
PHY 007A	General Physics	12
PHY 007B	General Physics	
PHY 007C	General Physics	
<i>Mathematics</i>		
MAT 017A	Calculus for Biology & Medicine	8
MAT 017B	Calculus for Biology & Medicine	
Preparatory Subject Matter Subtotal		
		58-64
<b>Depth Subject Matter</b>		
<i>Soil Science</i>		5
SSC 100	Principles of Soil Science	
<i>Plant Science</i>		
PLS 100A	Metabolic Processes of Cultivated Plants	25
PLS 100B	Growth & Yield of Cultivated Plants	
PLS 100C	Environmental Interactions of Cultivated Plants	
PLS 100AL	Metabolic Processes of Cultivated Plants Laboratory	
PLS 100BL	Growth & Yield of Cultivated Plants Laboratory	
PLS 100CL	Environmental Interactions of Cultivated Plants Laboratory	
PLS 101	Agriculture & the Environment	

## Plant Sciences, Bachelor of Science

### College of Agricultural & Environmental Sciences

### The Major Program

The Plant Sciences major is designed for students who are interested in a scientific understanding of how plants grow and develop in managed agricultural ecosystems and how plant products are utilized for food, fiber and environmental enhancement. Advances in science and technology have provided new insights and options for using plants to address the issues associated with providing renewable food, fiber and energy resources for a growing global population while minimizing adverse impacts on the natural environment. Graduates in Plant Sciences are able to apply their skills and knowledge to a diverse range of agricultural and environmental goals or pursue advanced degrees in plant sciences.

### The Program

The curriculum provides depth in the biological and physical sciences and a sound understanding of how plants obtain and utilize resources from their environment to sustain their growth and development. The influences of genetics, management systems and environmental inputs on crop development and productivity are emphasized along with the postharvest preservation and marketing of plant products. Students will develop an area of specialization with options in Crop Production, Plant Genetics & Breeding, or Postharvest Biology & Technology. An Individual option is also available to match specific subject matter or career goal interests in the plant sciences. All students gain practical experience through a combination of practical laboratory courses and internships. Students may also pursue an Honors thesis in their senior year.

### Lead Faculty Advisor

Daniel Potter (<https://www.plantsciences.ucdavis.edu/people/daniel-potter/>)

**Advising** for the major is located in 1220 Plant & Environmental Sciences; [plsadvising@ucdavis.edu](mailto:plsadvising@ucdavis.edu). For more information, see Undergraduate Advising.

### Career Alternatives

Graduates from this program are prepared to pursue a wide range of careers, including various technical and management positions in agricultural & business enterprises, farming, or consulting; public, private & non-profit agencies; Cooperative Extension; international development; teaching; or agricultural & environmental journalism and communication

PLS 152	Plant Genetics	PLS 123	Introduction to Plant & Crop Systems
PLS 192	Internship (Capstone Experience: Internship/Research Report)	BIT 150	Modeling Applied Bioinformatics
or PLS 199	Special Study for Advanced Undergraduates	<b>Depth; choose three:</b>	<b>11-12</b>
<i>Restricted electives; choose at least two from two different categories:</i>	7-10	PLS 105	Concepts in Pest Management
<i>Plant Diversity/Evolution/Taxonomy</i>		ABT/LDA 150	Introduction to Geographic Information Systems
ENH 105	Taxonomy & Ecology of Environmental Plant Families	PLS 150	Sustainability & Agroecosystem Management
EVE 100	Introduction to Evolution	PLS 157	Physiology of Environmental Stresses in Plants
PLB/PLS 102	California Floristics	PLS 158	Mineral Nutrition of Plants
PLB/EVE 108	Systematics & Evolution of Angiosperms	HYD 124	Plant-Water-Soil Relationships
PLB 143	Evolution of Crop Plants	<b>Total Units</b>	<b>26-27</b>
PLS/PLB 116	Plant Morphology & Evolution		
<i>Ecology</i>			
PLB/EVE 117	Plant Ecology		
PLS 150	Sustainability & Agroecosystem Management		
ENH 160 series:			
ENH 160	Restoration Ecology		
ENH 160L	Restoration Ecology Laboratory		
PLS 147 series:			
PLS 147	California Plant Communities		
PLS 147L	California Plant Communities Field Study		
<i>Pest Management</i>			
PLP 120	Introduction to Plant Pathology		
ENT 110	Arthropod Pest Management		
NEM 100	Plant Nematology		
PLS 105	Concepts in Pest Management		
PLS 176	Introduction to Weed Science		
PLB/EVE 119	Population Biology of Invasive Plants & Weeds		
Depth Subject Matter Subtotal	37-40		
<b>Areas of Specialization; choose one:</b>	<b>21-34</b>		
In consultation with an advisor, a student may complete requirements for more than one specialization, which can be noted on the student's transcript.			
Plant Informatics Option (p. 397)			
Ecological Management & Restoration Option (p. 397)			
Environmental Horticulture & Urban Landscape Management Option (p. 398)			
Crop Production & Agroecology Option (p. 398)			
Plant Breeding, Genetics, & Genomics Option (p. 398)			
Crop Quality and Safety Option (p. 399)			
Individual Option (p. 399)			
<b>Total Units</b>	<b>116-138</b>		
<b>Areas of Specialization</b>			
<b>Plant Informatics Option</b>			
<b>Code</b>	<b>Title</b>	<b>Units</b>	
<b>Required courses:</b>		<b>15</b>	
PLS 124	Introduction to Digital Agriculture		
PLS 125	Proximal & Remote Sensing of Plants		
<b>Total Units</b>			<b>24-32</b>
<b>Ecological Management &amp; Restoration Option</b>			
<b>Code</b>	<b>Title</b>		<b>Units</b>
<b>Required Major Electives (not included in AOS unit count):</b>			
PLS/PLB 102	California Floristics		
<b>Ecological Management &amp; Restoration; choose at least four:</b>			
PLB/EVE 119	Population Biology of Invasive Plants & Weeds		<b>12-17</b>
ENH 120	Management of Container Media		
PLS 130	Grassland Ecology		
PLS 135	Ecology & Community Structure of Grassland & Savannah Herbivores		
ESM 141	Role of Fire in Natural Ecosystems		
PLS/ESM 144	Trees & Forests		
PLS 147 & 147L	California Plant Communities and California Plant Communities Field Study		
PLS 150	Sustainability & Agroecosystem Management		
ESP 155	Wetland Ecology		
ENH 160 & 160L	Restoration Ecology and Restoration Ecology Laboratory		
PLS 162	Urban Ecology		
PLS 163	Ecosystem & Landscape Ecology		
PLS 171	Principles & Practices of Plant Propagation		
<b>Environmental Analysis, Monitoring, &amp; Policy; choose at least two:</b>			
ESM 108	Environmental Monitoring		<b>7-9</b>
LDA/ABT 150	Introduction to Geographic Information Systems		
ESP 160	The Policy Process		
ESP 172	Public Lands Management		
ESP 179	Environmental Impact Assessment		
<b>Outreach &amp; Communication; choose one:</b>			
EDU 142	Introduction to Environmental Education		<b>3-4</b>
<b>Internship:</b>			
PLS 164	(Discontinued)		<b>2</b>
PLS 192	Internship		
<b>Total Units</b>			

## Environmental Horticulture & Urban Landscape Management Option

Code	Title	Units
<b>Required Major Electives; not included in AOS unit count:</b>		
ENH 105	Taxonomy & Ecology of Environmental Plant Families	
PLS 105	Concepts in Pest Management	
<b>Required Courses:</b>		<b>8</b>
PLS 162	Urban Ecology	
PLS 157	Physiology of Environmental Stresses in Plants	
<b>Depth</b>		
<i>Choose at least three of the following:</i>		9-13
ENH 100	Urban Forestry	
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	
SSC 112	Soil Ecology	
LDA/ABT 150	Introduction to Geographic Information Systems	
ENH 120	Management of Container Media	
ENH 125	Greenhouse & Nursery Crop Production	
PLS 171	Principles & Practices of Plant Propagation	
PLS 158	Mineral Nutrition of Plants	
PLS 123	Introduction to Plant & Crop Systems Modeling	
<i>Choose one:</i>		4
ESP 171	Urban & Regional Planning	
ESP 179	Environmental Impact Assessment	
<b>Total Units</b>		<b>21-25</b>

## Crop Production & Agroecology Option

Code	Title	Units
<b>Required Major Electives; not included in AOS unit count:</b>		
PLS 150	Sustainability & Agroecosystem Management	
<b>Required courses:</b>		<b>8</b>
HYD 124	Plant-Water-Soil Relationships	
PLS 158	Mineral Nutrition of Plants	
<b>Production; choose two:</b>		<b>4-9</b>
PLS 049	Organic Crop Production Practices	
PLS 112	Forage Crop Production	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS/IAD 160	Agroforestry: Global & Local Perspectives	
PLS 170A	Fruit & Nut Cropping Systems	
PLS/ESM 144	Trees & Forests	
PLS 170B	Fruit & Nut Cropping Systems	
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	

ENH 125	Greenhouse & Nursery Crop Production	
PLS 110	Crop Management Systems for Vegetable Production	
ENH 120	Management of Container Media	
PLS 111	Principles of Agronomic Crop Production Systems	
PLS 171	Principles & Practices of Plant Propagation	
<b>Advanced Soil Science; choose one:</b>		<b>3-4</b>
SSC 111	Soil Microbiology	
SSC 102	Environmental Soil Chemistry	
SSC 112	Soil Ecology	
SSC 109	Sustainable Nutrient Management	
<b>Global Food Systems; choose one:</b>		<b>4</b>
ARE 015	Population, Environment & World Agriculture	
IAD 010	Introduction to International Agricultural Development	
CRD 020	Food Systems	
<b>Pest Management; choose one in addition to core:</b>		<b>3-5</b>
PLS 176	Introduction to Weed Science	
VEN 118	Grapevine Pests, Diseases & Disorders	
PLP 120	Introduction to Plant Pathology	
NEM 100	Plant Nematology	
ENT 110	Arthropod Pest Management	
PLS 105	Concepts in Pest Management	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
<b>Outreach &amp; Communication; choose one:</b>		<b>4</b>
EDU 142	Introduction to Environmental Education	
<b>Total Units</b>		<b>26-34</b>
<b>Plant Breeding, Genetics, &amp; Genomics Option</b>		
<b>Code</b>	<b>Title</b>	<b>Units</b>
<b>Required courses:</b>		
BIS 101	Genes & Gene Expression	
PLS 154	Introduction to Plant Breeding	
BIT 160	Principles of Plant Biotechnology	
BIT 161B	Plant Genetics & Biotechnology Laboratory	
BIT 171	Professionalism & Ethics in Genomics & Biotechnology	
<b>Production; choose one:</b>		<b>2-5</b>
PLS 049	Organic Crop Production Practices	
PLS 112	Forage Crop Production	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS/IAD 160	Agroforestry: Global & Local Perspectives	
PLS 170A	Fruit & Nut Cropping Systems	
PLS/ESM 144	Trees & Forests	
PLS 170B	Fruit & Nut Cropping Systems	
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	

or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink
ENH 125	Greenhouse & Nursery Crop Production
PLS 110	Crop Management Systems for Vegetable Production
PLS 111	Principles of Agronomic Crop Production Systems
ENH 120	Management of Container Media
PLS 171	Principles & Practices of Plant Propagation

**Restricted Elective; choose one:** 3-5

Choose one additional course from either Production or Depth Subject Matter.

Total Units	23-28
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### Crop Quality & Safety Option

Code	Title	Units
<b>Required Courses:</b>		
PLS 172	Biology and Quality of Harvested Crops	
PLS 173	Molecular & Cellular Aspects of Postharvest Biology (Discontinued)	
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables	
PLS 196	Postharvest Technology of Horticultural Crops	
<b>Depth; choose 8 units:</b>		
FST 117	Design & Analysis for Sensory Food Science	
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption	
FST 109	Principles of Quality Assurance in Food Processing	
PLS 006	Flower Power; Art & Science of Flowers & Their Uses	
or PLS 006V	Flower Power; Art & Science of Flowers & Their Uses	
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
FST 131	Food Packaging	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	

Total Units	22
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### Individual Option

Code	Title	Units
Choose a minimum of 23 upper division units, with approval from the master advisor, to form a coherent program of study resulting in expertise and competence in a sub-discipline of plant sciences.		23

## Political Science

### College of Letters & Science

Benjamin Highton, Ph.D., Chairperson of the Department; July 1, 2021-June 30, 2024

### Department Office

469 Kerr Hall; 530-752-0966; Political Science (<https://ps.ucdavis.edu/>); Faculty ([https://ps.ucdavis.edu/directory-of-people/ps-faculty/#c4=all&b\\_start=0](https://ps.ucdavis.edu/directory-of-people/ps-faculty/#c4=all&b_start=0))

### Undergraduate Majors

469 Kerr Hall; 530-752-0966; Undergraduate Information (<https://ps.ucdavis.edu/undergraduate/>)

### Graduate Program

472 Kerr Hall; 530-752-0969, Graduate Program (<https://ps.ucdavis.edu/graduate/>); Faculty ([https://ps.ucdavis.edu/directory-of-people/ps-faculty/#c4=all&b\\_start=0](https://ps.ucdavis.edu/directory-of-people/ps-faculty/#c4=all&b_start=0))

- International Relations, Bachelor of Arts (p. 399)
- Political Science—Public Service, Bachelor of Arts (p. 406)
- Political Science, Bachelor of Arts (p. 409)
- Political Science, Minor (p. 411)
- Political Science, Master of Arts (p. 411)
- Political Science, Master of Arts/Doctor of Jurisprudence (p. 411)
- Political Science, Doctor of Philosophy (p. 411)
- War-Peace Studies, Minor (p. 412)

## International Relations, Bachelor of Arts

### College of Letters & Science

**Program Director.** Contact the Department of Political Science (p. 399).

### Major Office

469 Kerr Hall; 530-754-8098; International Relations (<https://ps.ucdavis.edu/undergraduate/majors-and-minors/international-relations-major/>)

Problems of security, development, ethnic conflict, human rights, health, and the environment are increasingly confronted at a global rather than a national level. With its theoretical models and real-world application, the study of international relations is an exciting and highly relevant interdisciplinary major.

### The Major

Graduation with a major in international relations requires the completion of introductory courses in political science, economics, statistics, and history. The major also requires fluency in English and working knowledge (approximately 24 to 30 units of course credits or equivalent fluency) of one other modern language. Students choose one of four tracks that encompass major topical areas in combination with an area studies emphasis:

Total Units	23
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- World Trade & Development
- Peace & Security
- Global Environment, Health, & Natural Resources
- Peoples & Nationalities

*Upper division coursework for Tracks I, II and III is composed of twelve courses. Students choosing Track IV, Peoples and Nationalities, are required to study or work abroad for a minimum of one quarter; upper division course work is reduced to nine classes in recognition of the experience gained through education abroad.*

## Programs, Internships, & Career Alternatives

One program of special interest to international relations majors is the Education Abroad Program, which provides insights into the life and culture of other countries. At UC Davis, the Internship and Career Center assists students in obtaining legislative, legal, and business internships. In addition, the UC Davis Washington Center and UC Center Sacramento arrange internships and run a full-credit academic program in Washington, D.C. and Sacramento respectively with a full range of opportunities for International Relations majors (see also UC Washington Center (UCDC) (p. 468). International Relations graduates are prepared for employment in government agencies (such as the Foreign Service), state agencies, international or non-governmental organizations (such as the United Nations), foundations, and companies having interests in international business, trade, or finance. The stringent language requirement of the major program enhances career prospects in jobs that demand knowledge of the language and culture of other countries.

## International Relations Abroad

International Relations strongly encourages all students to participate in the UC Education Abroad Program; those who choose to study Track IV, Peoples and Nationalities, must study or work abroad for a minimum of one quarter. A maximum of five courses taken abroad may be applied toward the International Relations major. Courses are selected in consultation with an advisor for the Department of Political Science.

## Major Advisor

Contact the Department of Political Science (p. 399).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
ECN 001A or ECN 001AV	Principles of Microeconomics	4-5
or ECN 001AY	Principles of Microeconomics	
or ANT 002	Principles of Microeconomics	
HIS 004C or HIS 010C	Cultural Anthropology	
POL 003	History of Western Civilization	4
	World History III	
POL 003	World History III	4
ECN 001B or ECN 001BV	Principles of Macroeconomics	4
POL 002	Principles of Macroeconomics	
POL 051	Introduction to Comparative Politics	4
Choose one:	Scientific Study of Politics	4
POL/CMN/SOC/ PSC 012Y	Data Visualization in the Social Sciences	4-5
STA 013 or STA 013Y	Elementary Statistics	
SOC 056	Elementary Statistics	
SOC 056	Introduction to Social Statistics	

or SOC 056Y	Introduction to Social Statistics	
Note: Preparatory Subject Matter does not cover all potential prerequisite courses for upper division curriculum.		
Preparatory Subject Matter Subtotal		28-30
<b>Foreign Language</b>		
One of the following series in a single language, or certified fluency at the highest level required below:		0-30
<b>Arabic</b>		
ARB 001 & ARB 002 & ARB 003	Elementary Arabic 1 and Elementary Arabic 2 and Elementary Arabic 3	
ARB 021 & ARB 022 & ARB 023	Intermediate Arabic 21 and Intermediate Arabic 22 and Intermediate Arabic 23	
<b>Chinese</b>		
CHN 001 & CHN 002 & CHN 003 & CHN 004 & CHN 005 & CHN 006	Elementary Chinese and Elementary Chinese and Elementary Chinese and Intermediate Chinese and Intermediate Chinese and Intermediate Chinese	
<b>OR</b>		
CHN 001A & CHN 004 & CHN 005 & CHN 006	Accelerated Intensive Elementary Chinese and Intermediate Chinese and Intermediate Chinese and Intermediate Chinese	
<b>OR</b>		
CHN 001CN & CHN 002CN & CHN 003CN	Mandarin for Cantonese Speakers I and Mandarin for Cantonese Speakers II and Mandarin for Cantonese Speakers III	
CHN 001BL & CHN 002BL & CHN 003BL	Accelerated Written Chinese I and Accelerated Written Chinese II and Accelerated Written Chinese III	
<b>French</b>		
FRE 001 & FRE 002 & FRE 003 & FRE 021 & FRE 022	Elementary French and Elementary French and Elementary French and Intermediate French and Intermediate French	
<b>German</b>		
GER 001 & GER 002 & GER 003	Elementary German and Elementary German and Elementary German	
GER 020 & GER 021	Intermediate German and Intermediate German	
<b>Hebrew</b>		
HEB 001 & HEB 002 & HEB 003	Elementary Hebrew and Elementary Hebrew and Elementary Hebrew	
HEB 021 & HEB 022 & HEB 023	Intermediate Modern Hebrew I and Intermediate Modern Hebrew II and Intermediate Modern Hebrew III	
<b>Hindi/Urdu</b>		
HIN 001 & HIN 002 & HIN 003	Elementary Hindi/Urdu I and Elementary Hindi/Urdu II and Elementary Hindi/Urdu III	

HIN 021 & HIN 022 & HIN 023	Intermediate Hindi/Urdu I and Intermediate Hindi/Urdu II and Intermediate Hindi/Urdu III	SPA 022 or SPA 022V or SPA 022Y	Intermediate Spanish Intermediate Spanish II Intermediate Spanish
<b>Italian</b>			
ITA 001 & ITA 002 & ITA 003	Elementary Italian and Elementary Italian and Elementary Italian	SPA 031 & SPA 032 & SPA 033	Intermediate Spanish for Native Speakers I and Intermediate Spanish for Native Speakers II and Intermediate Spanish for Native Speakers III
ITA 021 & ITA 022	Intermediate Italian and Intermediate Italian		Foreign Language Subtotal
<b>OR</b>			
ITA 001 & ITA 002 & ITA 003	Elementary Italian and Elementary Italian and Elementary Italian		<b>Depth Subject Matter</b>
ITA 008A & ITA 008B	Italian Conversation and Italian Conversation		Tracks I, II & III: Twelve upper division courses.  Track IV: Nine upper division courses.
<b>Japanese</b>			
JPN 001 & JPN 002 & JPN 003 & JPN 004 & JPN 005 & JPN 006	Elementary Japanese and Elementary Japanese and Elementary Japanese and Intermediate Japanese and Intermediate Japanese and Intermediate Japanese		Choose one track:  Track I: World Trade & Development (p. 401) Track II: Peace & Security (p. 402) Track III: Global Environment, Health, & Natural Resources (p. 403) Track IV: Peoples & Nationalities (p. 403)
Depth Subject Matter Subtotal			
<b>Area Studies Requirement</b>			
JPN 001A	Accelerated Intensive Elementary Japanese		Choose four: Courses must incorporate at least two of three groups (History, Social Analysis, Culture and Literature); we encourage students to take all four courses from one region, but will accept a minimum of three from one region and one from a different region. Tracks I, II and III students who choose to take advantage of an Education Abroad experience may fulfill the Area Studies requirement by completing three courses instead of four; all three courses must be from one region.
JPN 004 & JPN 005 & JPN 006	Intermediate Japanese and Intermediate Japanese and Intermediate Japanese		
<b>Portuguese</b>			
POR 001 & POR 002 & POR 003	Elementary Portuguese and Elementary Portuguese and Elementary Portuguese		<b>Regions</b>
POR 021 & POR 022	Intermediate Portuguese and Intermediate Portuguese		Africa & the Middle East (p. 404) East & South Asia (p. 404) Latin America (p. 405) Russian & East/Central Europe (p. 405)
<b>Russian</b>			
RUS 001 & RUS 002 & RUS 003 & RUS 004 & RUS 005	Elementary Russian and Elementary Russian and Elementary Russian and Intermediate Russian and Intermediate Russian		Western Europe (p. 406)
Area Studies Requirement Subtotal			
<b>Spanish</b>			
SPA 001 or SPA 001Y	Elementary Spanish Elementary Spanish		<b>Total Units</b>
<b>AND</b>			
SPA 002 or SPA 002V or SPA 002Y	Elementary Spanish Elementary Spanish Elementary Spanish		
<b>AND</b>			
SPA 003 or SPA 003V or SPA 003Y	Elementary Spanish Elementary Spanish Elementary Spanish		
<b>AND</b>			
SPA 021 or SPA 021V or SPA 021Y	Intermediate Spanish Intermediate Spanish I Intermediate Spanish		
<b>AND</b>			
<b>Tracks</b>			
<b>Track I: World Trade &amp; Development</b>			
<i>Emphasizes contemporary economic relations of industrialized and developing countries.</i>			
<b>For Advanced Industrialized Focus</b>			
<b>Code</b>	<b>Title</b>		<b>Units</b>
ECN 100A	Intermediate Micro Theory: Consumer & Producer Theory		4
ECN 101	Intermediate Macro Theory		4
ECN 160A	International Microeconomics		4
ECN 160B	International Macroeconomics		4
POL 123	The Politics of Interdependence		4
Choose two from Group A. (p. 402)			
Choose one from Group B. (p. 402)			
<b>AND</b>			

Choose four to fulfill Area Studies Requirement. (p. 404)	16	ECN 110B	World Economic History Since the Industrial Revolution	4	
<b>Total Units</b>	<b>48</b>				
<b>For Developing Countries Focus</b>					
<b>Code</b>	<b>Title</b>	<b>Units</b>			
ECN/ARE 115A	Economic Development	4	IAD 103	Social Change & Agricultural Development	
ECN 115B/115BY/ ARE 115B/115BY	Economic Development	4	IRE/SOC 104	The Political Economy of International Migration	
ECN 162	International Economic Relations	4	POL 124	The Politics of Global Inequality	
POL 123	The Politics of Interdependence	4	POL 126	Ethnic Self-Determination & International Conflict	
POL 124	The Politics of Global Inequality	4	POL 142A	Comparative Development: Political Development in Modernizing Societies	
Choose one from Group A. (p. 402)		4	SAS 121	Global Poverty: Critical Thinking & Taking Action	
Choose two from Group B. (p. 402)		8	SOC 138	Economic Sociology	
Choose four to fulfill Area Studies Requirement. (p. 404)	16	SOC 141	Industrialization & Social Change		
<b>Total Units</b>	<b>48</b>	SOC 145A	Sociology of Third World Development		
		SOC 145B	Gender & Rural Development in the Third World		
<b>Group A; Advanced Industrialized Countries</b>					
<b>Code</b>	<b>Title</b>	<b>Units</b>			
ARE 138	International Commodity & Resource Markets	4		<b>Track II: Peace &amp; Security</b>	
ANT 127	Urban Anthropology	4		<i>Focuses on political and security relationships among states and non-state actors, examining questions of war, peace, alliances, and diplomacy.</i>	
CRD 118	Technology & Society	4			
CRD 141	Organization of Economic Space	4	<b>Code</b>	<b>Title</b>	<b>Units</b>
ECN 102	Analysis of Economic Data	4	Choose five courses spanning two disciplines:	20	
ECN 110B	World Economic History Since the Industrial Revolution	4	ECN 162	International Economic Relations	
IRE/SOC 104	The Political Economy of International Migration	4	HIS 119	World War I	
POL 130	Recent U.S. Foreign Policy	4	HIS 120	World War II	
POL 140A	Comparative Political Institutions: Electoral Systems	4	HIS 174B	War, Prosperity, & Depression: United States, 1917-1945	
POL 140B	Comparative Political Institutions: Parties	4	HIS 174C	The United States Since World War II, 1945 to the Present	
POL 140C	Comparative Political Institutions: Legislatures	4	POL 120	Theories of International Politics	
POL 140D	When Institutions Fail	4	POL 121	Scientific Study of War	
POL 140E	Policy-Making Processes	4	POL 130	Recent U.S. Foreign Policy	
SOC 138	Economic Sociology	4	POL 132	National Security Policy	
SOC 139	Corporations & Society	4		Choose three additional courses from at least two departments:	12
SOC 141	Industrialization & Social Change	4	COM 157	War & Peace in Literature	
<b>Group B; Developing Countries</b>			ECN 122	Theory of Games & Strategic Behavior	
<b>Code</b>	<b>Title</b>	<b>Units</b>	HIS 145	War & Revolution in Europe: 1789-1918	
ANT 122A	Economic Anthropology	4	HIS 146A	Europe in the 20th Century	
ANT 122B	Capitalism & Power	4	HIS 146B	Europe in the 20th Century	
ANT 126A	Anthropology of Development	4	HMR 131	Genocide	
ANT 126B	Women & Development	4	HMR 134	Human Rights	
ANT 127	Urban Anthropology	4	PHI 118	Political Philosophy	
CRD 153A	International Community Development: Asia	4	POL 112	Contemporary Democratic Theory	
CRD 153B	International Community Development: Europe	4	POL 122	International Law	
CRD 153C	International Community Development: Africa	4	POL 124	The Politics of Global Inequality	
CRD 180	Transnational Community Development	4	POL 126	Ethnic Self-Determination & International Conflict	
			POL 131	Analysis of U.S. Foreign Policy	
			POL 140A	Comparative Political Institutions: Electoral Systems	
			POL 140B	Comparative Political Institutions: Parties	
			POL 140C	Comparative Political Institutions: Legislatures	

POL 140D	When Institutions Fail		ESM/PLS 144	Trees & Forests	
POL 140E	Policy-Making Processes		ESP 167	Energy Policy	
SOC 100	Origins of Modern Sociological Theory		GEL 130	Non-Renewable Natural Resources	
SOC 118	Political Sociology		GEL 134	Environmental Geology & Land Use Planning	
SOC 157	Social Conflict		PLS 101	Agriculture & the Environment	
Choose four courses to fulfill Area Studies Requirement. (p. 404)		16	PLS/ESM 144	Trees & Forests	
<b>Total Units</b>		<b>48</b>	PLS 150	Sustainability & Agroecosystem Management	
<b>Track III: Global Environment, Health &amp; Natural Resources</b>					
<i>Familiarizes students with new sources of global interdependence such as biodiversity, natural resource conflicts, population growth, and world health.</i>					
<i>Note: Some courses shown below have additional prerequisites.</i>					
Code Requirements	Title	Units	<i>Health &amp; Human Populations</i>		
ECN 162	International Economic Relations	4	ANT/STS 121	Special Topics in Medical Anthropology	
POL 123	The Politics of Interdependence	4	ANT/STS 129	Health & Medicine in a Global Context	
ESP 161 or ESP 162	Environmental Law Environmental Policy	4	ANT 131	Ecology & Politics	
Choose one:		4	ESP 121	Population Ecology	
ANT/ESP 101	Ecology, Nature, & Society		ETX 101	Principles of Environmental Toxicology	
ANT 131	Ecology & Politics		IDI 141	Infectious Diseases of Humans	
PHI 120	Environmental Ethics		NUT 111AY	Introduction to Nutrition & Metabolism	
Choose two:		7-8	NUT 111B	Recommendations & Standards for Human Nutrition	
ARE 147	Resource & Environment Policy Analysis		NUT 118	Community Nutrition	
ARE/ESP 175	Natural Resource Economics		SOC 170	Population	
ARE 176	Environmental Economics		Choose four courses to fulfill Area Studies Requirement. (p. 404)		
ANT 103	Indigenous Peoples & Natural Resource Conservation		<b>Total Units</b>	<b>16</b>	
ABT/HYD 182	Environmental Analysis Using GIS			<b>43-48</b>	
CRD 149	Community Development Perspectives on Environmental Justice		<b>Track IV: Peoples &amp; Nationalities</b>		
ECN/ARE 115A	Economic Development		Examines social and cultural foundations of national development and international relations.		
ECN 125	Energy Economics		Code Requirements	Title	Units
IAD 170	Program Development for International Agriculture		Choose two:		8
PHI 120	Environmental Ethics		ANT 123AN	Resistance, Rebellion, & Popular Movements	
PHY/ENG 160	Environmental Physics & Society		ANT 130A	Cultural Dimensions of Globalization	
POL 107	Environmental Politics & Administration		SOC 118	Political Sociology	
POL 175	Science, Technology, & Policy		SOC 156	Social Movements	
SOC 160	Sociology of the Environment		Choose one each from three of the following four groups:		
Choose two from one of the following groups:		4-8	12		
<i>Atmospheric &amp; Marine Environments</i>					
ATM 116	Modern Climate Change		ANT 130BN	Migration & the Politics of Place & Identity	
ATM/ECI 149	Air Pollution		ANT 139AN	Race, Class, Gender Systems	
ESM 131	Air as a Resource		CRD 176	Comparative Ethnicity	
ESM 120	Global Environmental Interactions		HMR 131	Genocide	
ESM 121	Water Science & Management		HMR 134	Human Rights	
GEL/ESP 116N	Oceanography		IRE/SOC 104	The Political Economy of International Migration	
<i>Land Use &amp; Energy Supply</i>					
ANT 104N	Cultural Politics of the Environment		POL 126	Ethnic Self-Determination & International Conflict	
CRD 142	Rural Change in the Industrialized World		<i>Women</i>		
			ANT 126B	Women & Development	
			ANT 139BN	Gender & Sexuality	

SOC 145B	Gender & Rural Development in the Third World	AAS 110	West African Social Organization	4
WMS 182	Globalization, Gender & Culture	AAS 111	Cultural Politics in Contemporary Africa	4
<i>Religion</i>		AAS 156	Language & Identity in Africa & the African Diaspora	4
ANT 124	Religion in Society & Culture	AAS 176	The Politics of Resources	4
ANT 134	Buddhism in Global Culture	AAS 177	Politics of Life in Africa	4
PHI 105	Philosophy of Religion	ANT 140A	Cultures & Societies of West & Central Africa	4
RST 106	Christianity in the Contemporary World	ANT 140B	Cultures & Societies of East & South Africa	4
RST 161	Modern Islam	ANT 142	Peoples of the Middle East	4
RST 161B	Modern Islam: Authority & Tradition In Process	CRD 153C	International Community Development: Africa	4
RST 170	(Discontinued)	HMR 136	Human Rights in the Middle East	4
SOC 146	Sociology of Religion	MSA 150/GSW 185	Women & Islamic Discourses	4
<i>Development &amp; Its Impact on Social Cleavages</i>		POL 135	International Politics of the Middle East	4
ANT 122B	Capitalism & Power	POL 136	The Arab-Israeli Conflict	4
ANT 126A	Anthropology of Development	POL 146A	Politics of Africa: Issues in Contemporary African Politics	4
ANT 126B	Women & Development	POL 146B	Politics of Africa: Development in Africa	4
CRD 180	Transnational Community Development	RST 163	Social Life of Islam	4
POL 124	The Politics of Global Inequality	WMS 184	Gender in the Arab World	4
POL 142A	Comparative Development: Political Development in Modernizing Societies	WMS 185/MSA 150	(Discontinued)	4
SAS 121	Global Poverty: Critical Thinking & Taking Action	<b>Culture &amp; Literature</b>		
SOC 145A	Sociology of Third World Development	AAS 153/COM 154	African Literature	4
SOC 145B	Gender & Rural Development in the Third World	AAS 157	Literature & Society in South Africa	4
Four courses to fulfill Area Studies Requirement. (p. 404)		AAS 162	Islam in Africa & the Americas	4
Education/Internship Abroad for a minimum of one quarter.		AHI 150	Arts of Subsaharan Africa	4
<b>Total Units</b>		COM 147	Modern Jewish Writers	4
		COM 166	Literatures of the Modern Middle East	4
		DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean	4
		FRE 124	Post-Colonial & Francophone Literature	4
		JST 111	Israeli Writing Since 1960	4

## Area Studies Requirement—Regions

### Africa & the Middle East

Code	Title	Units	
<b>History</b>			
HIS 113	History of Modern Israel	4	
HIS 115A	History of West Africa	4	
HIS 115B	History of East Africa & the Indian Ocean	4	
HIS 115C	History of Southern Africa from Exploration to the Rainbow Nation	4	
HIS 115D	Postcolonial Africa	4	
HIS 115F	History of Modern North Africa, 1800 to the Present	4	
HIS 116	African History: Special Themes	4	
HIS 193B	History of the Modern Middle East, From 1914	4	
HIS 193C	The Middle East Environment: Historical Change & Current Challenges	4	
HIS 193D	History of Modern Iran, From 1850 to Present	4	
<b>Social Analysis</b>			
AAS 107C	African Descent Communities & Culture in Asia	4	
AAS 107D	African Descent Communities & Cultures in Europe	4	
<b>East &amp; South Asia</b>			
Code	Title	Units	
<b>History</b>			
HIS 191E	The Chinese Revolution	4	
HIS 191F	History of the People's Republic of China	4	
HIS 194C	Modern Japan	4	
HIS 194D	Business & Labor in Modern Japan	4	
HIS 194E	Education & Technology in Modern Japan	4	
HIS 195B	History of Modern Korea	4	
HIS 196B	Modern India	4	
<b>Social Analysis</b>			
AAS 107C	African Descent Communities & Culture in Asia	4	
ANT 143A	Ethnology of Southeast Asia	4	
ANT 147/MSA 131B/ CTS 146B	Modern South Asia Cinema	4	
ANT 148A	Culture & Political Economy in Contemporary China	4	
CRD 153A	International Community Development: Asia	4	

ECN 171	Economy of East Asia	4	HIS 168	History of Inter-American Relations	4
POL 148A	Government & Politics of East Asia: China	4	<b>Social Analysis</b>		
POL 148B	Government & Politics in East Asia: Japan	4	AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America	4
POL 148C	Government & Politics in East Asia: Southeast Asia	4	AAS 180	Race & Ethnicity in Latin America	4
RST 157	Hindu Women & Goddesses	4	ANT 144	Contemporary Societies & Cultures of Latin America	4
RST 165	Islam in Asia	4	CHI 130	United States-Mexican Border Relations	4
SOC 147	Sociological Perspectives on East Asia	4	NAS 120	Ethnopolitics of South American Indians	4
SOC 188	Markets, Culture & Inequality in China	4	NAS 133B	Ethnohistory of Native Peoples of Mexico & Central America 1500 to 2000	4
<b>Culture &amp; Literature</b>			POL 143A	Latin American Politics	4
ANT 145	Performance, Embodiment, & Space in South Asia	4	POL 143B	Mexican Politics	4
AHI 163C	Early Modern Chinese Painting	4	<b>Culture &amp; Literature</b>		
CHN 101	Chinese Film	4	AAS 163	African Religions in the Americas	4
CHN 103	Modern Chinese Drama	4	AHI 151	Arts of the Ancient New World	4
CHN 104	Modern Chinese Fiction (in English)	4	CHI 160	Mexican Film & Greater Mexican Identity	4
CHN 105	Western Influences on 20th-Century Chinese Literature (in English)	4	COM 152	Literature of the Americas	4
CHN 110	Great Writers of China: Texts & Context (in English)	4	COM 165	Caribbean Literatures	4
CHN 132	Readings in Modern Chinese Poetry	4	DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean	4
COM 110	Hong Kong Cinema	4	NAS 184	Contemporary Indigenous Literature of Mexico	4
DRA 154	Asian Theatre & Drama: Contexts & Forms	4	POR 163	20th C Masters in Brazilian Literature	4
EAS 113	Cinema & Society in China	4	SPA 149	Latin-American Literature in Translation	4
JPN 103	Japanese Literature in Translation: The Modern Period	4	SPA 153	Latin American Short Story	4
JPN 104	Modern Japanese Literature: War & Revolution	3	SPA 154	Latin American Novel	4
JPN 105	Modern Japanese Literature: Hero & Anti-Hero	4	SPA 155	Mexican Novel	4
JPN 106	Japanese Culture Through Film	4	SPA 156	Latin American Literature of the Turn of the 20th Century	4
JPN 131	Readings in Modern Japanese Literature: 1920-1945	4	SPA 157	Great Works of Latin American Literature/Culture	4
JPN 132	Readings in Modern Japanese Literature: 1945-1970	4	SPA 158	Latin American Poetry: From Vanguardism to Surrealism & Beyond	4
JPN 133	Readings in Modern Japanese Literature: 1970-Present	4	SPA 159	Special Topics in Latin American Literature & Culture	4
JPN 135	Readings in the Humanities: The Modern Period	4	SPA 160	Latin American Women Writers in Translation	4
JPN 136	Readings in Japanese Newspapers	4	SPA 170	Introduction to Latin American Culture	4
RST 156	Religion & the Performing Arts in India	4	SPA 172	Mexican Culture	4

## Russian & East/Central Europe

Code	Title	Units	Code	Title	Units
<b>History</b>			<b>History</b>		
HIS 159	Women & Gender in Latin American History	4	HIS 138B	Reform & Revolution in Tsarist Russia, 1825-1917	4
HIS/HMR 161	Human Rights in Latin America	4	HIS 138C	Russian History: The Rise & Fall of the Soviet Union, 1917 to Present	4
HIS 162	History of the Andean Region	4	HIS 143	History of Eastern Europe & the Balkans	4
HIS 163B	History of Brazil	4	<b>Social Analysis</b>		
HIS 164	History of Chile	4	POL 144A	Politics of Post-Communist Countries: East European Politics	4
HIS 165	Latin American Social Revolutions	4	POL 144B	Politics of Post-Communist Countries: Russia	4
HIS 166B	History of Mexico since 1848	4	<b>Culture &amp; Literature</b>		
HIS 167	Modern Latin American Cultural & Intellectual History	4			

RUS 124	20th-Century Russian Literature	4	GER/FMS 142	New German Cinema	4
RUS/FMS 129	Russian Film	4	GER 143	Language Through Media	4
RUS 130	Contemporary Russian Culture	4	GER 168	Multiculturalism in German Literature	4
RUS 133	Post-Soviet Literature	4	GER 185	The Age of Bismarck	4
RUS 142	Women in Russian Culture	4	ITA 107	Survey of Italian Culture & Institutions	4
RUS 150	Russian Culture	4	ITA 108	Contemporary Issues in Italian Culture & Society	4

**Western Europe**

Code	Title	Units			
<b>History</b>					
HIS 141	France Since 1815	4			
HIS 142A	History of the Holocaust	4			
HIS 144B	History of Germany since 1789	4			
HIS 145	War & Revolution in Europe: 1789-1918	4			
HIS 146A	Europe in the 20th Century	4			
HIS 146B	Europe in the 20th Century	4			
HIS 147B	European Intellectual History: 1870-1920	4			
HIS 147C	European Intellectual History: 1920-1970	4			
HIS 151D	Industrial England	4			
<b>Social Analysis</b>					
AAS 107D	African Descent Communities & Cultures in Europe	4			
CRD 153B	International Community Development: Europe	4			
POL 137	International Relations in Western Europe	4			
POL 147A	West European Politics	4			
POL 147B	West European Politics: British Politics	4			
POL 147C	West European Politics: French Politics	4			
POL 147D	West European Politics: German Politics	4			
<b>Culture &amp; Literature</b>					
FMS/ITA 121	New Italian Cinema	4			
FMS/GER 176A	Classic Weimar Cinema	4			
FMS 176B	Postwar German Cinema	4			
FRE 107	The Making of Modern France	4			
FRE 108	Modern French Culture	4			
FRE 120	Modern French Thought	4			
FRE 121	20th-Century French Novel	4			
FRE 133	Gender & Politics in French Literature & Culture	4			
GER 112	Topics in German Literature	4			
GER 114	From Marlene Dietrich to Run, Lola Run: German Women & Film	4			
GER 115	German Literature Since 1945	4			
GER 117	After the Catastrophe: Jews & Jewish Life in Post-1945 Germany	4			
GER 118B	Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism	4			
GER 118C	Germany Under the Third Reich	4			
GER 118E	Contemporary German Culture	4			
GER 120	Survey of German Culture	4			
GER 126	Modern German Literature	4			
GER 129	Postwar Women Writers	4			
GER 141	The Holocaust & its Literary Representation	4			

**Political Science—Public Service, Bachelor of Arts****College of Letters & Science****The Political Science Major Program**

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs.

**The Program**

The Department of Political Science offers three majors: International Relations (p. 399), Political Science (p. 409), and Political Science—Public Service (p. 406).

- The International Relations major explores problems of security, development, ethnic conflict, human rights, health, and the environment at a global level.
- The Political Science major aims to provide the student with a broad understanding of political concepts, political institutions, political behavior, and political processes.
- The Political Science—Public Service major is for students who desire opportunities for practical hands-on experience in their major. It differs in particular from the political science major in its internship requirement and its focus on the American political system.

**Major Advisors**

Contact the Department of Political Science (<https://ps.ucdavis.edu/>).

## Internships & Career Alternatives

Both the proximity of UC Davis to the state capitol and the programs offered by the UC Washington Center afford exceptional internship possibilities in local, state, and national government offices, providing students with actual experience in politics and government service while still attending school. A student who majors in political science acquires research and analytic skills relevant to many professional fields. Consequently, the majors offered in political science are valuable not only in providing students with a better understanding of politics and political systems, but also as a first step toward careers in teaching, law, management, government, urban planning, journalism, politics, administration, or for graduate studies in numerous fields.

## American History & Institutions

This University requirement may be satisfied by passing any one of the following Political Science (POL) courses:<sup>1</sup>

Code	Title	Units
POL 001	American National Government	4
POL 005	Contemporary Problems of the American Political System	4
POL 100	Local Government & Politics	4
POL 102	Urban Public Policy	4
POL 104	California State Government & Politics	4
POL 105	The Legislative Process	4
POL 106	The Presidency	4
POL 108	Policy Making in the Public Sector	4
POL 109	Public Policy & the Governmental Process	4
POL 113	American Political Thought	4
POL 130	Recent U.S. Foreign Policy	4
POL 131	Analysis of U.S. Foreign Policy	4
POL 160	American Political Parties	4
POL 163	Group Politics	4

<sup>1</sup> See also under American History & Institutions requirements (p. 36).

## Graduate Study

The Department of Political Science offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator's office.

### Graduate Advisor

Contact the Department of Political Science (<https://ps.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
POL 001	American National Government (Required.)	4
POL 051	Scientific Study of Politics (Required.)	4
Choose three:		12
POL 002	Introduction to Comparative Politics	
POL 003	International Relations	
POL 004	Basic Concepts in Political Theory	

POL 005	Contemporary Problems of the American Political System	
POL 007	Contemporary Issues in Law & Politics	
Choose one:		4
POL/CMN/SOC/PSC 012Y	Data Visualization in the Social Sciences	
STA 013 or STA 013Y	Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
Preparatory Subject Matter Subtotal		24
<b>Depth Subject Matter</b>		
<i>Core Program</i>		
Choose three:		12
POL 100	Local Government & Politics	
POL 102	Urban Public Policy	
POL 104	California State Government & Politics	
POL 105	The Legislative Process	
POL 106	The Presidency	
POL 108	Policy Making in the Public Sector	
POL 109	Public Policy & the Governmental Process	
POL 113	American Political Thought	
POL 114	Quantitative Analysis of Political Data	
POL 180	Bureaucracy in Modern Society	
<i>Internship</i>		
Choose one:		6
POL 192A	Internship in Public Affairs	
POL 192B	Internship in Public Affairs	
WAS 192	Internship in the UC Davis Washington Program	
<i>Research Paper</i>		
WAS 193/POL 193W or POL 193	Washington Center Research Seminar Research in Practical Politics	2-4
<i>Fields of Concentration</i>		
Select six upper division courses from two or three fields of concentration listed below with at least two courses in each field selected; at least 16 of the units must be in Political Science; No overlap between Core Program courses and Fields of Concentration allowed.		24
Field (1) Policy Process (p. 408)		
Field (2) Policy Interpretation (Public/Pre-Law) (p. 408)		
Field (3) State & Local Policy (p. 408)		
Field (4) Foreign Policy (p. 408)		
Field (5) Environmental Policy (p. 408)		
Field (6) Economic Policy (p. 408)		
Field (7) Social Policy (p. 408)		
Field (8) Policy Analysis Tool (p. 408)		
Field (9) Honors Thesis (p. 409)		
Depth Subject Matter Subtotal		44-46
Total Units		68-70

## Fields of Concentration

### Field (1) Policy Process

Code	Title	Units
POL 100	Local Government & Politics	4
POL 102	Urban Public Policy	4
POL 104	California State Government & Politics	4
POL 105	The Legislative Process	4
POL 106	The Presidency	4
POL 108	Policy Making in the Public Sector	4
POL 109	Public Policy & the Governmental Process	4
POL 140A	Comparative Political Institutions: Electoral Systems	4
POL 160	American Political Parties	4
POL 162	Elections & Voting Behavior	4
POL 163	Group Politics	4
POL 164	Public Opinion	4
POL 165	Mass Media & Politics	4
POL 166	Women in Politics	4
POL 168	Chicano Politics	4
POL 170	Political Psychology	4
POL 171	The Politics of Energy	4
POL 172	American Political Development	4
POL 174	Government & the Economy	4
POL 175	Science, Technology, & Policy	4
POL 180	Bureaucracy in Modern Society	4
POL 183	Administrative Behavior	4
POL 187	Administrative Theory	4
POL 195	Special Studies in American Politics	4
ECN 130	Public Microeconomics	4
ECN 131	Public Finance	4

### Field (2) Policy Interpretation (Public/Pre-Law)

Code	Title	Units
POL 119	Contemporary Political Thought	4
POL 150	Judicial Politics & Constitutional Interpretation	4
POL 151	Constitutional Politics of the First Amendment & the Right to Privacy.	4
POL 152	The Constitutional Politics of the Equality	4
POL 153	The Constitutional Politics of the Justice System	4
POL 155	Judicial Process & Behavior	4

### Field (3) State & Local Policy

Code	Title	Units
POL 100	Local Government & Politics	4
POL 102	Urban Public Policy	4
POL 104	California State Government & Politics	4
ESP 173	Land Use & Growth Controls	4
SOC 143A	Urban Society	4

### Field (4) Foreign Policy

Code	Title	Units
POL 122	International Law	4
POL 130	Recent U.S. Foreign Policy	4
POL 131	Analysis of U.S. Foreign Policy	4
POL 132	National Security Policy	4
POL 134	Africa & U.S. Foreign Policy	4
POL 139	Special Studies in Foreign Policy	4

### Field (5) Environmental Policy

Code	Title	Units
POL 107	Environmental Politics & Administration	4
ESP 160	The Policy Process	4
ESP 161	Environmental Law	4
ESP 162	Environmental Policy	4
ESP 166	Ocean & Coastal Policy	3
ESP 168A	Methods of Environmental Policy Analysis	5
ESP 168B	Methods of Environmental Policy Evaluation	4
ESP 169	Water Policy & Politics	3
ESP 171	Urban & Regional Planning	4
ESP 172	Public Lands Management	4
ESP 173	Land Use & Growth Controls	4
ESP 179	Environmental Impact Assessment	4

### Field (6) Economic Policy

Code	Title	Units
ECN 100A	Intermediate Micro Theory: Consumer & Producer Theory	4
ECN 130	Public Microeconomics	4
ECN 131	Public Finance	4
ECN 151A	Economics of the Labor Market	4
ECN 151B	Economics of Human Resources	4

### Field (7) Social Policy

Code	Title	Units
SOC/IRE 104	The Political Economy of International Migration	4
SOC 124	Education & Inequality in the U.S.	4
SOC 141	Industrialization & Social Change	4
SOC 150	Criminology	4
SOC 151	The Criminal Justice System	4
SOC 154	(Discontinued)	4
SOC 155	Sociology of Law	4
SOC 175	(Discontinued)	4
SOC 181	(Discontinued)	4

### Field (8) Policy Analysis Tools

Code	Title	Units
ECN 102	Analysis of Economic Data	4
ECN 140	Econometrics	4
POL 114	Quantitative Analysis of Political Data	4

## Field (9) Honors Thesis

Code	Title	Units
POL 194HA	Special Study for Honors Students	4
POL 194HB	Special Study for Honors Students	4

# Political Science, Bachelor of Arts

College of Letters & Science

## The Political Science Major Program

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### Major Advisors

Contact the Department of Political Science (<https://ps.ucdavis.edu/>).

## Internships & Career Alternatives

Both the proximity of UC Davis to the state capitol and the programs offered by the UC Washington Center afford exceptional internship possibilities in local, state, and national government offices, providing students with actual experience in politics and government service while still attending school. A student who majors in political science acquires research and analytic skills relevant to many professional fields. Consequently, the majors offered in political science are valuable not only in providing students with a better understanding of politics and political systems, but also as a first step toward careers in teaching, law, management, government, urban planning, journalism, politics, administration, or for graduate studies in numerous fields.

## American History & Institutions

This University requirement may be satisfied by passing any one of the following Political Science (POL) courses:<sup>1</sup>

Code	Title	Units
POL 001	American National Government	4
POL 005	Contemporary Problems of the American Political System	4
POL 100	Local Government & Politics	4
POL 102	Urban Public Policy	4

POL 104	California State Government & Politics	4
POL 105	The Legislative Process	4
POL 106	The Presidency	4
POL 108	Policy Making in the Public Sector	4
POL 109	Public Policy & the Governmental Process	4
POL 113	American Political Thought	4
POL 130	Recent U.S. Foreign Policy	4
POL 131	Analysis of U.S. Foreign Policy	4
POL 160	American Political Parties	4
POL 163	Group Politics	4

<sup>1</sup> See also under American History & Institutions requirements (p. 36).

## Graduate Study

The Department of Political Science offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator's office.

### Graduate Advisor

Contact the Department of Political Science (<https://ps.ucdavis.edu/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Political Science</i>		
POL 051	Scientific Study of Politics (required)	4
Choose three: <sup>1</sup>		12
POL 001	American National Government	
POL 002	Introduction to Comparative Politics	
POL 003	International Relations	
POL 004	Basic Concepts in Political Theory	
Choose one: <sup>1</sup>		4
POL 001	American National Government	
POL 002	Introduction to Comparative Politics	
POL 003	International Relations	
POL 004	Basic Concepts in Political Theory	
POL 005	Contemporary Problems of the American Political System	
POL 007	Contemporary Issues in Law & Politics	
POL 011A	America Decides: Who Will Win This Year's Election?	
POL 011B	Citizen Lawmaking: Direct Democracy, Public Policy & Political Representation in America	
POL 011C	Politics & Film	
POL 011D	Political Persuasion	
POL 012A	Politics & Sports	
POL 012B	Climate Change & Politics	
Choose one:		4
STA 013	Elementary Statistics	
or STA 013Y	Elementary Statistics	
STA 032	Gateway to Statistical Data Science	

POL/CMN/SOC/ PSC 012Y	Data Visualization in the Social Sciences		POL 170	Political Psychology	4
Preparatory Subject Matter Subtotal	24		POL 171	The Politics of Energy	4
<b>Depth Subject Matter</b>			POL 172	American Political Development	4
Four courses in one of the fields of concentration listed below. (p. 410)	16		POL 174	Government & the Economy	4
Three courses in another field of concentration listed below. (p. 410)	12		POL 175	Science, Technology, & Policy	4
Two courses in another field of concentration listed below. (p. 410)	8		POL 176	Racial Politics	4
Two other upper division courses in Political Science. <sup>2</sup>	8-9		POL 180	Bureaucracy in Modern Society	4
<i>Fields of Concentration</i>			POL 183	Administrative Behavior	4
American Politics (p. 410)			POL 187	Administrative Theory	4
Comparative Politics (p. 410)			POL 195	Special Studies in American Politics	4
International Relations (p. 410)			POL 196A	Seminar in American Politics	4
Political Theory (p. 411)					
Depth Subject Matter Subtotal	44-45				
<b>Total Units</b>	<b>68-69</b>				

<sup>1</sup> No overlap permitted between sections.<sup>2</sup> Only 5 units of POL 192A & POL 192B may be counted toward the depth subject matter; POL 198 & POL 199 may not be counted.

## Fields of Concentration

### American Politics

Courses with POL 001 recommended:

Code	Title	Units			Units
POL 100	Local Government & Politics	4	POL 126	Ethnic Self-Determination & International Conflict	4
POL 102	Urban Public Policy	4	POL 140A	Comparative Political Institutions: Electoral Systems	4
POL 104	California State Government & Politics	4	POL 140B	Comparative Political Institutions: Parties	4
POL 105	The Legislative Process	4	POL 140C	Comparative Political Institutions: Legislatures	4
POL 106	The Presidency	4	POL 140D	When Institutions Fail	4
POL 107	Environmental Politics & Administration	4	POL 140E	Policy-Making Processes	4
POL 108	Policy Making in the Public Sector	4	POL 142A	Comparative Development: Political Development in Modernizing Societies	4
POL 109	Public Policy & the Governmental Process	4	POL 142B	Comparative Development: Politics & Inequality	4
POL 150	Judicial Politics & Constitutional Interpretation	4	POL 142C	Comparative Political Development: Democracy & Democratization	4
POL 151	Constitutional Politics of the First Amendment & the Right to Privacy.	4	POL 143A	Latin American Politics	4
POL 152	The Constitutional Politics of the Equality	4	POL 143B	Mexican Politics	4
POL 153	The Constitutional Politics of the Justice System	4	POL 144A	Politics of Post-Communist Countries: East European Politics	4
POL 154	Legal Philosophy	4	POL 144B	Politics of Post-Communist Countries: Russia	4
POL 155	Judicial Process & Behavior	4	POL 146A	Politics of Africa: Issues in Contemporary African Politics	4
POL 160	American Political Parties	4	POL 146B	Politics of Africa: Development in Africa	4
POL 161	Ballots, Bucks, & Maps: The Rules of the Electoral Game in American Politics	4	POL 147A	West European Politics	4
POL 162	Elections & Voting Behavior	4	POL 147B	West European Politics: British Politics	4
POL 163	Group Politics	4	POL 147C	West European Politics: French Politics	4
POL 164	Public Opinion	4	POL 147D	West European Politics: German Politics	4
POL 165	Mass Media & Politics	4	POL 148A	Government & Politics of East Asia: China	4
POL 166	Women in Politics	4	POL 148B	Government & Politics in East Asia: Japan	4
POL 168	Chicano Politics	4	POL 148C	Government & Politics in East Asia: Southeast Asia	4
			POL 179	Special Studies in Comparative Politics	4
			POL 196B	Seminar in Comparative Politics	4

### International Relations

Courses with POL 003 recommended:

Code	Title	Units
POL 120	Theories of International Politics	4
POL 121	Scientific Study of War	4
POL 122	International Law	4
POL 123	The Politics of Interdependence	4
POL 124	The Politics of Global Inequality	4
POL 126	Ethnic Self-Determination & International Conflict	4
POL 129	Special Studies in International Politics	4
POL 130	Recent U.S. Foreign Policy	4
POL 131	Analysis of U.S. Foreign Policy	4
POL 132	National Security Policy	4
POL 134	Africa & U.S. Foreign Policy	4
POL 135	International Politics of the Middle East	4
POL 136	The Arab-Israeli Conflict	4
POL 137	International Relations in Western Europe	4
POL 139	Special Studies in Foreign Policy	4
POL 190	International Relations	4
POL 196C	Seminar in International Relations	4

<sup>1</sup> POL 193, POL 198, POL 199 may not count towards minor. Only 5 units of POL 192 series courses may be counted.

## Political Science, Master of Arts

### College of Letters & Science

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs.

### Graduate Study

The Department of Political Science offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator office.

The Master of Arts degree is offered only in route to the Ph.D.

### Graduate Advisor

Contact the Department of Political Science (p. 399).

## Political Science, Master of Arts/ Doctor of Jurisprudence

### College of Letters & Science

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs.

### Graduate Study

The Department of Political Science (<https://ps.ucdavis.edu/>) offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator's office.

### Graduate Advisor

Contact the Department of Political Science (<https://ps.ucdavis.edu/>).

## Political Science, Doctor of Philosophy

### College of Letters & Science

## The Political Science Major Program

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political

## Political Theory

Courses with POL 004 recommended:

Code	Title	Units
POL 110	The Strategy of Politics	4
POL 112	Contemporary Democratic Theory	4
POL 113	American Political Thought	4
POL 114	Quantitative Analysis of Political Data	4
POL 115	Medieval Political Thought	4
POL 116	Foundations of Political Thought	4
POL 117	Topics in the History of Political Thought	4
POL 118A	History of Political Theory: Ancient	4
POL 118B	History of Political Theory: Early Modern	4
POL 118C	History of Political Theory: Late Modern	4
POL 119	Contemporary Political Thought	4
POL 187	Administrative Theory	4
POL 196D	Seminar in Political Theory	4

## Political Science, Minor

### College of Letters & Science

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs.

Code	Title	Units
Choose six upper division Political Science (POL) courses from any field. <sup>1</sup>		24

Political Science (POL) courses. (p. 1245)

Total Units

24

behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs.

### Graduate Study

The Department of Political Science offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator office.

### Graduate Advisor

Contact the Department of Political Science (p. 399).

## War-Peace Studies, Minor

College of Letters & Science

### Minor

For more information, contact the Department of Political Science (<https://ps.ucdavis.edu/>).

Code	Title	Units
<i>Restriction</i>		
No more than two courses from a single department may be offered in satisfaction of the minor requirements.		
Choose one or two from each of the following areas:		
<i>Approaches</i>		
ANT 123AN	Resistance, Rebellion, & Popular Movements	
ANT 126B	Women & Development	
COM 157	War & Peace in Literature	
PHI 115	Problems in Normative Ethics	
PHI 118	Political Philosophy	
POL 121	Scientific Study of War	
POL 123	The Politics of Interdependence	
POL 124	The Politics of Global Inequality	
POL 132	National Security Policy	
POL 176	Racial Politics	
SOC 157	Social Conflict	
<i>Northern &amp; Western Regions</i>		
HIS 134A	The Age of Revolution	
HIS 138C	Russian History: The Rise & Fall of the Soviet Union, 1917 to Present	
HIS 142A	History of the Holocaust	
HIS 143	History of Eastern Europe & the Balkans	
HIS 144A	History of Germany, 1450 to 1789	
HIS 144B	History of Germany since 1789	
HIS 145	War & Revolution in Europe: 1789-1918	
HIS 170B	The American Revolution	
HIS 171B	Civil War Era	
HIS 174B	War, Prosperity, & Depression: United States, 1917-1945	
NAS 130B	Native American Ethno-Historical Development	

POL 130	Recent U.S. Foreign Policy
POL 131	Analysis of U.S. Foreign Policy
<i>Southern &amp; Eastern Regions</i>	
ANT 142	Peoples of the Middle East
ANT 143A	Ethnology of Southeast Asia
ANT 144	Contemporary Societies & Cultures of Latin America
HIS 165	Latin American Social Revolutions
HIS 191F	History of the People's Republic of China
HIS 194C	Modern Japan
NAS 120	Ethnopolitics of South American Indians
POL 142A	Comparative Development: Political Development in Modernizing Societies

Total Units 20

## Population Biology (Graduate Group)

### Graduate Studies

Brian Moore, Ph.D., Chairperson of the Group

### Group Office

2320 Storer Hall; 530-752-1274; Population Biology Graduate Group (<https://pbg.ucdavis.edu/>); Faculty (<https://pbg.ucdavis.edu/faculty/>)

- Population Biology, Master of Science (p. 412)
- Population Biology, Doctor of Philosophy (p. 412)

## Population Biology, Master of Science

### Graduate Studies

### Graduate Study

The Population Biology Graduate Group (PBGG) emphasizes programs of study and research leading to a Ph.D. degree. The PBGG concentrates on population biology as a broad discipline that unifies ecology, evolution, population genetics and phylogenetics. The course curriculum consists of a first-year core course offered by PBGG faculty, seminars, and advanced courses in population biology and related disciplines; chosen in consultation with a guidance committee.

The Master of Science is offered only as an en route degree.

### Graduate Advisor

Consult the Population Biology Graduate Group office (<https://pbg.ucdavis.edu/contact/>).

## Population Biology, Doctor of Philosophy

### College of Biological Sciences

### Graduate Study

The Population Biology Graduate Group (PBGG) emphasizes programs of study and research leading to a Ph.D. degree. The PBGG concentrates on population biology as a broad discipline that unifies ecology, evolution,

population genetics and phylogenetics. The course curriculum consists of a first-year core course offered by PBGG faculty, seminars, and advanced courses in population biology and related disciplines; chosen in consultation with a guidance committee.

### **Graduate Advisor**

Consult the Population Biology Graduate Group office (<https://pbg.ucdavis.edu/contact/>).

## **Preventive Veterinary Medicine (Graduate Group)**

### **School of Veterinary Medicine**

Janet Foley, D.V.M., Ph.D., Chairperson of the Group; email ([jefoley@ucdavis.edu](mailto:jefoley@ucdavis.edu))

### **Group Office**

1022 Veterinary Medicine Administrative Building; 530-752-2657; Fax 530-754-9161; Preventive Veterinary Medicine Graduate Group (<http://mpvm.vetmed.ucdavis.edu/>); Faculty (<http://mpvm.vetmed.ucdavis.edu/about/faculty/>)

### **Graduate Advisor**

Gabriele Maier ([gumaier@ucdavis.edu](mailto:gumaier@ucdavis.edu))

- Master of Preventive Veterinary Medicine (p. 413)

## **Master of Preventive Veterinary Medicine**

### **School of Veterinary Medicine**

Janet Foley, D.V.M., Ph.D., Chairperson of the Group; [jefoley@ucdavis.edu](mailto:jefoley@ucdavis.edu)

### **Group Office**

Veterinary Medicine Administrative Building, Rm 1022; 530-752-2657; Fax 530-754-9161; Master of Preventive Veterinary Medicine (<http://mpvm.vetmed.ucdavis.edu/>); Faculty (<http://mpvm.vetmed.ucdavis.edu/about/faculty/>)

### **Graduate Advisor**

Gabriele Maier ([gumaier@ucdavis.edu](mailto:gumaier@ucdavis.edu))

For program requirements, see Master of Preventive Veterinary Medicine (<https://mpvm.vetmed.ucdavis.edu/program-requirements/>).

## **Psychology**

### **College of Letters & Science**

Kristin Lagattuta, Ph.D., Chairperson of the Department; term ends June 30, 2025

### **Department Office**

101 Young Hall; 530-752-1880; Psychology (<http://psychology.ucdavis.edu>); Faculty ([http://psychology.ucdavis.edu/directory-of-people/faculty/#c4=all&b\\_start=0](http://psychology.ucdavis.edu/directory-of-people/faculty/#c4=all&b_start=0))

## **Advising**

Staff advisors are located in Young Hall; [psychadvising@ucdavis.edu](mailto:psychadvising@ucdavis.edu). For more information on how to make an appointment or join Drop-In Advising, see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

- Psychology, Bachelor of Arts (p. 413)
- Psychology, Bachelor of Science (p. 415)
- Psychology, Minor (p. 419)
- Psychology, Master of Arts (p. 420)
- Psychology, Doctor of Philosophy (p. 421)

## **Psychology, Bachelor of Arts**

### **College of Letters & Science**

### **The Major Programs**

The psychology program at UC Davis is broad and includes students and faculty with a variety of interests. The department has developed around five core areas of psychology:

*Perception, Cognition, & Cognitive Neuroscience (PCCN)* involves the study of awareness and thought, and includes such topics as perception, learning, memory, language and cognition.

*Biological Psychology* covers a broad spectrum of topics including evolutionary, neurobiological, and molecular mechanisms of behavior.

*Social-Personality Psychology* involves the study of the individual in their social environment and includes such topics as personality & individual differences, emotions, stereotyping & prejudice, intergroup relations, the psychology of religion and psychological health & dysfunction.

*Developmental Psychology* involves the study of changes in behavioral, cognitive, emotional, and social abilities that occur throughout the lifespan. Typical and atypical development is examined using a variety of methods including behavioral, neuroimaging, and physiological assessments.

*Quantitative Psychology* involves the study of linear & nonlinear models, psychometrics, mixed-effects models, and dynamic models, including experimental design, analysis of variance, regression, multivariate analysis, latent growth models, time series models, and factor analytic models.

The department offers the Bachelor of Arts (A.B.) program for students interested in the liberal arts and the Bachelor of Science (B.S.) program geared for students with an interest in either biology or mathematics. The main objective of both programs is a broad introduction to the scope of contemporary psychology. In addition to completing a number of common core courses for their degree, students may take approved elective courses from a wide range of topics including Educational Psychology, Interpersonal Communication, and Psychological Anthropology, to name a few. The department strongly encourages students to become involved in individual research projects under the direction of faculty members and to participate in our internship program to broaden experience and understanding of the field of psychology.

### **Preparatory Requirements**

Before declaring a major in Psychology, students must complete PSC 001 and PSC 041 with a combined grade point average of at least 2.500. Both

courses must be taken for a letter grade. If a 2.500 GPA is not attained in these two courses, a 2.000 GPA in a minimum of three upper division Psychology courses is also acceptable for major declaration.

## Career Alternatives

A degree in psychology provides broad intellectual foundations which are useful to the graduate for the development of careers in a variety of areas, including social work, teaching, business, management and counseling. An undergraduate education in psychology also provides excellent preparation for graduate study. Individuals with degrees in psychology may enter graduate programs to prepare for teaching, research, or clinical/counseling careers in psychology, or may go on to professional schools for training in veterinary and human medicine, law, and many other professions.

## Honors & Honors Program

In order to be eligible for high or highest honors in Psychology, the student must both meet the college criteria for honors and complete a research project involving a minimum of 6 units of course work over at least two quarters which represents an original analysis of data on psychological phenomena. Courses PSC 194HA-PSC 194HB or other approved courses can be used to satisfy the unit requirement. This project is to be written in thesis form and approved by the department. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

## Recommended for All Majors

Students who plan to do graduate work in any area of psychology are strongly encouraged to gain experience through research and internship activities.

## Major Advisor

Staff advisors are located in Young Hall; psychadvising@ucdavis.edu; 530-752-5104. For more information on how to make an appointment or join Drop-In Advising hours, please see Yellow Cluster Undergraduate Advising (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

## Graduate Study

The Department offers programs of study and research leading to the Ph.D. degree in psychology. Detailed information regarding graduate study may be obtained on our website (<https://psychology.ucdavis.edu/graduate/>).

## Graduate Advisor

See Graduate Students (<http://psychology.ucdavis.edu/graduate/>).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Psychology</i> <sup>1</sup>		
Choose one:		4
PSC 001 or PSC 001Y	General Psychology	
OR		
The equivalent.		
<i>Statistics</i> <sup>1</sup>		
Choose one:		4
PSC/CMN/SOC/ POL 012Y	Data Visualization in the Social Sciences	
STA 013	Elementary Statistics	

or STA 013Y	Elementary Statistics	
STA 100	Applied Statistics for Biological Sciences	
<i>Research Methods</i> <sup>1</sup>		
PSC 041	Research Methods in Psychology	4
<i>Biology</i>		
Choose BIS 002A or a combination, as below:		5-8
BIS 002A	Introduction to Biology: Essentials of Life on Earth <sup>2</sup>	
OR a combination of:		
BIS 010	Everyday Biology	
<b>AND</b>		
ANT 001	Human Evolutionary Biology	
or ANT 001Y	Human Evolutionary Biology (Hybrid Version)	
or MCB 010	Introduction to Human Heredity	
or NPB 010	Elementary Human Physiology	
Preparatory Subject Matter Subtotal		17-20
<b>Depth Subject Matter</b>		
Choose two courses each from two of the following Core Groups and one course each from the remaining two Core Groups. Total upper division units should equal at least 40 units between core group courses and major elective courses.		22-24
<i>Core Group A: Perception, Cognition, &amp; Cognitive Neuroscience</i>		
PSC 100 or PSC 100Y	Introduction to Cognitive Psychology	
PSC 130	Human Learning & Memory	
PSC 131	Perception	
PSC 132	Language & Cognition	
PSC 133/ CGS 107/ECN 107	Neuroeconomics/Reinforcement Learning & Decision Making	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind	
PSC 136	Psychology of Music	
<i>Core Group B: Psychobiology</i>		
PSC 101	Introduction to Biological Psychology	
PSC 113	Developmental Psychobiology	
PSC 121	Physiological Psychology	
PSC 122/NPB 150	Advanced Animal Behavior	
PSC 123/NPB 152	Hormones & Behavior (3 units) <sup>3</sup>	
PSC/NPB 124	Comparative Neuroanatomy (3 units) <sup>3</sup>	
PSC 125	Behavioral Epigenetics	
PSC 126	Health Psychology	
PSC 137	Neurobiology of Learning & Memory	
PSC 159	Gender & Human Reproduction	
<i>Core Group C: Social/Personality</i>		
PSC 151	Social Psychology	
PSC 152	Social Cognition	
PSC 154	Psychology of Emotion	
PSC 158	Sexual Orientation & Prejudice	
PSC 161	Psychology of the Self	
PSC 162	Introduction to Personality Psychology	
PSC 165	Introduction to Clinical Psychology	
PSC 168	Abnormal Psychology	
<i>Core Group D: Developmental</i>		

PSC 140	Developmental Psychology <sup>4</sup>	
or PSC 140Y	Developmental Psychology	
or HDE 100A	Infancy & Early Childhood	
or HDE 100AV	Infancy & Early Childhood	
or HDE 100B	Middle Childhood & Adolescence	
PSC 141	Cognitive Development	
PSC 142	Social & Personality Development	
PSC 143	Infant Development	
PSC 145	Developmental Cognitive Neuroscience	
PSC 146	The Development of Memory	
PSC 148	Developmental Disorders	
Depth Subject Matter Subtotal		22-24
<b>Approved Major Electives</b>		
Additional units to achieve a total of 40 units of approved upper division major elective coursework. See list of Approved Major Electives below:		
	Any upper division Psychology (PSC) course(s). (p. 1272)	<sup>5</sup>
AAS 141	Psychology of the African American Experience	
ANT 132	Psychological Anthropology	
CHI 120	Chicana/o Psychology	
CHI 121	Chicana/o Community Mental Health	
CHI 122	Psychology Perspectives Chicana/o & Latina/o Family	
CHI 123	Psychological perspectives on Chicana/o & Latina/o Children & Adolescents	
CMN 120	Interpersonal Communication	
CMN 122	Nonverbal Communication	
CNS 100	Consumer Behavior (3 units)	<sup>3</sup>
EDU 110	Educational Psychology: General	
EXB 102	Introduction to Motor Learning & the Psychology of Sport & Exercise	
HDE 100A	Infancy & Early Childhood	
or HDE 100AV	Infancy & Early Childhood	
HDE 100B	Middle Childhood & Adolescence	
HDE 100C	Adulthood & Aging	
HDE/ENT 117	Longevity	
HDE 163	Cognitive Neuropsychology in Adulthood & Aging	
LIN 171	Introduction to Psycholinguistics	
NPB 102	Animal Behavior (3 units)	<sup>3</sup>
NPB 168	Neurobiology of Addictive Drugs	
POL 170	Political Psychology	
SOC 126	Social Interaction	
SOC 135	Social Relationships	
SOC 152	Juvenile Delinquency	
SOC 171	Sociology of Violence & Inequality	
Approved Major Electives Subtotal		16-18
<b>Total Units</b>		<b>55-62</b>

<sup>2</sup> Recommended to take CHE 002A before BIS 002A.

<sup>3</sup> If you take one or more 3-unit course(s), you will need additional PSC Major Elective units to fulfill the 40 total units of upper division PSC required in the major.

<sup>4</sup> Students who have completed HDE 100A or HDE 100AV or HDE 100B prior to PSC 140 will receive 2 units of credit for PSC 140.

<sup>5</sup> Except PSC 197T.

## Psychology, Bachelor of Science

College of Letters & Science

### The Major Programs

The psychology program at UC Davis is broad and includes students and faculty with a variety of interests. The department has developed around five core areas of psychology:

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*Social-Personality Psychology* involves the study of the individual in their social environment and includes such topics as personality & individual differences, emotions, stereotyping & prejudice, intergroup relations, the psychology of religion and psychological health & dysfunction.

*Developmental Psychology* involves the study of changes in behavioral, cognitive, emotional, and social abilities that occur throughout the lifespan. Typical and atypical development is examined using a variety of methods including behavioral, neuroimaging, and physiological assessments.

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### Preparatory Requirements

Before declaring a major in Psychology, students must complete PSC 001 and PSC 041 with a combined grade point average of at least 2.500. Both courses must be taken for a letter grade. If a 2.500 GPA is not attained in these two courses, a 2.000 GPA in a minimum of three upper division Psychology courses is also acceptable for major declaration.

<sup>1</sup> Strongly recommended that PSC 001, PSC 041, and PSC 012Y or STA 013 or STA 100 be completed in the first year. Recommended to take Statistics before PSC 041.

## Career Alternatives

A degree in psychology provides broad intellectual foundations which are useful to the graduate for the development of careers in a variety of areas, including social work, teaching, business, management and counseling. An undergraduate education in psychology also provides excellent preparation for graduate study. Individuals with degrees in psychology may enter graduate programs to prepare for teaching, research, or clinical/counseling careers in psychology, or may go on to professional schools for training in veterinary and human medicine, law, and many other professions.

## Honors & Honors Program

In order to be eligible for high or highest honors in Psychology, the student must both meet the college criteria for honors and complete a research project involving a minimum of 6 units of course work over at least two quarters which represents an original analysis of data on psychological phenomena. Courses PSC 194HA-PSC 194HB or other approved courses can be used to satisfy the unit requirement. This project is to be written in thesis form and approved by the department. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

## Recommended for All Majors

Students who plan to do graduate work in any area of psychology are strongly encouraged to gain experience through research and internship activities.

## Major Advisor

Staff advisors are located in Young Hall; psychadvising@ucdavis.edu; 530-752-5104. For more information on how to make an appointment or join Drop-In Advising hours, please see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

## Graduate Study

The Department offers programs of study and research leading to the Ph.D. degree in psychology. Detailed information regarding graduate study may be obtained on our website (<https://psychology.ucdavis.edu/graduate/>).

## Graduate Advisor

See Graduate Students (<http://psychology.ucdavis.edu/graduate/>).

## Biological Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Psychology</i> <sup>1</sup>		
Choose one:		4
PSC 001 or PSC 001Y	General Psychology General Psychology	
<b>OR</b>		
The equivalent.		
<i>Statistics</i> <sup>1</sup>		
Choose one:		4
PSC/CMN/SOC/ POL 012Y	Data Visualization in the Social Sciences	
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	

STA 100	Applied Statistics for Biological Sciences	
<i>Research Methods</i> <sup>1</sup>		
PSC 041	Research Methods in Psychology	4
<b>Mathematics</b>		
Choose one series:		6-8
MAT 016A & MAT 016B	Short Calculus and Short Calculus	
<b>OR</b>		
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B	Calculus and Calculus	
<b>Physics</b>		
Choose PHY 010 (or PHY 010C or PHY 010CY) or PHY 007A & PHY 007B:		3-8
PHY 010 or PHY 010C or PHY 010CY	Topics in Physics for Nonscientists Physics of California Physics of California	
<b>OR</b>		
PHY 007A & PHY 007B	General Physics and General Physics	
<b>Biological Science</b>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth <sup>2</sup>	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5
<b>Chemistry</b>		
CHE 002A	General Chemistry	5
CHE 002B	General Chemistry	5
Choose one series:		6-8
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
<b>OR</b>		
CHE 118A & CHE 118B	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<b>OR</b>		
CHE 128A & CHE 128B	Organic Chemistry and Organic Chemistry	
Preparatory Subject Matter Subtotal		52-61
<b>Depth Subject Matter</b>		
BIS 101	Genes & Gene Expression	4
NPB 101	Systemic Physiology	5
<i>Seven Psychology Courses Distributed as Specified</i>		
Core Group A: Perception, Cognition, & Cognitive Neuroscience; choose two:		8
PSC 100 or PSC 100Y	Introduction to Cognitive Psychology Introduction to Cognitive Psychology	
PSC 130	Human Learning & Memory	
PSC 131	Perception	

PSC 132	Language & Cognition	Depth Subject Matter Subtotal	47-51	
PSC 133/ CGS 107/ECN 107	Neuroeconomics/Reinforcement Learning & Decision Making	Total Units	99-112	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind	<sup>1</sup> Strongly recommended that PSC 041 and PSC 012Y or STA 013 or STA 013Y or STA 100 be completed in the first year.		
PSC 136	Psychology of Music	<sup>2</sup> Recommended to take CHE 002A before taking BIS 002A.		
PSC 139	Advanced Cognitive Neuroscience	<sup>3</sup> If you take one or more 3-unit course(s), you will need additional PSC Major Elective units to fulfill the 40 total units of upper division PSC required in the major.		
Core Group B: Psychobiology; choose three:	10-12	<sup>4</sup> Students who have completed HDE 100A or HDE 100AV or HDE 100B prior to PSC 140 will receive 2 units of credit for PSC 140.		
PSC 101	Introduction to Biological Psychology			
PSC 113	Developmental Psychobiology			
PSC 121	Physiological Psychology			
PSC 122/NPB 150	Advanced Animal Behavior			
PSC 123/NPB 152	Hormones & Behavior (3 units) <sup>3</sup>			
PSC/NPB 124	Comparative Neuroanatomy (3 units) <sup>3</sup>			
PSC 125	Behavioral Epigenetics			
PSC 126	Health Psychology			
PSC 137	Neurobiology of Learning & Memory			
PSC 159	Gender & Human Reproduction			
Core Group C: Social/Personality; choose one:	4			
PSC 151	Social Psychology			
PSC 152	Social Cognition			
PSC 154	Psychology of Emotion			
PSC 158	Sexual Orientation & Prejudice			
PSC 161	Psychology of the Self			
PSC 162	Introduction to Personality Psychology			
PSC 165	Introduction to Clinical Psychology			
PSC 168	Abnormal Psychology			
Core Group D: Developmental; choose one:	4			
PSC 140 or PSC 140Y or HDE 100A or HDE 100AV or HDE 100B	Developmental Psychology <sup>4</sup> Developmental Psychology Infancy & Early Childhood Infancy & Early Childhood Middle Childhood & Adolescence	HDE 100A or HDE 100AV HDE 100B HDE 100C HDE/ENT 117 HDE 163 LIN 171 NPB 102 NPB 168 POL 170 SOC 126 SOC 135 SOC 152 SOC 171	Infancy & Early Childhood Infancy & Early Childhood Middle Childhood & Adolescence Adulthood & Aging Longevity Cognitive Neuropsychology in Adulthood & Aging Introduction to Psycholinguistics Animal Behavior <sup>2</sup> Neurobiology of Addictive Drugs Political Psychology Social Interaction Social Relationships Juvenile Delinquency Sociology of Violence & Inequality	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
Approved Major Electives				
Additional units to achieve a total of 40 units of approved upper division major elective coursework. See list of Approved Major Electives below. <sup>3</sup>	12-14			
Recommended Coursework for Those Interested in Graduate Programs in Biological Psychology				
PSC 180B	Research in Psychobiology (on a Biological Psychology topic)			
PSC 199	Special Study for Advanced Undergraduates			
ANT 154A	The Evolution of Primate Behavior			
ESP 110	Principles of Environmental Science			
EVE 100	Introduction to Evolution			
EVE 101	Introduction to Ecology			

<sup>1</sup> Except PSC 197T.<sup>2</sup> If you take one or more 3-unit course(s), you will need additional PSC Major Elective units to fulfill the 40 total units of upper division PSC required in the major.

## Quantitative Emphasis

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>Psychology</i> <sup>1</sup>			<b>Preparatory Subject Matter Subtotal</b> 40-54
Choose one:		4	<b>Depth Subject Matter</b>
PSC 001 or PSC 001Y	General Psychology General Psychology		<i>Psychology Statistical Analysis and Applied Psychometrics Courses</i>
or the equivalent			PSC 103A Statistical Analysis of Psychological Data 5
			PSC 103B or PSC 104 Statistical Analysis of Psychological Data 4-5 Applied Psychometrics: An Introduction to Measurement Theory
<i>Statistics</i> <sup>1</sup>			<b>Statistics</b>
Choose one:		4	Choose one series: 8
PSC/CMN/SOC/ POL 012Y	Data Visualization in the Social Sciences		STA 106 & STA 108 Applied Statistical Methods: Analysis of Variance and Applied Statistical Methods: Regression Analysis
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics		<b>OR</b>
STA 100	Applied Statistics for Biological Sciences		STA 130A & STA 130B Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course
<i>Research Methods</i> <sup>1</sup>			<b>OR</b>
PSC 041	Research Methods in Psychology	4	STA 131A & STA 131B Introduction to Probability Theory and Introduction to Mathematical Statistics
<b>Mathematics</b>			<i>Five Psychology Courses, Distributed as Specified</i>
MAT 021A	Calculus	4	Core Group A: Perception, Cognition, & Cognitive Neuroscience; 8 choose two:
MAT 021B	Calculus	4	PSC 100 Introduction to Cognitive Psychology or PSC 100Y Introduction to Cognitive Psychology
MAT 021C	Calculus	4	PSC 130 Human Learning & Memory
<i>Computer Science Engineering</i>			PSC 131 Perception
ECS 032A or ECS 036A	Introduction to Programming Programming & Problem Solving	4	PSC 132 Language & Cognition
<i>Chemistry</i>			PSC 133/ CGS 107/ECN 107 Neuroeconomics/Reinforcement Learning & Decision Making
Choose 010 or 002A & B or 002AH & BH:		4-10	PSC 135 Cognitive Neuroscience: The Biological Foundations of the Mind
CHE 010	Concept of Chemistry		PSC 136 Psychology of Music
<b>OR</b>			PSC 139 Advanced Cognitive Neuroscience
CHE 002A & CHE 002B	General Chemistry and General Chemistry		Core Group B: Psychobiology: choose two: 6-8
<b>OR</b>			PSC 101 Introduction to Biological Psychology
CHE 002AH & CHE 002BH	Honors General Chemistry and Honors General Chemistry		PSC 113 Developmental Psychobiology
<i>Physics</i>			PSC 121 Physiological Psychology
Choose PHY 010 (or 010C or 010CY) or 007A & B:		3-8	PSC 122/NPB 150 Advanced Animal Behavior
PHY 010 or PHY 010C or PHY 010CY	Topics in Physics for Nonscientists Physics of California Physics of California		PSC 123/NPB 152 Hormones & Behavior (3 units) <sup>3</sup>
<b>OR</b>			PSC/NPB 124 Comparative Neuroanatomy (3 units) <sup>3</sup>
PHY 007A & PHY 007B	General Physics and General Physics		PSC 125 Behavioral Epigenetics
<i>Biology</i>			PSC 126 Health Psychology
Choose BIS 002A or a combination, as below:		5-8	PSC 137 Neurobiology of Learning & Memory
BIS 002A	Introduction to Biology: Essentials of Life on Earth <sup>2</sup>		PSC 159 Gender & Human Reproduction
<b>OR a combination of:</b>			Choose one course from Group C or Group D: 4
BIS 010	Everyday Biology		<b>Core Group C: Social/Personality</b>
<b>AND</b>			PSC 151 Social Psychology
ANT 001 or ANT 001Y or MCB 010 or NPB 010	Human Evolutionary Biology Human Evolutionary Biology (Hybrid Version) Introduction to Human Heredity Elementary Human Physiology		PSC 152 Social Cognition
			PSC 154 Psychology of Emotion
			PSC 158 Sexual Orientation & Prejudice
			PSC 161 Psychology of the Self
			PSC 162 Introduction to Personality Psychology
			PSC 165 Introduction to Clinical Psychology
			PSC 168 Abnormal Psychology

**Core Group D: Developmental**

PSC 140	Developmental Psychology <sup>4</sup>
or PSC 140Y	Developmental Psychology
or HDE 100A	Infancy & Early Childhood
or HDE 100AV	Infancy & Early Childhood
or HDE 100B	Middle Childhood & Adolescence
PSC 141	Cognitive Development
PSC 142	Social & Personality Development
PSC 143	Infant Development
PSC 145	Developmental Cognitive Neuroscience
PSC 146	The Development of Memory
PSC 148	Developmental Disorders

**Approved Major Electives**

Additional units to achieve a total of 40 units of approved upper division major elective coursework. See list of Approved Major Electives below. (p. ) <sup>3</sup>	10-13
Depth Subject Matter Subtotal	45-51
<b>Total Units</b>	<b>85-105</b>

<sup>1</sup> Strongly recommended that PSC 001, PSC 041, and PSC 012Y or STA 013 or STA 100 be completed in the first year. Recommended to take Statistics before taking PSC 041.

<sup>2</sup> Recommended to take CHE 002A before taking BIS 002A.

<sup>3</sup> If you take one or more 3-unit course(s), you may need additional PSC Major Elective units to fulfill the 40 total units of upper division PSC required in the major.

<sup>4</sup> Students who have completed HDE 100A or HDE 100B prior to PSC 140 will receive 2 units of credit for PSC 140.

**Approved Major Electives**

Code	Title	Units
Any upper division Psychology (PSC) course(s). (p. 1272)		<sup>1</sup> 1-13
AAS 141	Psychology of the African American Experience	4
ANT 132	Psychological Anthropology	4
CHI 120	Chicana/o Psychology	4
CHI 121	Chicana/o Community Mental Health	4
CHI 122	Psychology Perspectives Chicana/o & Latina/o Family	4
CHI 123	Psychological perspectives on Chicana/o & Latina/o Children & Adolescents	4
CMN 120	Interpersonal Communication	4
CMN 122	Nonverbal Communication	4
CNS 100	Consumer Behavior <sup>2</sup>	3
EDU 110	Educational Psychology: General	4
EXB 102	Introduction to Motor Learning & the Psychology of Sport & Exercise	4
HDE 100A	Infancy & Early Childhood	4
or HDE 100AV	Infancy & Early Childhood	
HDE 100B	Middle Childhood & Adolescence	4
HDE 100C	Adulthood & Aging	4
HDE/ENT 117	Longevity	4
HDE 163	Cognitive Neuropsychology in Adulthood & Aging	4

LIN 171	Introduction to Psycholinguistics	4
NPB 102	Animal Behavior <sup>2</sup>	3
NPB 168	Neurobiology of Addictive Drugs	4
POL 170	Political Psychology	4
SOC 126	Social Interaction	4
SOC 135	Social Relationships	4
SOC 152	Juvenile Delinquency	4
SOC 171	Sociology of Violence & Inequality	4

<sup>1</sup> Except PSC 197T.

<sup>2</sup> If you take one or more 3-unit course(s), you will need additional PSC Major Elective units to fulfill the 40 total units of upper division PSC required in the major.

**Psychology, Minor****College of Letters & Science****The Minor Program**

The psychology program at UC Davis is broad and includes students and faculty with a variety of interests. The department has developed around five core areas of psychology:

*Perception, Cognition, & Cognitive Neuroscience (PCCN)* involves the study of awareness and thought, and includes such topics as perception, learning, memory, language and cognition.

*Biological Psychology* covers a broad spectrum of topics including evolutionary, neurobiological, and molecular mechanisms of behavior.

*Social-Personality Psychology* involves the study of the individual in their social environment and includes such topics as personality & individual differences, emotions, stereotyping & prejudice, intergroup relations, the psychology of religion and psychological health & dysfunction.

*Developmental Psychology* involves the study of changes in behavioral, cognitive, emotional, and social abilities that occur throughout the lifespan. Typical and atypical development is examined using a variety of methods including behavioral, neuroimaging, and physiological assessments.

*Quantitative Psychology* involves the study of linear & nonlinear models, psychometrics, mixed-effects models, and dynamic models, including experimental design, analysis of variance, regression, multivariate analysis, latent growth models, time series models, and factor analytic models.

**Recommended for All Majors**

Students who plan to do graduate work in any area of psychology are strongly encouraged to gain experience through research and internship activities.

**Minor Advisor**

Staff advisors are located in Young Hall; [psychadvising@ucdavis.edu](mailto:psychadvising@ucdavis.edu); 530-752-5104. For more information on how to make an appointment or join Drop-In Advising hours, please see Yellow Cluster Undergraduate Advising Center ([https://yellowcluster.ucdavis.edu/advising/undergraduate/](https://yellowcluster.ucdavis.edu/advising/)).

## Graduate Study

The Department offers programs of study and research leading to the Ph.D. degree in psychology. Detailed information regarding graduate study may be obtained on our website (<https://psychology.ucdavis.edu/graduate/>).

### Graduate Advisor

See Graduate Students (<http://psychology.ucdavis.edu/graduate/>).

Code	Title	Units
PSC 041	Research Methods in Psychology <sup>1</sup>	4
<i>One course from each of the following four groups:</i>		
<i>Core Group A: Perception, Cognition, &amp; Cognitive Neuroscience</i>		
Choose 4 units:		
PSC 100 or PSC 100Y	Introduction to Cognitive Psychology Introduction to Cognitive Psychology	
PSC 130	Human Learning & Memory	
PSC 131	Perception	
PSC 132	Language & Cognition	
PSC 133/ CGS 107/ECN 107	Neuroeconomics/Reinforcement Learning & Decision Making	
PSC 135	Cognitive Neuroscience: The Biological Foundations of the Mind	
PSC 136	Psychology of Music	
PSC 139	Advanced Cognitive Neuroscience	
<i>Core Group B: Psychobiology</i>		
Choose 3-4 units:		
PSC 101	Introduction to Biological Psychology	
PSC 113	Developmental Psychobiology	
PSC 121	Physiological Psychology	
PSC 122/NPB 150	Advanced Animal Behavior	
PSC 123/NPB 152	Hormones & Behavior (3 units)	
PSC/NPB 124	Comparative Neuroanatomy (3 units)	
PSC 125	Behavioral Epigenetics	
PSC 126	Health Psychology	
PSC 137	Neurobiology of Learning & Memory	
PSC 159	Gender & Human Reproduction	
<i>Core Group C: Social/Personality</i>		
Choose 4 units:		
PSC 151	Social Psychology	
PSC 152	Social Cognition	
PSC 154	Psychology of Emotion	
PSC 158	Sexual Orientation & Prejudice	
PSC 161	Psychology of the Self	
PSC 162	Introduction to Personality Psychology	
PSC 165	Introduction to Clinical Psychology	
PSC 168	Abnormal Psychology	
<i>Core Group D: Developmental</i>		
Choose 4 units:		
HDE 100A or HDE 100AV	Infancy & Early Childhood Infancy & Early Childhood	
HDE 100B	Middle Childhood & Adolescence	
PSC 140	Developmental Psychology	

or PSC 140Y	Developmental Psychology	
PSC 141	Cognitive Development	
PSC 142	Social & Personality Development	
PSC 143	Infant Development	
PSC 145	Developmental Cognitive Neuroscience	
PSC 146	The Development of Memory	
PSC 148	Developmental Disorders	
Psychology Subtotal		19-20
<b>Approved Major Electives</b>		
Additional units to achieve a total of 20 units of approved upper division major coursework.		4-5
Any upper division Psychology (PSC) course(s). (p. 1272) <sup>2</sup>		
AAS 141	Psychology of the African American Experience	
ANT 132	Psychological Anthropology	
CHI 120	Chicana/o Psychology	
CHI 121	Chicana/o Community Mental Health	
CHI 122	Psychology Perspectives Chicana/o & Latina/o Family	
CHI 123	Psychological perspectives on Chicana/o & Latina/o Children & Adolescents	
CMN 120	Interpersonal Communication	
CMN 122	Nonverbal Communication	
CNS 100	Consumer Behavior (3 units)	
EDU 110	Educational Psychology: General	
EXB 102	Introduction to Motor Learning & the Psychology of Sport & Exercise	
HDE 100A or HDE 100AV	Infancy & Early Childhood Infancy & Early Childhood	
HDE 100B	Middle Childhood & Adolescence	
HDE 100C	Adulthood & Aging	
HDE/ENT 117	Longevity	
HDE 163	Cognitive Neuropsychology in Adulthood & Aging	
LIN 171	Introduction to Psycholinguistics	
NPB 102	Animal Behavior (3 units)	
NPB 168	Neurobiology of Addictive Drugs	
POL 170	Political Psychology	
SOC 126	Social Interaction	
SOC 135	Social Relationships	
SOC 152	Juvenile Delinquency	
SOC 171	Sociology of Violence & Inequality	
Approved Major Electives Subtotal		4-5
<b>Total Units</b>		23-25

<sup>1</sup> Please note that PSC 001 or PSC 001Y is a prerequisite for PSC 041 and all upper division PSC courses.

<sup>2</sup> Except PSC 197T.

## Psychology, Master of Arts

College of Letters & Science

## Graduate Study

The Department offers programs of study and research leading to a Ph.D. degree in psychology. Detailed information regarding graduate study may be obtained on our website (<https://psychology.ucdavis.edu/graduate/>).

The Master of Arts degree is offered only in route to the Ph.D.

### Graduate Advisor

See Graduate Students (<http://psychology.ucdavis.edu/graduate/>).

## Psychology, Doctor of Philosophy

**College of Letters & Science**

### Graduate Study

The Department offers programs of study and research leading to a Ph.D. degree in psychology. Detailed information regarding graduate study may be obtained on our website. (<https://psychology.ucdavis.edu/graduate/>)

### Graduate Advisor

See Graduate Students (<http://psychology.ucdavis.edu/graduate/>).

## Public Health Sciences

### Department

Public Health Sciences; Med-Sci 1C; Public Health Sciences (<http://www.ucdmucdavis.edu/phs/>); Faculty ([https://health.ucdavis.edu/phs/about/phs\\_faculty.html](https://health.ucdavis.edu/phs/about/phs_faculty.html))

Contact the Public Health Science Advising Team at  
[PHSInstAffairs@ucdavis.edu](mailto:PHSInstAffairs@ucdavis.edu).

## Education Programs

Public Health Sciences Education Programs (<https://health.ucdavis.edu/phs/education/>)

- Master of Public Health (p. 421)
- Public Health Sciences, Doctor of Philosophy (p. 421)
- Public Health Sciences, Minor (p. 422)

## Master of Public Health

### School of Medicine

Master of Public Health (<https://health.ucdavis.edu/phs/education/mph/>)

The UC Davis M.P.H. Program's goal is to develop the public health leaders of the future by providing a high-quality Master's degree curriculum in partnership with the public health community. We accomplish this through the collaborative efforts of the UC Davis and health networks, including the Schools of Medicine, Veterinary Medicine, Management, Law, Education, and Nursing and the California Department of Public Health, local county health departments, and non-profit agencies. These partnerships comprise teaching, student mentorship and field placements, research, service, direction, and support for the UC Davis M.P.H. Program.

The UC Davis M.P.H. Program is an accelerated, 56-unit program that focuses on the essentials of public health. It offers students two

concentration areas – General Public Health & Epidemiology – and includes a practicum experience, or internship, in a public health setting.

For program inquiries, contact [PHSInstAffairs@ucdavis.edu](mailto:PHSInstAffairs@ucdavis.edu).

## Core Courses

Code	Title	Units
EPI 205	Principles of Epidemiology	4
SPH 210	Public Health Informatics	2
SPH 222	Social & Behavioral Aspects of Public Health	3
SPH 244	Introduction to Medical Statistics	4
SPH 245	Biostatistics for Biomedical Science	4
SPH 262	Principles of Environmental Health Science	3
SPH 273	Health Services Administration	3
SPH 281	Data Management in SAS	1
SPH 283	Program Planning & Evaluation	3
SPH 290	Topics in Public Health	3
SPH 297	Public Health Practicum	10
Total Core Course Units		40
Required Electives		16
Total Units		56

## Elective Courses

Students choose electives reflecting their professional public health interests to complete the 56-unit requirement. The M.P.H. program provides a quarterly list of available electives to students. Students may select appropriate courses not on the electives list and have them approved by their Graduate Advisor. Electives must be upper-division undergraduate-level or graduate-level courses. See list of suggested electives. (<https://health.ucdavis.edu/phs/education/mph/documents/GGPHS-elective-courses-2020.pdf>)

## Public Health Sciences, Doctor of Philosophy

### Graduate Studies

As a student in the doctoral degree program in Public Health Sciences at UC Davis, you will become a highly educated public health research professional prepared for leadership in governmental public health agencies, community-based public health organizations, and academic health centers. The Ph.D. in Public Health Sciences requires two years of research courses and rotations and completion of a dissertation to allow students to practice research and translational public health sciences techniques they have learned in the classroom.

Code	Title	Units
<b>Required Core Courses</b>		
SPH 202	Public Health Issues in California's Central Valley	3
SPH 212	Migration & Health	3
SPH 213	Health Disparities in the U.S.	3
SPH 214	Scientific Proposal Writing	3
SPH 246	Biostatistics for Clinical Research	4
SPH 276	Critical Assessment in Health Policy & Economics	2

SPH 291	Public Health Sciences Doctoral Seminar	6	CMN 161	Health Communication
SPH 292A	Public Health Translational Science Rotation	5	CMN 165	Media & Health
SPH 292B	Public Health Translational Science Rotation	5	CRD 149	Community Development Perspectives on Environmental Justice
EPI 206	Epidemiologic Study Design	4	ECN 132	Health Economics
MHI 210	Introduction to Health Informatics	4	ECN 140	Econometrics
Required Core Courses Total		42	ECS 124	Theory & Practice of Bioinformatics
Elective Units		14	ETX 101	Principles of Environmental Toxicology
<b>Total Units</b>		<b>56</b>	ETX 146	Exposure & Dose Assessment
			EXB 117	Exercise & Aging in Health & Disease

Upon completion of the required 56 core course and elective units, students will complete SPH 299 dissertation units.

## Public Health Sciences, Minor

The Public Health Sciences minor offers undergraduate students a foundation of knowledge for those who plan to enter the field of public health immediately following graduation and for those planning to earn an advanced degree in Public Health or a related field including medicine, nursing, and dentistry.

Subscribe to the Public Health Minor mailing list at PHS Minor listserv ([https://health.ucdavis.edu/phs/education/minor\\_mail.html](https://health.ucdavis.edu/phs/education/minor_mail.html)).

Contact the Public Health Science Advising Team at [PHSInstAffairs@ucdavis.edu](mailto:PHSInstAffairs@ucdavis.edu).

Code	Title	Units	
SPH 101	Introduction to Public Health	3	
SPH 102	Introduction to Human Epidemiology	4	
SPH 190	Topics in Public Health	1	
Choose (SPH 104 or VME 057V) or SPH 113: <sup>1</sup>		3-4	
SPH 104	Globalization & Health: Evidence & Policies		
<b>OR</b>			
VME 057V	Global Population, Health, & Environment		
<b>OR</b>			
SPH 113	Health Disparities in the U.S. <sup>1</sup>		
<b>Electives</b>			
Choose 8-9 units:		8-9	
ANT/STS 129	Health & Medicine in a Global Context		
ANT 002	Cultural Anthropology		
ARE 106	Econometric Theory & Applications		
ASA/SPH 132	Health Issues Confronting Asian Americans & Pacific Islanders		
BIM 105	Probability & Data Science for Biomedical Engineers		
BIS 020Q	Modeling in Biology		
BIS/MAT 027A	Linear Algebra with Applications to Biology		
CHE 121	Introduction to Molecular Structure & Spectra		
CHI 040	Comparative Health: Top Leading Causes of Death		
CHI 114	Women of Color Reproductive Health & Reproductive Politics in a Global Perspective		
CHI 121	Chicana/o Community Mental Health		
CMN 161	Health Communication		
CMN 165	Media & Health		
CRD 149	Community Development Perspectives on Environmental Justice		
ECN 132	Health Economics		
ECN 140	Econometrics		
ECS 124	Theory & Practice of Bioinformatics		
ETX 101	Principles of Environmental Toxicology		
ETX 146	Exposure & Dose Assessment		
EXB 117	Exercise & Aging in Health & Disease		
FAP 192C	Primary Care Clinics		
FAP 195	Health Care to Underserved Populations		
HIS/SAS 109	Environmental Change, Disease & Public Health		
IMD 164	Practicum in Community Health Clinic: Bayanihan Clinic (2 units maximum.)		
NAS 240	Native American Public Health: Topics & Issues		
NUT 111AY	Introduction to Nutrition & Metabolism		
NUT 111B	Recommendations & Standards for Human Nutrition		
OBG 194	Shifa Clinic Student Volunteer (2 units maximum)		
PHI 015	Introduction to Bioethics		
PMI 129Y	One Health: Human, Animal & Environment Interfaces		
PSC 126	Health Psychology		
PSY 192	Willow Clinic (2 units maximum)		
SAS/HIS 109	Environmental Change, Disease & Public Health		
SAS 121	Global Poverty: Critical Thinking & Taking Action		
SOC 162	Society, Culture, & Health		
SOC 163	Population Health: Social Determinants & Disparities in Health		
SOC 164	Health Policy & Politics		
SPH 092	Internship in Community Health		
SPH 103	Introduction to Health Economics, Services, Policy, Administration & Management		
SPH 106	Intermediate Human Epidemiology		
SPH 108	Introduction to Program Planning & Evaluation		
SPH 109	History of Epidemiology in Public Health		
SPH 120	Introduction to Health Informatics		
SPH 121	Health Informatics Systems		
SPH/ASA 132	Health Issues Confronting Asian Americans & Pacific Islanders		
SPH 190	Topics in Public Health (1 unit maximum.)		
SPH 192	Internship in Community Health Practice (2 units maximum.)		
SPH 198	Study in Community & International Health		
SPH 199	Research in Community & International Health		
STA 013	Elementary Statistics		

or STA 013Y	Elementary Statistics
STA 100	Applied Statistics for Biological Sciences
STA 144	Sampling Theory of Surveys
STS/ANT 129	Health & Medicine in a Global Context
UWP 198	Directed Group Study (4 units maximum)
VME 057V	Global Population, Health, & Environment

**Total Units** **19-21**

<sup>1</sup> If taken prior to Winter 2018 as SPH 105 (2 units; Discontinued), student must take another unit to meet the minor requirement of 20 units total.

## Religious Studies

College of Letters & Science

### Chair

Consult the Department Office.

### Department Office

215 Sproul Hall; 530-752-1219; Religious Studies (<https://religions.ucdavis.edu/>); Faculty (<http://religions.ucdavis.edu/people/>)

### Study of Religion

Consult the Department Office.

### Program Office

210 Sproul Hall; 530-752-2239; Fax 530-752-8630; Faculty (<https://religions.ucdavis.edu/faculty/>)

- Religious Studies, Bachelor of Arts (p. 423)
- Religious Studies, Minor (p. 425)
- Study of Religion, Master of Arts (p. 425)
- Study of Religion, Doctor of Philosophy (p. 426)

## Religious Studies, Bachelor of Arts

College of Letters & Science

### The Major Program

Religion is a major force in human experience. It has shaped the world's history, literature, art, culture, politics, ethics, and economics. In addition to offering courses in all the major religious traditions (Judaism, Christianity, Islam, and Hinduism,) the Religious Studies Program has developed cross cultural courses dealing with religious symbols, myths, and rituals in written texts, art, theater, and film, and the Internet, as well as, thematic courses dealing with such topics as religion and the body, the rise of fundamentalism, religion and science, religion and ethics, and religion and violence.

### The Program

The major introduces students to the academic study of religion. Students can choose from a broad range of courses both in the program itself and in other departments and programs-history, philosophy, psychology, sociology, anthropology, American studies, classics, and medieval studies. In addition to studying religious thought per se, students in the major can also study the way religion has shaped human

behavior in such matters as family life, gender roles, ethics, artistic life, concepts of individual freedom, the pursuit of science, and economics. For some students, Religious Studies is an appropriate second major and combines well with anything from philosophy to international agricultural development, political science, and the physical sciences.

### Career Alternatives

Because of the program's focus on developing critical thinking, writing, and reading skills, students who major in Religious Studies are well prepared to enter a variety of careers, including, the health professions, law, business, teaching, and government. In an increasingly global society, knowledge of the world's religious traditions and practices has become an essential part of a student's education.

### Recommended

A reading knowledge of a foreign language is highly recommended.

### Course Equivalents

The major advisors have a list of lower and upper division courses that can be substituted for courses suggested above.

### Honors & Honors Program

A student becomes eligible for graduation with honors by meeting the minimum GPA and course requirements established by the College of Letters & Science. Upon successful completion of the additional requirements of the College of Letters & Science Honors Program, individual students may be recommended by the program for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major.

### Education Abroad Program

The Religious Studies program encourages students to study in the Summer Abroad program, the Quarter Abroad program, or the Education Abroad program. With the approval of a major advisor, applicable courses taken abroad may be accepted in the major or minor programs.

### Teaching Credential Subject Representative

See the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

### Hebrew

Students interested in Hebrew courses should see Hebrew (<https://mesa.ucdavis.edu/hebrew/>).

### Human Rights Minor

Students interested in the Human Rights minor should see Human Rights Minor.

### Jewish Studies

Students interested in Jewish Studies should see Jewish Studies (<http://jewishstudies.ucdavis.edu>).

### Major Advisors

Consult the Program office.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
(A) Choose one from the RST 001 series:		4
RST 001	Survey of Religion	
RST 001A	Pilgrimage	

RST 001B	Death & Afterlife	RST 115	Mysticism
RST 001C	Sacrifice	RST 120	Religion, Magic & Science
RST 001D	Conversion	RST 122	Studies in Biblical Texts
RST 001E	Fundamentalism	RST 123	Sex & Gender in the Bible
RST 001F	Religion Today	RST 124	Topics in Judaism
RST 001G	Myth, Ritual, & Symbolism	RST 125	Dead Sea Scrolls, Apocrypha, & Pseudepigrapha
RST 001H	Sex, Marriage, & Divorce in Medieval & Modern Society	RST 126	The Formation of the Rabbinic Tradition
RST 001J	Music, Voice, & the Word	RST 130	Topics in Religious Studies
(B) Choose four from other lower division RST offerings:	16	RST 132	Topics in Mediterranean Ancient Religion
RST 005	Comparative Religion	RST 135	The Bible & Film
RST 006	Introduction to Health Sciences & the Humanities	RST 136	Topics in Jainism
RST 008	Healthcare & Religious Ethics	RST 137	Topics in Buddhism
RST 010	Contemporary Ethical Issues	RST 139	Topics in Hinduism
RST 010A	Contemporary Ethical Issues	RST 140	Christian Theology
RST 011	Ethical Eating	RST 141A	New Testament Literature: Synoptic Gospels
RST 012	Emergence of Judaism, Christianity & Islam	RST 141B	New Testament Literature: John
RST 015Y	Reading War/Fighting War	RST 141C	New Testament Literature: Paul
RST 021	The Bible & Its Interpreters	RST 143	New Testament Apocrypha
RST 023	Introduction to Judaism	RST 144	History of the Bible
RST 030	Religions of South Asia	RST 145	Contemporary American Religion
RST 031	Introduction to Jainism	RST 150	Religious Ethics
RST 032	History of Yoga	RST 152	Justice, Equity, & Privacy in Medical Humanities
RST 033	Magic & Demons in South Asia	RST 154	The Hindu Temple
RST 040	New Testament	RST 155A	Bhakti: Indian Devotional Traditions to 1200 CE
RST 042	Religion & Science Fiction	RST 155B	Bhakti: Indian Devotional Traditions, 1200 CE to Present
RST 045	Christianity	RST 156	Religion & the Performing Arts in India
RST 060	Introduction to Islam	RST 157	Hindu Women & Goddesses
RST 065C	The Qur'an & Its Interpretation	RST 158	The Ramayana
RST 066	The Song of God: The Bhagavad Gita	RST 159	The Mahabharata
RST 067	Modern Hinduism	RST 160	Introduction to Islamic Thought
RST 068	Introduction to Hinduism	RST 161	Modern Islam
RST 069	Introduction to Hindu Mythology	RST 161B	Modern Islam: Authority & Tradition In Process
RST 070	Religion & Language	RST 162	Introduction to Islamic Law
RST 075	Introduction to Chinese Philosophy	RST 163	Social Life of Islam
RST 080	Religion, Gender, Sexuality	RST 165	Islam in Asia
Preparatory Subject Matter Subtotal	20	RST 166	Religion & Media in the Arab World
<b>Depth Subject Matter</b>		RST 169	Topics in Islam
RST 100	Study of Religion: Issues & Methods	RST 171	Buddhist Art
or RST 190	Seminar	RST 172	Ch'an (Zen) Buddhism
Choose nine upper division RST courses. Four of these courses may be upper division courses related to religion that are offered by other departments and taken with the approval of a Religious Studies advisor.	36	RST 175A	Daoist Traditions
RST 102	Christian Origins	RST 180	Popular Religious Art in India
RST 103	Medieval & Byzantine Christianity	RST 181	Hindu Gods & Hindu Symbols
RST 104	Christianity 1450-1700	RST 182	Ramayana, Religion, & the Arts
RST 105	Christianity & Modernity, 1700-1920	RST 189	Senior Colloquium
RST 106	Christianity in the Contemporary World	<b>Depth Subject Matter Subtotal</b>	
RST 110	Life, Meaning & Identity	40	
RST 111	Persuasion & Conviction in Religious Tradition	<b>Total Units</b>	
		60	

# Religious Studies, Minor

College of Letters & Science

## The Minor Program

Religion is a major force in human experience. It has shaped the world's history, literature, art, culture, politics, ethics, and economics. In addition to offering courses in all the major religious traditions (Judaism, Christianity, Islam, and Hinduism,) the Religious Studies Program has developed cross-cultural courses dealing with religious symbols, myths, and rituals in written texts, art, theater, and film, and the Internet, as well as, thematic courses dealing with such topics as religion and the body, the rise of fundamentalism, religion and science, religion and ethics, and religion and violence.

## The Program

The major introduces students to the academic study of religion. Students can choose from a broad range of courses both in the program itself and in other departments and programs-history, philosophy, psychology, sociology, anthropology, American studies, classics, and medieval studies. In addition to studying religious thought per se, students in the major can also study the way religion has shaped human behavior in such matters as family life, gender roles, ethics, artistic life, concepts of individual freedom, the pursuit of science, and economics. For some students, Religious Studies is an appropriate second major and combines well with anything from philosophy to international agricultural development, political science, and the physical sciences.

## Career Alternatives

Because of the program's focus on developing critical thinking, writing, and reading skills, students who major in Religious Studies are well prepared to enter a variety of careers, including, the health professions, law, business, teaching, and government. In an increasingly global society, knowledge of the world's religious traditions and practices has become an essential part of a student's education.

## Recommended

A reading knowledge of a foreign language is highly recommended.

## Course Equivalents

The major advisors have a list of lower and upper division courses that can be substituted for courses suggested above.

## Honors & Honors Program

A student becomes eligible for graduation with honors by meeting the minimum GPA and course requirements established by the College of Letters & Science. Upon successful completion of the additional requirements of the College of Letters & Science Honors Program, individual students may be recommended by the program for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major.

## Education Abroad Program

The Religious Studies program encourages students to study in the Summer Abroad program, the Quarter Abroad program, or the Education Abroad program. With the approval of a major advisor, applicable courses taken abroad may be accepted in the major or minor programs.

## Teaching Credential Subject Representative

See the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma/>).

## Hebrew

Students interested in Hebrew courses should see Hebrew (<https://mesa.ucdavis.edu/hebrew/>).

## Human Rights Minor

Students interested in the Human Rights minor should see Human Rights Minor.

## Jewish Studies

Students interested in Jewish Studies should see Jewish Studies (<http://jewishstudies.ucdavis.edu>).

## Major Advisors

Consult the Program office.

Code	Title	Units
Choose one lower division RST course.		4
Choose 16 units of upper division RST courses.		16
RST 190	Seminar (Recommended)	
Some substitutions from other departments or programs allowed with consent of advisor.		
<b>Total Units</b>		<b>20</b>

# Study of Religion, Master of Arts

College of Letters & Science

## Graduate Study

The Study of Religion Graduate Program offers students classical training in the literatures of particular religious traditions, and they are encouraged to understand these traditions at the intersection of contemporary thematic and regional phenomena.

Students have the opportunity to concentrate primarily on one of three regional specializations: American religious cultures, Mediterranean religions, and Asian religions. An additional regional specialization typically serves as a secondary area of competence. Students further shape their scholarship through intensive engagement in one of the following thematic specializations: Values, Ethics, and Human Rights; Modernity, Science, & Secularism; Visual Culture, Media, & Technology; Language, Rhetoric, and Performance; Body & Praxis; Theory & Method.

This curriculum guides students through a rigorous course of study, providing the breadth and depth necessary to produce exciting, rigorous scholarship at the forefront of the field of Religious Studies. Graduate training prepares students for careers in academia as well as in the government and the private sector.

## Preparation

Admission to the program requires a Bachelor's or Master's degree in a discipline relevant to the study of religion, as well as preparation in at least one language relevant to the intended area of primary research. The program requires three letters of recommendation and a sample of recent written work.

While an M.A. degree may be obtained while pursuing a Ph.D. degree, only Ph.D. applications will be accepted.

### **Graduate Advisor**

Archana Venkatesan (<https://religionsgrad.ucdavis.edu/people/archana-venkatesan/>)

## **Study of Religion, Doctor of Philosophy**

### **Graduate Studies**

### **Graduate Study**

The Study of Religion Graduate Program offers students classical training in the literatures of particular religious traditions, and they are encouraged to understand these traditions at the intersection of contemporary thematic and regional phenomena.

Students have the opportunity to concentrate primarily on one of three regional specializations: American religious cultures, Mediterranean religions, and Asian religions. An additional regional specialization typically serves as a secondary area of competence. Students further shape their scholarship through intensive engagement in one of the following thematic specializations: Values, Ethics, and Human Rights; Modernity, Science, & Secularism; Visual Culture, Media, & Technology; Language, Rhetoric, and Performance; Body & Praxis; Theory & Method.

This curriculum guides students through a rigorous course of study, providing the breadth and depth necessary to produce exciting, rigorous scholarship at the forefront of the field of Religious Studies. Graduate training prepares students for careers in academia as well as in the government and the private sector.

### **Preparation**

Admission to the program requires a Bachelor's or Master's degree in a discipline relevant to the study of religion, as well as preparation in at least one language relevant to the intended area of primary research. The program requires three letters of recommendation and a sample of recent written work.

While an M.A. degree may be obtained while pursuing a Ph.D. degree, only Ph.D. applications will be accepted.

### **Graduate Advisor**

Archana Venkatesan (<https://religionsgrad.ucdavis.edu/people/archana-venkatesan/>)

## **Science & Society**

### **College of Agricultural & Environmental Sciences**

David M. Rizzo, Ph.D., Program Director  
Theresa Garcia, Program Coordinator

### **Program Office**

160 Hutchison Hall; 530-754-7277; Science & Society (<https://sas.ucdavis.edu/>)

- Contemporary Leadership, Minor (p. 426)
- Science & Society, Minor (p. 427)

## **Contemporary Leadership, Minor**

### **College of Agricultural & Environmental Sciences**

### **Minor**

The Science & Society Program offers a minor in Contemporary Leadership, open to all undergraduate students regardless of major. The minor provides a broad overview of leadership theory and practice, and engages students in critical thinking, self-reflection, problem solving and multicultural education. Students should contact the minor advisor for course selection and plan approval.

Consult advisors often to insure timely enrollment in SAS 192 and SAS 190X only offered in spring quarter once a year.

### **Minor Advisor**

The list of appropriate courses may change over time. To request an advising appointment, consult Elvira Galvan Hack ([eghack@ucdavis.edu](mailto:eghack@ucdavis.edu)) in Science & Society (Plant Pathology).

<b>Code</b>	<b>Title</b>	<b>Units</b>
<b>Core Leadership Courses</b>		
SAS 130	Contemporary Leadership	4
SAS 192	Internship in Science & Society (must be taken concurrently with an approved internship for 2 units)	2
SAS 190X	Science & Society Seminar (2 units required)	2
Core Leadership Courses Subtotal		8
<b>Preparatory Subject Matter</b>		
Students are required to complete 4 units from each of the following four categories; all courses are 4 units except where noted:		15-16
<i>Ethics &amp; Values</i>		
ANS 170	Ethics of Animal Use	
ECS 188	Ethics in an Age of Technology	
ENL 107	Freedom of Expression	
PHI 115	Problems in Normative Ethics	
PHI 116	Ethical Theories	
PHI 117	Foundations of Ethics	
PSC 175	Genius, Creativity, & Leadership	
<i>Communication, Interpersonal Relationships &amp; Human Dynamics</i>		
ANT 139AN	Race, Class, Gender Systems	
CMN 136	Organizational Communication	
CRD 172	Social Inequality: Issues & Innovations	
LIN 163	Language, Gender, & Society	
PSC 151	Social Psychology	
SOC 126	Social Interaction	
SOC 132	The Sociology of Gender	
UWP 104A	Writing in the Professions: Business Writing	
or UWP 104AY	Writing in the Professions: Business Writing	
UWP 104B	Writing in the Professions: Law	
UWP 104C	Writing in the Professions: Journalism	
UWP 104D	Writing in the Professions: Elementary & Secondary Education	

UWP 104E	Writing in the Professions: Science
UWP 104F	Writing in the Professions: Health
or UWP 104FY	Writing in the Professions: Health
<i>Organization Structure &amp; Cultures</i>	
AMS 125	Corporate Cultures
CRD 152	Community Development
CRD 154	Social Theory & Community Change
CRD 158	Community Governance
CRD 164	Theories of Organizations & Their Role in Community Change
SOC 156	Social Movements
SOC 180A	Complex Organizations
WMS 140	Gender & Law
<i>Multiculturalism, the Global Community &amp; Social Change</i>	
AMS 153	The Individual & Community in America
AMS 156	Race, Culture & Society in the United States
CRD 176	Comparative Ethnicity
ENL 179	Topics in Comparative Racial & Ethnic Literary Studies
HIS 173	Becoming an American: Immigration & American Culture
NAS 134	Race, Culture, & Nation
POL 124	The Politics of Global Inequality
POL 130	Recent U.S. Foreign Policy
Preparatory Subject Matter Subtotal	15-16
<b>Total Units</b>	<b>23-24</b>

## Science & Society, Minor

College of Agricultural & Environmental Sciences

### The Program

Science & Society is an interdepartmental teaching program administered by the College of Agricultural & Environmental Sciences that offers students throughout the campus the opportunity to discover the connections that link the social, biological, and physical sciences with societal issues and cultural discourses. Course work examines discovery processes in relation to societal values, public policy and ethics, including issues associated with cultural diversity. Whenever possible, opportunities outside the classroom are included as part of the learning experience.

The Science & Society teaching program serves students of all majors and interests. It can allow lower division students who have not yet declared a major a meaningful context for exploring diverse subject matters. The minor for the program includes, in addition to Science & Society courses, upper division courses from both the College of Agricultural & Environmental Sciences and the College of Letters & Science in the areas of history and philosophy of science, policy & decision making, communication of science, and culture, ethics and applications.

### Related Courses

See ARE 120, ARE 147, CMN 140, CRD 118, CRD 142, CRD 162, AVS 013, ESP 160, ESP 165, FPS 110, HIS 185A, HIS 185B, PLP 140, POL 175, WFC 010.

### Minor Advisor

D.M. Rizzo

Code	Title	Units
<i>Prep Coursework</i>		
SAS 001	(Discontinued)	4
SAS 120	Science & Contemporary Societal Issues	3
Choose one:		3-4
SAS 002	Feeding the World: Influences on the Global Food Supply	
or SAS 002V	Feeding the World: Influences on the Global Food Supply	
SAS 005	Pathways to Discovery: Science & Society (Discontinued)	
SAS 020	Genetics & Society	
SAS 030	Mushrooms, Molds, & Society	
Prep Coursework Subtotal		10-11
Choose one from each of the four areas:		14-17
<i>History &amp; Philosophy of Science</i>		
CRD 118	Technology & Society	
CRD 162	People, Work & Technology	
HIS 185A	History of Science in America	
HIS 185B	History of Technology in America	
PHI 107	Philosophy of the Physical Sciences	
PHI 108	Philosophy of the Biological Sciences	
PHI 109	Philosophy of the Social Sciences	
<i>Policy &amp; Decision Making</i>		
ARE 120	Agricultural Policy	
ARE 147	Resource & Environment Policy Analysis	
ARE 150	Agricultural Labor	
CNS 100	Consumer Behavior	
ESP 160	The Policy Process	
ESP 165	Climate Policy	
POL 175	Science, Technology, & Policy	
SOC 155	Sociology of Law	
<i>Communication of Science</i>		
AED 172	Multimedia Productions	
ANT 120	Language & Culture	
CMN 130	Group Communication	
CMN 140	Introduction to Mass Communication	
LIN 163	Language, Gender, & Society	
POL 165	Mass Media & Politics	
<i>Culture, Ethics &amp; Applications</i>		
CRD 142	Rural Change in the Industrialized World	
FPS 110	Plastics in Society & the Environment	
PLP 140	(Discontinued)	
SOC 144	Agriculture & Society	
<b>Total Units</b>		<b>24-28</b>

## Science & Technology Studies

College of Letters & Science

Marisol de la Cadena, Ph.D., Interim Department Chair; term ends June 30, 2023.

## Department Office

1246 Social Sciences and Humanities Building; Science & Technology Studies (<http://sts.ucdavis.edu>); Faculty (<http://sts.ucdavis.edu/directory-of-people/sts-faculty/>)

## Advising

Staff advisors are located in Young Hall; [stsadvising@ucdavis.edu](mailto:stsadvising@ucdavis.edu). For more information on how to make an appointment or join Drop-In Advising hours, please see Yellow Cluster Undergraduate Advising Center (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

- History & Philosophy of Science, Minor (p. 428)
- Science & Technology Studies, Bachelor of Arts (p. 428)

## History & Philosophy of Science, Minor

College of Letters & Science

### Minor

History & Philosophy of Science Minor (<https://sts.ucdavis.edu/history-philosophy-science-minor>)

The interdisciplinary minor in the History & Philosophy of Science invites students to examine historical and contemporary problems in a variety of scientific disciplines, and to explore concepts and procedures basic to science and how they have evolved. The minor is sponsored by the Program in Science & Technology Studies (<https://sts.ucdavis.edu/>).

### Minor Advisor

Staff advisors are located in Young Hall; [stsadvising@ucdavis.edu](mailto:stsadvising@ucdavis.edu); for more information on how to make an appointment or join Drop-In Advising hours, please see Yellow Cluster Undergraduate Advising (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

## Faculty Advisor

The current Director of STS is also available for advising by appointment.

Code	Title	Units
<b>History &amp; Philosophy of Science</b>		
PHI 030	Introduction to Philosophy of Science	4
Choose five courses from those listed below; one course must be from each of three areas:		
(a) <i>History</i>		
HIS 135A	History of Science to the 18th Century	
HIS 135B	History of Science, 18th to 20th Centuries	
HIS/STS 136	Scientific Revolution	
HIS 138A	The Rise of the Russian Empire, 1304-1825	
HIS 139A	Medieval & Renaissance Medicine	
HIS 139B	Medicine, Society, & Culture in Modern Europe	
HIS 185A	History of Science in America	
HIS 185B	History of Technology in America	
(b) <i>Philosophy</i>		

PHI 107	Philosophy of the Physical Sciences
PHI 108	Philosophy of the Biological Sciences
PHI 109	Philosophy of the Social Sciences
PHI 111	Philosophy of Space & Time
(c) <i>Science &amp; Technology Studies</i>	
STS 130A	From Natural History to the History of Nature
STS 130B	History of Modern Biology
STS 131	Darwin
STS 150	Gender & Science
STS 180	Topics in Science & Technology Studies
<b>Total Units</b>	
<b>24</b>	

or join Drop-In Advising hours, please see Yellow Cluster Undergraduate Advising (<https://yellowcluster.ucdavis.edu/advising/undergraduate/>).

## Faculty Advisor

The current chair of STS is also available for advising by appointment.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
STS 001	Introduction to Science, Technology & Medicine Studies	4
Choose three additional courses:		12
STS/HIS 002	Introduction to the History of Science & Technology	
or STS/HIS 002Y	Introduction to the History of Science & Technology	
STS 011	Science on Trial: Law, Science, & Technology in the United States	
STS/HIS 016	Sex, Science, & Society	
STS/ANT 032	Drugs, Science & Culture	
STS/CTS 040A	Media History 1, Gutenberg to Oppenheimer	
STS/CTS 040B	Media History 2 1945-Present	
STS/CLA 050	Ancient Science	
STS/CLA 051	Ancient Medicine	
PHI 030	Introduction to Philosophy of Science	
PHI 031	Appraising Scientific Reasoning	
PHI 032	Understanding Scientific Change	
Preparatory Subject Matter Subtotal		16
<b>Depth Subject Matter</b>		
<i>Methods &amp; Theories</i>		
STS 100	Methods in Science, Technology, & Medicine Studies	4
Choose three:		12
STS 101	Data & Society	
STS 108	Intellectual Property in Science	
STS/ANT 121	Special Topics in Medical Anthropology	
STS 122	Health & Medical Technologies	
STS 150	Gender & Science	
STS 151/CTS 150 (DISCONTINUED)	Media Theory	
STS/ENL 164	Writing Science	
STS 175	Laboratory Studies Lab	
STS/SOC 176	Sociology of Knowledge, Science, & Scientific Knowledge	
Note: Courses taken to fulfill the requirement above cannot also be used to fulfill the emphasis requirement.		
<i>Science Coursework</i>		
All STS majors are required to complete two upper division science courses in the same field. Science coursework should be planned in consultation with the faculty advisor or staff advisors.		8
1		
<i>Emphasis</i>		
Choose one of the following four options:	20-24	
1. Complete five courses from one emphasis list.		
2. Complete four courses from one emphasis list and one additional STS course.		
3. Complete four courses from one emphasis list and a research thesis in STS <sup>2</sup> . **The thesis option is open to all students. Students whose GPA meets the honors threshold may also qualify for High or Highest Honors in the College of Letters & Science.		
4. STS General Emphasis: Complete any five upper division STS courses. Note: STS courses include any upper division or special study courses offered in the STS program; <sup>3</sup>		
Emphasis Lists:		
(1) Law & Innovation (p. 429)		
(2) Health & Environment (p. 429)		
(3) Data & Media Technologies (p. 430)		
(4) History & Philosophy of Science (p. 430)		
Depth Subject Matter Subtotal		
<b>Total Units</b>		
<b>44-48</b>		
<b>60-64</b>		

<sup>1</sup> For a list of approved science fields, please see the STS Major Worksheet (<https://ucdavis.app.box.com/file/536234309457/?s=2qliktvdu2kgn9z9imwec6hvjt85lhkp>).

<sup>2</sup> (STS 194A & STS 194B)

<sup>3</sup> Including: STS 180, STS 190, STS 192, STS 194A, STS 194B, STS 195.

## Law & Innovation Emphasis

Code	Title	Units
STS 108	Intellectual Property in Science	4
STS/ANT 109	Visualization in Science: A Critical Introduction	4
STS 110	Computing, Data, & Law in the United States	4
STS 112	Visualizing Society with Data	4
STS 113	Business & Technology in the United States: From Electricity to E-Commerce	4
STS 114	The Global Information Age	4
STS/CTS 162	Surveillance Technologies & Social Media	4
STS/SOC 176	Sociology of Knowledge, Science, & Scientific Knowledge	4
CRD 118	Technology & Society	4
CRD 140	Dynamics of Regional Development	4

## Health & Environment Emphasis

Code	Title	Units
STS/ANT 109	Visualization in Science: A Critical Introduction	4
STS/ANT 121	Special Topics in Medical Anthropology	4
STS 122	Health & Medical Technologies	4
STS/ANT 129	Health & Medicine in a Global Context	4
STS 130A	From Natural History to the History of Nature	4
STS 130B	History of Modern Biology	4
STS 131	Darwin	4
STS 150	Gender & Science	4
STS 165	Built Environments	4

ANT 104N	Cultural Politics of the Environment	4	PHI 121	Bioethics	4
ANT 131	Ecology & Politics	4	PHI 131	Philosophy of Logic & Mathematics	4
PHI 120	Environmental Ethics	4	PHI 189I	Special Topics in Philosophy: Philosophy of Science	4

## Data & Media Technologies Emphasis

Code	Title	Units
STS 101	Data & Society	4
STS/ANT 109	Visualization in Science: A Critical Introduction	4
STS 110	Computing, Data, & Law in the United States	4
STS 112	Visualizing Society with Data	4
STS 113	Business & Technology in the United States: From Electricity to E-Commerce	4
STS 114	The Global Information Age	4
STS 115	Data Sense & Exploration: Critical Storytelling with Analysis	4
STS 151/ CTS 150 (DISCONTIN	Media Theory	5
STS 152	Sounding Data: Critical Approaches to Sonification	4
STS/TCS 160	Ghosts of the Machine: How Technology Rewires our Senses	4
STS 161	Time: Mechanism & Measurement	4
STS/CTS 162	Surveillance Technologies & Social Media	4
STS 163	History of Communication Technologies	4
STS/ENL 164	Writing Science	4
STS/CDM/ENL 172	Video Games & Culture	4
STS/ENL 173	Science Fiction	4

## History & Philosophy of Science Emphasis

Code	Title	Units
STS 110	Computing, Data, & Law in the United States	4
STS 112	Visualizing Society with Data	4
STS 113	Business & Technology in the United States: From Electricity to E-Commerce	4
STS 114	The Global Information Age	4
STS 122	Health & Medical Technologies	4
STS/ANT 129	Health & Medicine in a Global Context	4
STS 130A	From Natural History to the History of Nature	4
STS 130B	History of Modern Biology	4
STS 131	Darwin	4
STS 150	Gender & Science	4
STS 161	Time: Mechanism & Measurement	4
STS/ENL 164	Writing Science	4
CLA 101E	Topics in Ancient Science	4
PHI 107	Philosophy of the Physical Sciences	4
PHI 108	Philosophy of the Biological Sciences	4
PHI 109	Philosophy of the Social Sciences	4
PHI 111	Philosophy of Space & Time	4
PHI 120	Environmental Ethics	4

## Sociology

### College of Letters & Science

Laura Grindstaff, Ph.D., Department Chairperson; term ends June 30, 2024  
 Maxine Craig, Ph.D., Graduate Program Chairperson; term ends June 30, 2024

## Undergraduate Advising

socantadvisor@ucdavis.edu

## Graduate Coordinator Office

Jacqueline Leaver (jleaver@ucdavis.edu), 530-752-5015; Sociology Department (<http://sociology.ucdavis.edu>); Faculty (<http://sociology.ucdavis.edu/people/>)

- Sociology, Bachelor of Arts (p. 433)
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## Sociology—Organizational Studies, Bachelor of Arts

### College of Letters & Science

## The Major Programs

The Organizational Studies (OS) major is designed to provide a broad understanding of the political, social, and economic organizations that make up modern society. Whether thinking about the structure of government bureaucracies, legal systems, economic markets, educational systems, or workplaces, OS offers an interdisciplinary view from which to understand the contemporary world in which complex and formal organizations are ubiquitous. Formal organizations influence how we feel, what we think, and what we can accomplish. As such, the OS major provides both a basic understanding of the field as well as enhances your ability to pursue their more specialized career interests.

At the upper division level, you can choose one of four specialized tracks, any one of which will help to better identify and inform your career goals —whether that be in postgraduate education or a specific type of job—and pursue them after graduation. Whether you select the "Business & Society," "Public Policy & Social Welfare," "Nonprofit & Social Movement Organizations" or the "Student-Initiated Theme" track, once completed you will have a unique and valuable area of expertise.

Students who plan to enroll in graduate programs in business, public policy, public administration, and education are advised to develop proficiencies in statistics and calculus (such as the MAT 016 series).

## Track 1: Business & Society (BAS)

The Business and Society track is for students who hold an interest in or wish to pursue careers in management or corporate professions and who are interested in economic institutions and commerce, management and administration, work and workplaces, and labor markets. Courses in this cluster analyze businesses, firms, corporations, and markets—nationally and globally—and their place in society, historically and in the present, from a critical perspective. The BAS track examines the origins of business corporations and economic markets (and relations); the power relations, inequalities, and stratification associated with contemporary business organizations (firms and corporations); why business organizations rely on particular organizational structures to increase their efficiencies and effectiveness; and overviews of the role business and regulatory organizations play in the economy.

Postgraduate training and careers that follow from this cluster:

- *Professional training:* MBA programs; mediation programs; law; public policy.
- *Graduate training:* sociology; economics; Ph.D. business school programs (with concentrations in organizational behavior, entrepreneurship, industrial relations, economic analysis, policy analysis, and labor relations).
- *Career paths:* managers, human resources professionals, project managers, diversity personnel, corporate social responsibility personnel, lobbyists, business entrepreneur, labor relations specialists, creative professionals, research staff at policy institutes such as Economic Policy Institute, Urban Institute or E2.

## Track 2: Public Policy & Social Welfare (PPSW)

The PPSW track is for students who hold an interest in or plan to pursue careers in government and/or social welfare organizations. Courses in this track emphasize how formal organizations and institutions emerge to address key social problems and the policies they generate and utilize to solve them; the unique challenges that government and other policy-oriented organizations confront in addressing and managing public problems and promoting the common good; and the dynamics and special circumstances that specific organizational/institutional policy fields such as education, health care, and social welfare confront in seeking to fulfill their charge.

Postgraduate training and careers that follow from this track:

- *Professional training:* programs in public policy, public administration, government, social welfare, counseling, public affairs, law, leadership institutes, and community psychology.
- *Graduate training:* Ph.D. programs in sociology, political science, public administration, education, and educational leadership.
- *Career paths:* consultants, social service workers and administrators, staff at policy institutes and think tanks, program evaluation and development, nonprofit administrators, lawyers, teachers, research staff at policy institutes and think tanks, leadership positions in education, including higher education and counselors.

## Track 3: Nonprofit & Social Movement Organizations (NSMO)

The NSMO track is for students who wish to contribute to local, national, and global transformation(s), to social justice, and/or who plan to pursue a career in the non-profit sector focusing on addressing specific causes and fulfilling social agendas. Students in this cluster may have particular interest in understanding the role that informal and formal

organizations—from well-organized and mature non-profits to emergent social movement organizations—play in responding to and affecting social change. This cluster familiarizes students with the unique capacity of organizations to change the world but simultaneously, the barriers, limitations, and challenges to doing so.

Postgraduate training and careers that follow from this track:

- *Professional training:* programs in community development, regional development, urban development, public policy, public administration, Master's programs in social change, law and social change, and business programs with a concentration in corporate responsibility.
- *Graduate training:* programs sociology, history, labor studies, development, international relations, and political science.
- *Career paths:* working in nongovernmental organizations around the world (NGO's), joining the Peace Corps or Teach America; teaching in other countries; jobs in any number of areas that are the focus of social change and social justice efforts (energy, housing, labor, community and regional development, health, corporate social responsibility); working in for-profit companies in the areas of energy, corporate social responsibility, work/family support programs, research staff at policy institutes and think tanks.

## Track 4: Student-Initiated Track

Select a combination of five courses from any of the above 3 themes (at least three courses should be from SOC). Students choosing this track must meet with a SOC undergraduate advisor to obtain approval of selected courses.

### Major Advisor

Consult the Departmental Advising office in 1282 Social Sciences & Humanities Building or see the SOC Advising Office (<http://sociology.ucdavis.edu/undergraduate/advising/advising-office/>).

### Honors Program

An Honors Program is available to Sociology & Sociology-Organizational Studies majors who have demonstrated excellence in their field of study. To be eligible for the program, students must have a grade-point average of 3.500 in the major and the recommendation of a faculty sponsor familiar with their work. In addition to meeting the standard major requirements, students are encouraged to take a 199 course with their sponsor in the spring of their third year, prior to the seminar courses. Honors students write an honors thesis and take two quarters (8 units) of Honors coursework (SOC 194HA & SOC 194HB). Successful completion of the Honors Program, when combined with College GPA requirements, enables the student to graduate with High or Highest Honors. Students should apply for the program before they begin their fourth year.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Sociology		
SOC 001	Introduction to Sociology	5
SOC 002	Self & Society	4
Choose one:		
SOC 004	Immigration & Opportunity	
SOC 005	Global Social Change: An Introduction to Macrosociology	
SOC 006	Health & Illness	
SOC 007	Race & Ethnicity	
SOC 011	Sociology of Labor & Employment	

SOC 046	Introduction to Social Research Methods	4	ARE 132	Cooperative Business Enterprises	4
SOC 056 or SOC 056Y	Introduction to Social Statistics	5	AMS 125	Corporate Cultures	4
	Introduction to Social Statistics		CRD 118	Technology & Society	4
<i>Economics</i>			CRD 141	Organization of Economic Space	4
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics	4	CRD 156	Community Economic Development	5
	Principles of Microeconomics		CRD 162	People, Work & Technology	5
	Principles of Microeconomics		ECN 110B	World Economic History Since the Industrial Revolution	4
ECN 001B or ECN 001BV	Principles of Macroeconomics	4	ECN 111B	Economics History	4
Preparatory Subject Matter Subtotal		30	ECN/ARE 115A	Economic Development	4
<b>Depth Subject Matter</b>			ECN 116	Comparative Economic Systems	4
<i>Sociology</i>			ECN 121A	Industrial Organization	4
SOC 100	Origins of Modern Sociological Theory	4	ECN 151A	Economics of the Labor Market	4
SOC 180A	Complex Organizations	4	ECN 151B	Economics of Human Resources	4
Choose one:			HIS 185B	History of Technology in America	4
SOC 106 or STA 103	Intermediate Social Statistics Applied Statistics for Business & Economics	4-5	HIS 194D	Business & Labor in Modern Japan	4
Choose one:		4	MGT 150	Technology Management	4
CMN 120	Interpersonal Communication		POL 180	Bureaucracy in Modern Society	4
CMN 130	Group Communication		POL 187	Administrative Theory	4
CMN 136	Organizational Communication		SOC 103	Evaluation Research Methods	4
CMN 170 or CMN 170V	Digital Technology & Social Change Digital Technology & Social Change		SOC 138	Economic Sociology	4
CMN 172	Interpersonal Technologies		SOC 139	Corporations & Society	4
SOC 126	Social Interaction		SOC 141	Industrialization & Social Change	4
SOC 135	Social Relationships		SOC 159	Work, Employment, & Careers in the 21st Century	4
Choose five from one of the following tracks; at least three of the five must be from Sociology:		20	SOC 160	Sociology of the Environment	4
Track 1: Business & Society (p. 432)			SOC 188	Markets, Culture & Inequality in China	4
Track 2: Public Policy & Social Welfare (p. 432)					
Track 3: Nonprofit & Social Movement Organizations (p. 433)					
Track 4: Student-Initiated Track (p. 433)					
Choose one:		4			
SOC 128	Interracial Interpersonal Dynamics				
SOC 130	Race Relations				
SOC 132	The Sociology of Gender				
SOC 140	Social Stratification				
SOC 145A	Sociology of Third World Development				
SOC 145B	Gender & Rural Development in the Third World				
Choose one additional elective upper division Sociology course not already used to fulfill other major requirements <sup>1</sup>		4			
Depth Subject Matter Subtotal		44-45			
<b>Total Units</b>		<b>74-75</b>			

<sup>1</sup> May use 4 units of 192, 194HA, 195, or 199.

## Track 1: Business & Society

Code	Title	Units
ARE 112	Fundamentals of Organization Management	4
ARE 130	Agricultural Markets	4

## Track 2: Public Policy & Social Welfare

Code	Title	Units
ARE 147 or ARE 147M	Resource & Environment Policy Analysis Resource & Environmental Policy Analysis	2-3
CRD 142	Rural Change in the Industrialized World	4
CRD 151	Community Field Research: Theory & Analysis	5
CRD 152	Community Development	4
CRD 154	Social Theory & Community Change	4
CRD 158	Community Governance	4
CRD 164	Theories of Organizations & Their Role in Community Change	5
CRD 171	Housing & Social Policy	4
CRD 172	Social Inequality: Issues & Innovations	4
ECN/ARE 115A	Economic Development	4
ECN 116	Comparative Economic Systems	4
POL 107	Environmental Politics & Administration	4
POL 118A	History of Political Theory: Ancient	4
POL 118B	History of Political Theory: Early Modern	4
POL 118C	History of Political Theory: Late Modern	4
POL 180	Bureaucracy in Modern Society	4
POL 187	Administrative Theory	4
SOC 103	Evaluation Research Methods	4
SOC/IRE 104	The Political Economy of International Migration	4

SOC 124	Education & Inequality in the U.S.	4
SOC 162	Society, Culture, & Health	4
SOC 163	Population Health: Social Determinants & Disparities in Health	4
SOC 164	Health Policy & Politics	4
CRD 149	Community Development Perspectives on Environmental Justice	4
SOC 185 or SOC 185Y	Social Policy Social Policy (Hybrid Version)	4

the main forces that sustain or weaken social groups, and to determine the conditions that transform social life. Sociology, like any science, is a disciplined, intellectual quest for knowledge about the fundamental nature of things. Students selecting the Sociology major will choose one of five options:

- The *General Sociology emphasis* allows students to gain a broad perspective of sociology by providing an introduction to the discipline and its central issues and concepts. This emphasis offers the most flexibility in allowing students to choose which upper division courses to take.
- The *Law & Society emphasis* is designed for students interested in the study of law, politics, and research. It offers a structured program of courses in law, criminology, deviance, and their relation to issues of societal order and change. Focusing on law in action, students will study how legal and criminal systems operate and theories of legal/criminal behavior. Students can expect to take courses in violence and inequality, delinquency, deviance, the criminal justice system, criminology, and social problems.
- The *Social Services emphasis* focuses on the interactive perspective of family, community, social problems, and social services. The core of the curriculum addresses the fields of social welfare, the family, and social stratification. Students round out their program with courses chosen from areas of social issues, social interaction, gender, and organizational behavior. Students will also take multiple courses within the areas of psychology and race and ethnicity. The program provides a strong liberal arts education and adequately prepares students to work in the diverse social environment of the 21st century.
- The *Global & International Sociology emphasis* is designed for students interested in developing an interdisciplinary, historically-informed understanding of global issues as well as regional challenges and characteristics. Students will study the social bases of political and economic life, culture and communities, inequalities, ethnic relations, migration, environmental changes, and other issues. Besides sociology courses, students choose classes across diverse disciplines, for example, economics, anthropology, political science, history, religious studies, and international agriculture.
- The *Race, Ethnicity, & Immigration emphasis* brings together two sociological subfields by allowing students to take common core of lower division courses that provide them with a foundational knowledge of race & ethnicity and immigration. Students will build on this foundation by choosing from an array of Sociology courses that provide in-depth instruction in specific areas related to Race, Ethnicity, and Immigration, and from electives offered by the departments of African American and African Studies, Chicana/Chicano Studies, Native American Studies, Asian American Studies, Middle East and South Asia Studies, and other Social Science and Humanities departments offering relevant courses.

## Track 3: Nonprofit & Social Movement Organizations

Code	Title	Units
CHI 132	Political Economy of Chicana/o Communities	4
CRD 140	Dynamics of Regional Development	4
CRD 147	Community Youth Development	4
CRD 149	Community Development Perspectives on Environmental Justice	4
CRD 152	Community Development	4
CRD 154	Social Theory & Community Change	4
CRD 156	Community Economic Development	5
CRD 158	Community Governance	4
CRD 164	Theories of Organizations & Their Role in Community Change	5
ECN 111B	Economics History	4
ECN/ARE 115A	Economic Development	4
ECN 116	Comparative Economic Systems	4
HIS 185B	History of Technology in America	4
HIS 194D	Business & Labor in Modern Japan	4
POL 180	Bureaucracy in Modern Society	4
POL 187	Administrative Theory	4
SOC 103	Evaluation Research Methods	4
SOC 140	Social Stratification	4
SOC 156	Social Movements	4
SOC 160	Sociology of the Environment	4
SOC 163	Population Health: Social Determinants & Disparities in Health	4
SOC 164	Health Policy & Politics	4
WMS 187	Gender & Public Policy	4

## Track 4: Student-Initiated Track

Choose a combination of five courses from any of the above three themes; at least three courses should be from SOC. Students choosing this track must meet with a SOC undergraduate advisor to obtain approval of selected courses.

## Sociology, Bachelor of Arts

College of Letters & Science

## The Major Programs

Sociology is the study of human society in all its manifestations. Its aim is to discover the process and structure of human interaction, to identify

## Career Opportunities

The Sociology major provides students with a solid liberal arts education that will prepare them for graduate work in the social sciences as well as a variety of careers. Students who major in sociology often work in areas such as business, education, law, social work or counseling, data analytics, research, health services, community engagement, and global fields.

## Advising

Sociology Advising Office (<http://sociology.ucdavis.edu/undergraduate/advising/advising-office/>)

## Honors Program

An Honors Program is available to Sociology and Sociology-Organizational Studies majors who have demonstrated excellence in their field of study. This programs gives students the opportunity to engage in their own sociological research in the form of an honors thesis.

To be eligible for the program, students must have a grade-point average of 3.500 in the major, completed 135 units, and obtained the recommendation of a sociology faculty sponsor familiar with their work. Honors students write an honors thesis and take two courses (SOC 194HA & SOC 194HB) during their senior year. In addition, students are encouraged to take a 199 course with their sponsor in the spring of their third year, prior to the seminar courses. Successful completion of the Honors Program, when combined with College GPA requirements, enables the student to graduate with High or Highest Honors. Students should apply for the program before they begin their fourth year.

## General Emphasis

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Sociology</i>		
SOC 001	Introduction to Sociology	5
SOC 046	Introduction to Social Research Methods	4
SOC 056 or SOC 056Y	Introduction to Social Statistics	5
Choose one:		3-4
SOC 002	Self & Society	
SOC 003	Social Problems	
SOC 004	Immigration & Opportunity	
SOC 005	Global Social Change: An Introduction to Macrosociology	
SOC 006	Health & Illness	
SOC 007	Race & Ethnicity	
SOC 011	Sociology of Labor & Employment	
SOC 025	Sociology of Popular Culture	
<i>Anthropology</i>		
ANT 002 or ANT 020	Cultural Anthropology Comparative Cultures	4-5
<i>History</i>		
Choose one:		4
HIS 004A	History of Western Civilization	
HIS 004B	History of Western Civilization	
HIS 004C	History of Western Civilization	
HIS 006	Introduction to the Middle East	
HIS 007A	History of Latin America to 1700	
HIS 007B	History of Latin America, 1700-1900	
HIS 007C	History of Latin America 1900-present	
HIS 008	History of Indian Civilization	
HIS 009A	History of East Asian Civilization	
HIS 009B	History of East Asian Civilization	
HIS 010C	World History III	

HIS 015A	Africa to 1900	
HIS 015B	Africa Today	
HIS 017A	History of the United States	
HIS 017B	History of the United States	
<i>Philosophy</i>		
Choose one:		4
PHI 005	Critical Reasoning	
PHI 014	Ethical & Social Problems in Contemporary Society	
PHI 024	Introduction to Ethics	
<b>Preparatory Subject Matter Subtotal</b>		29-31
<b>Depth Subject Matter</b>		
(A)		
SOC 100	Origins of Modern Sociological Theory	4
(B)		
Choose one from each of the following four categories:		16
<i>Individual, Culture &amp; Society</i>		
SOC 125	Sociology of Culture	
SOC 126	Social Interaction	
SOC 135	Social Relationships	
SOC 165	Death & Dying	
<i>Stratification &amp; Social Differentiation</i>		
SOC 130	Race Relations	
SOC 132	The Sociology of Gender	
SOC 140	Social Stratification	
<i>Organizations &amp; Institutions</i>		
SOC 118	Political Sociology	
SOC 131	The Family	
SOC 146	Sociology of Religion	
SOC 180A	Complex Organizations	
<i>Social Dynamics</i>		
SOC/IRE 104	The Political Economy of International Migration	
SOC 141	Industrialization & Social Change	
SOC 143A	Urban Society	
SOC 170	Population	
(C)		
Choose three upper division courses from one of the following clusters, not counting courses taken to fulfill requirement B:		12
<i>Cluster 1: Individual, Culture &amp; Society</i>		
SOC 120	Deviance	
SOC 122	Sociology of Adolescence	
SOC 125	Sociology of Culture	
SOC 126	Social Interaction	
SOC 128	Interracial Interpersonal Dynamics	
SOC 129	Sociology of Black Experience in America	
SOC 131	The Family	
SOC 132	The Sociology of Gender	
SOC 135	Social Relationships	
SOC 137	African American Society & Culture 1790 to 1990	
SOC 143B	Sociology of City Life	
SOC 148	Collective Behavior	

SOC 150	Criminology		or SOC 185Y	Social Policy (Hybrid Version)
SOC 152	Juvenile Delinquency			Cluster 4: Social Dynamics
SOC 153	The Sociology of Childhood		SOC/IRE 104	The Political Economy of International Migration
SOC 162	Society, Culture, & Health		SOC 125	Sociology of Culture
SOC 163	Population Health: Social Determinants & Disparities in Health		SOC 138	Economic Sociology
SOC 173	Sociology Through Literature		SOC 141	Industrialization & Social Change
SOC 174	American Jewish Identities & Communities		SOC 143A	Urban Society
SOC/STS 176	Sociology of Knowledge, Science, & Scientific Knowledge		SOC 145A	Sociology of Third World Development
Cluster 2: Stratification & Social Differentiation			SOC 145B	Gender & Rural Development in the Third World
SOC 118	Political Sociology		SOC 147	Sociological Perspectives on East Asia
SOC 128	Interracial Interpersonal Dynamics		SOC 148	Collective Behavior
SOC 129	Sociology of Black Experience in America		SOC 156	Social Movements
SOC 130	Race Relations		SOC 157	Social Conflict
SOC 132	The Sociology of Gender		SOC 170	Population
SOC 133	Sexual Stratification & Politics		Student-Initiated Thematic Cluster	
SOC 140	Social Stratification		Developed with a faculty advisor and approved by the Sociology Undergraduate Curriculum Committee.	
SOC 145A	Sociology of Third World Development		(D)	
SOC 145B	Gender & Rural Development in the Third World		8 units of Sociology beyond courses taken to fulfill above requirements, and outside of the course cluster used to fulfill requirement C.	8
SOC 163	Population Health: Social Determinants & Disparities in Health		(E)	
SOC 171	Sociology of Violence & Inequality		One additional elective upper division Sociology course not already used to fulfill other major requirements <sup>1</sup>	4
SOC 185	Social Policy		Depth Subject Matter Subtotal	
or SOC 185Y	Social Policy (Hybrid Version)		Total Units	44
SOC 188	Markets, Culture & Inequality in China			73-75
Choose one:				
AAS 123	Black Female Experience in Contemporary Society		1 May use 4 units of 192, 194HA, 195 or 199.	
ASA 100	Asian American Communities		<b>Law &amp; Society Emphasis</b>	
CHI 110	Sociology of the Chicana/o Experience		<b>Code</b>	<b>Title</b>
NAS 115	Native Americans in the Contemporary World		<b>Preparatory Subject Matter</b>	
Cluster 3: Organizations & Institutions				
SOC 118	Political Sociology		<i>Sociology</i>	
SOC 124	Education & Inequality in the U.S.		SOC 001	Introduction to Sociology
SOC 131	The Family		SOC 046	Introduction to Social Research Methods
SOC 133	Sexual Stratification & Politics		SOC 056	Introduction to Social Statistics
SOC 139	Corporations & Society		or SOC 056Y	Introduction to Social Statistics
SOC 146	Sociology of Religion		Choose one:	
SOC 150	Criminology		SOC 003	Social Problems
SOC 151	The Criminal Justice System		SOC 004	Immigration & Opportunity
SOC 155	Sociology of Law		SOC 006	Health & Illness
SOC 159	Work, Employment, & Careers in the 21st Century		SOC 007	Race & Ethnicity
SOC 160	Sociology of the Environment		SOC 011	Sociology of Labor & Employment
SOC 163	Population Health: Social Determinants & Disparities in Health		Choose one:	
SOC 164	Health Policy & Politics		ANT 002	Cultural Anthropology
SOC 178	Punishment & Corrections		ANT 020	Comparative Cultures
SOC 180A	Complex Organizations		POL 001	American National Government
SOC 185	Social Policy		POL 003	International Relations

<b>Choose one:</b>	4	SOC 151	The Criminal Justice System
HIS 004A	History of Western Civilization	SOC 152	Juvenile Delinquency
HIS 004B	History of Western Civilization	SOC 171	Sociology of Violence & Inequality
HIS 004C	History of Western Civilization	SOC 178	Punishment & Corrections
HIS 006	Introduction to the Middle East	<i>Stratifications &amp; Social Dynamics</i>	
HIS 007A	History of Latin America to 1700	<b>Choose one:</b>	4
HIS 007B	History of Latin America, 1700-1900	SOC 118	Political Sociology
HIS 007C	History of Latin America 1900-present	SOC 137	African American Society & Culture 1790 to 1990
HIS 008	History of Indian Civilization	SOC 148	Collective Behavior
HIS 009A	History of East Asian Civilization	SOC 156	Social Movements
HIS 009B	History of East Asian Civilization	SOC 157	Social Conflict
HIS 010C	World History III	SOC 162	Society, Culture, & Health
HIS 015A	Africa to 1900	SOC 163	Population Health: Social Determinants & Disparities in Health
HIS 015B	Africa Today	SOC 164	Health Policy & Politics
HIS 017A	History of the United States	AAS 123	Black Female Experience in Contemporary Society
HIS 017B	History of the United States	AAS 145A	Black Social & Political Thought
<b>Philosophy</b>		AAS 145B	Black Intellectuals
<b>Choose one:</b>	4	CHI 130	United States-Mexican Border Relations
PHI 005	Critical Reasoning	CHI 132	Political Economy of Chicana/o Communities
PHI 014	Ethical & Social Problems in Contemporary Society	NAS 117	Native American Governmental Decision Making
PHI 024	Introduction to Ethics	NAS 118	Native American Politics
<b>Preparatory Subject Matter Subtotal</b>	30-31	<b>Depth Subject Matter</b>	
<b>Sociology</b>		<b>Legal Studies</b>	
SOC 100	Origins of Modern Sociological Theory	ASA 155	Asian American Legal History
SOC 155	Sociology of Law	CHI 182	Race & Juvenile Justice
<b>Choose from the following categories:</b>		ENL 107	Freedom of Expression
<i>Individual Culture &amp; Society</i>		ESP 161	Environmental Law
<b>Choose one:</b>	4	ETX 138	Legal Aspects of Environmental Toxicology
SOC 125	Sociology of Culture	HYD 150	Water Law
SOC 126	Social Interaction	PHI 119	Philosophy of Law
SOC 135	Social Relationships	POL 122	International Law
<i>Stratification &amp; Social Differentiation</i>		POL 150	Judicial Politics & Constitutional Interpretation
<b>Choose one:</b>	4	POL 151	Constitutional Politics of the First Amendment & the Right to Privacy.
SOC 130	Race Relations	POL 152	The Constitutional Politics of the Equality
SOC 132	The Sociology of Gender	POL 154	Legal Philosophy
SOC 140	Social Stratification	PSC 153	Psychology & Law
<i>Organizations &amp; Institutions</i>		UWP 104B	Writing in the Professions: Law
<b>Choose one:</b>	4	WMS 140	Gender & Law
SOC 118	Political Sociology	<b>Choose one additional elective upper division Sociology course not already used to fulfill other major requirements</b>	
SOC 131	The Family	1	
SOC 146	Sociology of Religion	Choose one additional elective upper division Sociology course not already used to fulfill other major requirements	
SOC 160	Sociology of the Environment	1	
SOC 163	Population Health: Social Determinants & Disparities in Health	Choose one additional elective upper division Sociology course not already used to fulfill other major requirements	
SOC 164	Health Policy & Politics	1	
SOC 180A	Complex Organizations	Choose one additional elective upper division Sociology course not already used to fulfill other major requirements	
<i>Crime &amp; Social Dynamics</i>		<b>Depth Subject Matter Subtotal</b>	
<b>Choose three:</b>	12	<b>Total Units</b>	
SOC 120	Deviance	43-44	
SOC 150	Criminology	73-75	

<sup>1</sup> May use 4 units of 192, 194HA, 195 or 199.

## Social Services Emphasis

Code	Title	Units	
<b>Preparatory Subject Matter</b>			
<i>Sociology</i>			
SOC 001	Introduction to Sociology	5	SOC 143A Urban Society
SOC 046	Introduction to Social Research Methods	4	SOC 146 Sociology of Religion
SOC 056 or SOC 056Y	Introduction to Social Statistics	5	SOC 150 Criminology
	Introduction to Social Statistics		SOC 152 Juvenile Delinquency
Choose One		4	SOC 153 The Sociology of Childhood
SOC 002	Self & Society		SOC 155 Sociology of Law
SOC 003	Social Problems		SOC 156 Social Movements
SOC 006	Health & Illness		SOC 160 Sociology of the Environment
SOC 011	Sociology of Labor & Employment		SOC 162 Society, Culture, & Health
<i>Psychology</i>			
PSC 001 or PSC 001Y	General Psychology	4	SOC 163 Population Health: Social Determinants & Disparities in Health
Choose two:		6-8	SOC 170 Population
ASA 001	Historical Experience of Asian Americans		SOC 171 Sociology of Violence & Inequality
ASA 002	Contemporary Issues of Asian Americans		SOC 178 Punishment & Corrections
AAS 010	African-American Culture & Society		
AAS 015	Introduction to African American Humanities		
CHI 010	Introduction to Chicana/o Studies		
CHI 050	Chicana & Chicano Culture		
NAS 001	Introduction to Native American Studies		
NAS 010	Native American Experience		
SOC 004	Immigration & Opportunity		
SOC 007	Race & Ethnicity		
Preparatory Subject Matter Subtotal		28-30	
<b>Depth Subject Matter</b>			
<i>Sociology</i>			
SOC 100	Origins of Modern Sociological Theory	4	
SOC 131	The Family	4	
SOC 140	Social Stratification	4	
SOC 185 or SOC 185Y	Social Policy	4	
	Social Policy (Hybrid Version)		
<i>Psychology</i>			
Choose one:		4	
PSC 140 or PSC 140Y	Developmental Psychology		
	Developmental Psychology		
PSC 142/HDE 102	Social & Personality Development		
PSC 151	Social Psychology		
PSC 168	Abnormal Psychology		
Choose from the following categories:			
<i>Social Issues</i>			
Choose two:		8	
SOC/IRE 104	The Political Economy of International Migration		
SOC 120	Deviance		
SOC 122	Sociology of Adolescence		
SOC 124	Education & Inequality in the U.S.		
SOC 139	Corporations & Society		
<i>Gender</i>			
Choose one:		4	
SOC 132	The Sociology of Gender		
SOC 133	Sexual Stratification & Politics		
SOC 145B	Gender & Rural Development in the Third World		
<i>Organizational Behavior</i>			
Choose one:		4	
SOC 139	Corporations & Society		
SOC 146	Sociology of Religion		
SOC 151	The Criminal Justice System		

SOC 159	Work, Employment, & Careers in the 21st Century		<i>Regional Focus</i>
SOC 164	Health Policy & Politics		Choose three from one of the following groups: 12
SOC 180A	Complex Organizations		Africa; choose three:
Depth Subject Matter Subtotal		44	AAS 110 West African Social Organization
Total Units		72-74	AAS 111 Cultural Politics in Contemporary Africa
			AAS 162 Islam in Africa & the Americas
			ANT 140A Cultures & Societies of West & Central Africa
			ANT 140B Cultures & Societies of East & South Africa
			HIS 115A History of West Africa
			HIS 115B History of East Africa & the Indian Ocean
			HIS 115C History of Southern Africa from Exploration to the Rainbow Nation
			HIS 116 African History: Special Themes
			POL 134 Africa & U.S. Foreign Policy
			Latin America; choose three:
			AAS 107A African Descent Communities & Culture in the Caribbean & Latin America
			AAS 180 Race & Ethnicity in Latin America
			ANT 144 Contemporary Societies & Cultures of Latin America
			HIS 159 Women & Gender in Latin American History
			HIS 162 History of the Andean Region
			HIS 163A History of Brazil
			HIS 163B History of Brazil
			HIS 164 History of Chile
			HIS 165 Latin American Social Revolutions
			HIS 166A History of Mexico to 1848
			HIS 166B History of Mexico since 1848
			HIS 167 Modern Latin American Cultural & Intellectual History
			HIS 168 History of Inter-American Relations
			NAS 120 Ethnopolitics of South American Indians
			NAS 133 Ethnohistory of Native People of Mexico & Central America
			SPA 170 Introduction to Latin American Culture
			SPA 172 Mexican Culture
			SPA 173 Cinema & Latin American Culture
			Middle East; choose three:
			ANT 142 Peoples of the Middle East
			HIS 112A Topics in Pre-Modern Jewish History
			HIS 112B Topics in Modern Jewish History
			HIS 113 History of Modern Israel
			HIS 190A Middle Eastern History I: The Rise of Islam, 600-1000
			HIS 190B Middle Eastern History II: The Age of the Crusades, 1001-1400
			HIS 190C Middle Eastern History III: The Ottomans, 1401-1730
			HIS 193A History of the Modern Middle East, 1750-1914
			HIS 193B History of the Modern Middle East, From 1914
			Jewish Studies; see an advisor.

MSA 131A/ CTS 146A	Modern Iranian Cinema	HIS 191F	History of the People's Republic of China
MSA 180	Topics in Middle East & South Asian Studies	HIS 191G	Special Topics in Chinese History to 1800
MSA 181A	Topics in Regional ME/SA Studies	HIS 191H	Special Topics in Chinese History after 1800
MSA 181C	Topics in Regional ME/SA Studies: Arab Studies	HIS 191J	Sex & Society in Modern Chinese History
MSA 182A	Undergraduate Proseminar in Middle East/ South Asia	HIS 195B	History of Modern Korea
MSA 182C	Undergraduate Proseminar in Middle East/ South Asia: Arab Studies Seminar	HIS 196A	Medieval India
RST 162	Introduction to Islamic Law	HIS 196B	Modern India
WMS 184	Gender in the Arab World	MSA 100	Middle East & South Asia: Comparative Perspectives
Asia-China & Japan; choose three:		MSA 131B	Modern South Asia Cinema
AAS 107C	African Descent Communities & Culture in Asia	MSA 181B	Topics in Regional ME/SA Studies
ANT 148A	Culture & Political Economy in Contemporary China	MSA 182B	Undergraduate Proseminar in Middle East/ South Asia
EAS 113	Cinema & Society in China	POL 148B	Government & Politics in East Asia: Japan
ECN 171	Economy of East Asia	POL 148C	Government & Politics in East Asia: Southeast Asia
HIS 191A	Classical China	RST 165	Islam in Asia
HIS 191B	High Imperial China	RST 172	Ch'an (Zen) Buddhism
HIS 191C	Late Imperial China	Depth Subject Matter Subtotal	
HIS 191D	19th-Century China: The Empire Confronts the West	48	
HIS 191E	The Chinese Revolution	<b>Total Units</b>	
HIS 191F	History of the People's Republic of China	<b>78-109</b>	
HIS 191G	Special Topics in Chinese History to 1800		
HIS 191H	Special Topics in Chinese History after 1800		
HIS 191J	Sex & Society in Modern Chinese History		
HIS 194A	Aristocratic & Feudal Japan		
HIS 194B	Early Modern Japan		
HIS 194C	Modern Japan		
POL 148A	Government & Politics of East Asia: China		
POL 148B	Government & Politics in East Asia: Japan		
RST 165	Islam in Asia		
RST 172	Ch'an (Zen) Buddhism		
SOC 147	Sociological Perspectives on East Asia		
SOC 188	Markets, Culture & Inequality in China		
Southeast Asia/Pacific; choose three:			
ANT 143A	Ethnology of Southeast Asia		
ANT 145	Performance, Embodiment, & Space in South Asia		
ANT 147/ MSA 131B/ CTS 146B	Modern South Asia Cinema		
ECN 171	Economy of East Asia		
HIS 191A	Classical China		
HIS 191B	High Imperial China		
HIS 191C	Late Imperial China		
HIS 191D	19th-Century China: The Empire Confronts the West	Preparatory Subject Matter Subtotal	
HIS 191E	The Chinese Revolution	30	
<b>Depth Subject Matter</b>			
SOC 100		Origins of Modern Sociological Theory	4

SOC 130	Race Relations	4	ASA 113	Asian American Sexuality
Choose six:		24	ASA 114	Asian Diasporas
SOC 104	The Political Economy of International Migration		ASA 115	Multiracial Asian Pacific American Issues
SOC 125	Sociology of Culture		ASA 116	Asian American Youth
SOC 128	Interracial Interpersonal Dynamics		ASA 150	Filipino American Experience
SOC 131	The Family		ASA 150B	Japanese American Experience
SOC 132	The Sociology of Gender		ASA 150C	Chinese American Experience
SOC 137	African American Society & Culture 1790 to 1990		ASA 150D	Korean American Experience
SOC 140	Social Stratification		ASA 150E	Southeast Asian American Experience
SOC 143A	Urban Society		ASA 150F	South Asian American History, Culture, & Politics
SOC 143B	Sociology of City Life		CHI 100	Chicana/o Theoretical Perspective
SOC 145A	Sociology of Third World Development		CHI 102A	Chicana/o Feminist Theoretical Understandings of K-20 Educational Disparities
SOC 145B	Gender & Rural Development in the Third World		CHI 102B	Grassroots Community Activism & Mobilization Efforts Challenging Educational Inequity
SOC 151	The Criminal Justice System		CHI 102C	Policy & Law Challenging Segregation & Educational Inequity
SOC 172	Intersections of Race, Gender & Class		CHI 111	Chicanas/Mexicanas in Contemporary Society
SOC 174	American Jewish Identities & Communities		CHI 112	Globalization, Transnational Migration, & Chicana/o & Latina/o Communities
One other upper division SOC course with advisor approval.			CHI 113	Latin American Women's Engagement in Social Movements
Choose three:		12	CHI 114	Women of Color Reproductive Health & Reproductive Politics in a Global Perspective
AAS 100	Survey of Ethnicity in the US		CHI 114S	Women of Color Reproductive Health & Gender Politics in Cuba & the U.S.
AAS 101	Introduction to Research in the Afro-American Community		CHI 120	Chicana/o Psychology
AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America		CHI 121	Chicana/o Community Mental Health
AAS 107B	African Descent Communities & Culture in North America		CHI 122	Psychology Perspectives Chicana/o & Latina/o Family
AAS 107C	African Descent Communities & Culture in Asia		CHI 122S	Psychology Perspectives Chicana/o & Latina/o Family
AAS 123	Black Female Experience in Contemporary Society		CHI 123	Psychological perspectives on Chicana/o & Latina/o Children & Adolescents
AAS 130	Education in the African-American Community		CHI 125S	Latino Families in the Age of Globalization: Migration & Transculturation
AAS 141	Psychology of the African American Experience		CHI 130	United States-Mexican Border Relations
AAS 145A	Black Social & Political Thought		CHI 131	Chicanas in Politics & Public Policy
AAS 145B	Black Intellectuals		CHI 131S	Chicanas in Politics & Public Policy
AAS 162	Islam in Africa & the Americas		CHI 132	Political Economy of Chicana/o Communities
AAS 163	African Religions in the Americas		CHI 135S	Transnational Latina/o Political Economy
AAS 165	Afro-Christianity & the Black Church		CHI 148	Decolonizing Spirit
AAS 172	Diaspora & New Black Identities		CHI 150	The Chicana & Chicano Movement
AAS 178	African Modernity & Globalization		CHI 161	Queer Latinidad
AAS 180	Race & Ethnicity in Latin America		CHI 165	Chicanas, Latinas & Mexicanas in Commercial Media
AMS 150	Interdisciplinary Approaches to Environmental Justice/Injustice		CHI 181	Chicanas & Latinas in the U.S.: Historical Perspectives
AMS 156	Race, Culture & Society in the United States		CHI 182	Race & Juvenile Justice
ANT 103	Indigenous Peoples & Natural Resource Conservation			
ANT 139AN	Race, Class, Gender Systems			
ANT 130BN	Migration & the Politics of Place & Identity			
ASA 102	Theoretical Perspective in Asian American Studies			
ASA 112	Asian American Women			

CHI 184	Latino Youth Gangs in Global Perspective
CHI 184S	Latino Youth Gangs in Global Perspective
CMN 149	Race & Media
EDU 150	Cultural Diversity & Education in a Sociopolitical Context
EDU 153	Diversity in the K-12 Classroom
HIS/SAS 109	Environmental Change, Disease & Public Health
HIS 110A	Colonialism & the Making of the Modern World
HIS 115E	Slavery, Africa, & the Atlantic World
HIS 156	Latin American Migration History
HIS 171A	Slavery, Society & Expansion in the Early U.S.
HIS 173	Becoming an American: Immigration & American Culture
HIS 177A	History of Black People & American Race Relations: 1450-1860
HIS 177B	History of Black People & American Race Relations: 1860-Present
HIS 179	Asian American History, 1850-Present
MSA 112	History of South Asian Islam
MSA 150/ WMS 185 (DISCON)	Women & Islamic Discourses
MSA 151A	Iranian Society & Culture
NAS 115	Native Americans in the Contemporary World
NAS 118	Native American Politics
NAS 119	Introduction to Federal Indian Law
NAS 120	Ethnopolitics of South American Indians
NAS 121	Corporate Colonialism
NAS 130A	Native American Ethno-Historical Development
NAS 134	Race, Culture, & Nation
NAS 146	Orientation to Research in Native American Studies
WMS 160	Women, "Race" & Sexuality in Postcolonial Cinema
WMS 175	Gender & Experience of Race
Depth Subject Matter Subtotal	44
Total Units	74

## Sociology, Minor

College of Letters & Science

Code	Title	Units
Choose any five upper division Sociology courses, except:		
SOC 192	Internship & Research Practicum	20
SOC 193	Workshop in Field Research	
SOC 194HA	Special Study for Honors Students	
SOC 194HB	Special Study for Honors Students	
SOC 197T	Tutoring in Sociology	
SOC 198	Directed Group Study	

SOC 199	Special Study for Advanced Undergraduates
Sociology (SOC) courses. (p. 1323)	
<b>Total Units</b>	<b>20</b>

## Sociology, Master of Arts

College of Letters & Science

### Graduate Study

The Master of Arts degree is offered only in route to the Ph.D.

Graduate students in Sociology have the opportunity to pursue designated emphases in African American & African Studies, Critical Theory, Feminist Theory & Research, Human Rights, Science & Technology Studies, and Study of Religion.

### Graduate Advisors

Sociology Graduate Advising (<https://sociology.ucdavis.edu/graduate/>)

## Sociology, Doctor of Philosophy

College of Letters & Science

### Graduate Study

The Department offers programs of study and research leading to a Ph.D. degree in sociology. Further information regarding graduate study may be obtained on our website (<https://sociology.ucdavis.edu/graduate/>).

Graduate students in Sociology have the opportunity to pursue designated emphases in African American & African Studies, Critical Theory, Feminist Theory & Research, Human Rights, Science & Technology Studies, and Study of Religion.

### Graduate Advisors

Sociology Graduate Advising (<https://sociology.ucdavis.edu/graduate/>)

## Soils & Biogeochemistry (Graduate Group)

College of Agricultural & Environmental Sciences

Anthony Toby O'Geen, Ph.D., Chairperson of the Group

### Group Office

1152 Plant & Environmental Sciences Building; 530-752-1669; Soils & Biogeochemistry Graduate Group (<http://soils.ucdavis.edu/>); Faculty (<http://soils.ucdavis.edu/people/faculty/>)

- Soils & Biogeochemistry, Master of Science (p. 441)
- Soils & Biogeochemistry, Doctor of Philosophy (p. 442)

## Soils & Biogeochemistry, Master of Science

College of Agricultural & Environmental Sciences

## Graduate Study

The Soils & Biogeochemistry Graduate Group offers programs of study and research leading to M.S. and Ph.D. degrees. The focus of Soils and Biogeochemistry is on the physical, chemical and biological processes occurring in soils of different landforms and ecosystems. The goal is to understand the complex processes of mass and energy flow that control agricultural and natural ecosystem functions, productivity, and sustainability. Investigations assess impacts and implications of natural processes and anthropogenic effects, such as climate change, on soil and ecosystem behavior and development. Examples include: fate and emission of greenhouse gases; soil carbon sequestration; fate and transport of native and applied chemicals; soil microbial ecology; nutrient uptake and management; nutrient cycling in managed and wildland ecosystems; pesticide and trace element adsorption on surfaces; mineral weathering; organic agriculture; bioavailability of toxics; soil erosion; conservation; ecosystem productivity and sustainability; and the study of soil evolution on the landscape. These studies are carried out within a framework of integrating applied chemical, physical, mathematical, and biological sciences.

### Graduate Advisors

Cristina Lazcano, Ph.D., Amelie Gaudin, Ph.D., Majdi Abou Najm, Ph.D., Anthony Toby O'Geen, Ph.D.

### Graduate Admissions Officer

Anthony Toby O'Geen, Ph.D.

## Soils & Biogeochemistry, Doctor of Philosophy

College of Agricultural & Environmental Sciences

## Graduate Study

The Soils & Biogeochemistry Graduate Group offers programs of study and research leading to M.S. and Ph.D. degrees. The focus of Soils and Biogeochemistry is on the physical, chemical and biological processes occurring in soils of different landforms and ecosystems. The goal is to understand the complex processes of mass and energy flow that control agricultural and natural ecosystem functions, productivity, and sustainability. Investigations assess impacts and implications of natural processes and anthropogenic effects, such as climate change, on soil and ecosystem behavior and development. Examples include: fate and emission of greenhouse gases; soil carbon sequestration; fate and transport of native and applied chemicals; soil microbial ecology; nutrient uptake and management; nutrient cycling in managed and wildland ecosystems; pesticide and trace element adsorption on surfaces; mineral weathering; organic agriculture; bioavailability of toxics; soil erosion; conservation; ecosystem productivity and sustainability; and the study of soil evolution on the landscape. These studies are carried out within a framework of integrating applied chemical, physical, mathematical, and biological sciences.

### Graduate Advisors

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### Graduate Admissions Officer

Anthony Toby O'Geen, Ph.D.

## Spanish & Portuguese

College of Letters & Science

### Department Office

213 Sproul Hall; 530-752-0835; Spanish & Portuguese (<http://spanish.ucdavis.edu>); Faculty (<http://spanish.ucdavis.edu/people/>)

- Luso-Brazilian Studies, Minor (p. 442)
- Spanish, Bachelor of Arts (p. 443)
- Spanish, Minor (p. 445)
- Spanish, Master of Arts (p. 445)
- Spanish, Doctor of Philosophy (p. 445)

## Luso-Brazilian Studies, Minor

College of Letters & Science

### Department Office

Minor in Luso-Brazilian Studies (<https://spanish.ucdavis.edu/minor-luso-brazilian-studies/>)

The Department of Spanish & Portuguese sponsors the minor in Luso-Brazilian Studies, which offers students the opportunity to engage with the Portuguese-speaking world as a global space, as well as gain in-depth knowledge of Brazilian literature, culture and society. The minor is structured to facilitate engagement with Latin American, peninsular, and transatlantic topics, while ensuring that students master the essential skills of linguistic competence, and literary and cultural knowledge.

### Education Abroad Program Options

We highly recommend that students participate in study abroad; see Study Abroad (<http://studyabroad.ucdavis.edu>). Courses taken abroad may count toward the Luso-Brazilian Studies minor.

### Minor Advisor

L. Bernucci, R. Newcomb

Code	Title	Units
<b>Luso-Brazilian Studies</b>		
<i>Portuguese</i>		
POR 100	Principles of Luso-Brazilian Literature & Criticism	4
POR 161	Luso-Brazilian Literature & Culture	4
Choose one course in each of the following categories:		7-8
<i>Spanish</i>		
SPA 111N	The Structure of Spanish: Sounds & Words	
SPA 115	History of the Spanish Language	
SPA 116	Applied Spanish Linguistics	
<i>Portuguese</i>		
POR 162	Introduction to Brazilian Literature	
POR 163	20th C Masters in Brazilian Literature	
Choose one elective course in each of the following categories:		8
<i>Portuguese</i>		
POR 159	Special Topics in Luso-Brazilian Literature & Culture	
POR 162	Introduction to Brazilian Literature	

POR 163	20th C Masters in Brazilian Literature
<b>History</b>	
HIS 159	Women & Gender in Latin American History
HIS 163A	History of Brazil
HIS 163B	History of Brazil
Note: Consult a departmental advisor if any of these courses are to be taken abroad.	
Note: Additional courses may count toward the minor with prior approval by a departmental advisor.	

Total Units

23-24

two quarters. Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of their junior year (135 units), have attained a cumulative GPA of 3.500 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in Spanish are in addition to the regular requirements for the major in Spanish.

## UC Education Abroad Program Options

The department encourages its majors to consider study in a Spanish-speaking country with our UC Education Abroad Program (UCEAP). It is now possible for our students to complete significant portions of the Spanish major in the UCEAP centers at both the lower (Preparatory Subject Matter) and upper division levels through newly introduced options. See the Global Learning Hub (<https://globallearning.ucdavis.edu/>).

## UC Davis Quarter Abroad

The Quarter Abroad Program offers programs in Mendoza, Argentina (fall quarter) and in Madrid, Spain (spring quarter). These programs aim at providing students with opportunities to increase their knowledge of the Spanish language and cultures by experiencing the life-learning challenges of living and studying abroad.

Students may earn 15-22 UC Davis units toward the Spanish major, minor, or foreign language requirement. Each program may offer an upper division course taught by the UC Davis Program Director focusing on history, culture and society.

For more information, see UC Davis Quarter Abroad.

## Prerequisite Credit

Credit normally will not be given for a course if that course is the prerequisite of a course already successfully completed. Exceptions can be made by the Department Chairperson only.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
SPA 001	Elementary Spanish	5
or SPA 001Y	Elementary Spanish	
or SPA 001S	Elementary Spanish	
Choose one:		5
SPA 002	Elementary Spanish	
SPA 002S	Elementary Spanish	
SPA 002V	Elementary Spanish	
SPA 002Y	Elementary Spanish	
Choose one:		5
SPA 003	Elementary Spanish	
SPA 003S	Elementary Spanish	
SPA 003V	Elementary Spanish	
SPA 003Y	Elementary Spanish	
Choose one:		5
SPA 021	Intermediate Spanish	
SPA 021S	Intermediate Spanish	
SPA 021V	Intermediate Spanish I	
SPA 021Y	Intermediate Spanish	
Choose one:		5
SPA 022	Intermediate Spanish	

# Spanish, Bachelor of Arts

College of Letters & Science

## The Major Program

The Spanish major program assures proficiency in all four language skills-speaking, understanding, reading, and writing-and acquaints students with the intellectual and cultural contributions of the Spanish-speaking world through a study of its language, literature, and cultural productions.

## The Program

The department's lower division program gives students a solid foundation in the Spanish language, either through the traditional elementary and intermediate language series or through an accelerated three-course sequence of Spanish for native speakers. At the upper division level, students receive a broad introduction to basic concepts and the practice of literary and cultural criticism and to the four areas of study represented in the department's curriculum: Spanish linguistics, Spanish literature and culture, Latin-American literature and culture, and Latina/o literatures and cultures in the United States. Students are encouraged to work closely with the department's academic advisors in designing a program of studies tailored to their individual needs and interests. Many students combine the Spanish major with another major in the humanities or social sciences.

## Advising

Given the great flexibility in the Spanish major, it is important that students design their programs in close consultation with their major advisor. This is especially important for students who intend to use their major as preparation for graduate study, for those who are planning a teaching career, and for those who wish to take advantage of our Education Abroad Program options.

## Major Advisors

213 Sproul Hall.

## Career Alternatives

The program, alone or in combination with other major programs, may lead to advanced study of the language or literature and culture of Spain and Spanish America, and to careers not only in teaching, but also in other professions such as library science, law, medicine, and in government, social service, business, or international relations.

## Honors Program

Candidates for high or highest honors in Spanish must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in at least 6 units of SPA 194H distributed over

SPA 022S	Intermediate Spanish		Choose six electives in consultation with the student's major advisor.	22-24	
SPA 022V	Intermediate Spanish II				
SPA 022Y	Intermediate Spanish		Students may, with the approval of their advisor, choose up to two electives outside the Spanish department (p. 444)		
Choose one:		4			
SPA 023	Spanish Composition I		Depth Subject Matter Subtotal	41-44	
or SPA 023S	Spanish Composition I		Total Units	41-77	
Choose one:		4			
SPA 024	Spanish Composition II		A maximum of 6 units of SPA 199 may be counted toward the major.		
or SPA 024S	Spanish Composition II		SPA 199 cannot be used to replace regular departmental courses.		
<b>All of the above, OR</b>					
SPA 031 & SPA 032 & SPA 033	Intermediate Spanish for Native Speakers I and Intermediate Spanish for Native Speakers II and Intermediate Spanish for Native Speakers III	0-15	Students may, with the approval of their advisor, choose up to two electives outside the Spanish department in such programs as:		
Preparatory Subject Matter Subtotal		0-33			
<b>Depth Subject Matter</b>					
Choose one in each of the following five areas:		19-20			
<i>Group 1</i>					
SPA 100	Principles of Hispanic Literature & Criticism		<b>Code</b>	<b>Title</b>	<b>Units</b>
SPA 100S	Principles of Hispanic Literature & Criticism		AAS 107A	African Descent Communities & Culture in the Caribbean & Latin America	4
SPA 141	Introduction to Spanish Culture		AAS 180	Race & Ethnicity in Latin America	4
SPA 141S	Introduction to Spanish Culture		ANT 144	Contemporary Societies & Cultures of Latin America	4
SPA 170	Introduction to Latin American Culture		AHI 151	Arts of the Ancient New World	4
SPA 170S	Introduction to Latin American Culture		CHI 154	The Chicana/o Novel	4
<i>Group 2</i>			CHI 155	Chicana/o Theater	4
SPA 111N	The Structure of Spanish: Sounds & Words		CHI 156	Chicana/o Poetry	4
SPA 115	History of the Spanish Language		CHI 160	Mexican Film & Greater Mexican Identity	4
SPA 116	Applied Spanish Linguistics		CHI 170	Contemporary Issues in Chicano Art	4
SPA 116S	Applied Spanish Linguistics		CHI/ART 171	Mexican & Chicano Mural Workshop	4
<i>Group 3</i>			<b>Comparative Literature</b>		
SPA 130	Survey of Spanish Literature to 1700		COM 152	Literature of the Americas	4
SPA 131N	Survey of Spanish Literature: 1700 to Present		COM 165	Caribbean Literatures	4
SPA 134A	Don Quijote I		COM 165S	Caribbean Literatures	4
SPA 142	Special Topics in Spanish Cultural & Literary Studies		EDU 151	History & Approaches to Multilingualism in K-12 Contexts	3
<i>Group 4</i>			EDU 152	Academic Spanish for Bilingual Teachers	3
SPA 150N	Survey of Latin American Literature to 1900		<b>History</b>		
SPA 151	Survey of Latin American Literature 1900 to Present		HIS 159	Women & Gender in Latin American History	4
SPA 157	Great Works of Latin American Literature/ Culture		HIS 160	Spain & America in the 16th Century	4
SPA 159	Special Topics in Latin American Literature & Culture		HIS 164	History of Chile	4
SPA 159S	Special Topics in Latin American Literature & Culture		HIS 165	Latin American Social Revolutions	4
<i>Group 5</i>			HIS 166A	History of Mexico to 1848	4
SPA 117	Teaching Spanish as a Native Tongue in the U.S.: Praxis & Theory		HIS 166B	History of Mexico since 1848	4
SPA 174	Chicano Culture		HIS 167	Modern Latin American Cultural & Intellectual History	4
SPA 176	Literature in Spanish Written in the United States		HIS 168	History of Inter-American Relations	4
SPA 177	California & Latin America		HIS 169A	Mexican-American History	4
			HIS 169B	Mexican-American History	4
<i>Linguistics</i>			LIN 166	The Spanish Language in the United States	4
<i>Native American Studies</i>					

NAS 120	Ethnopolitics of South American Indians	4	SPA 150N	Survey of Latin American Literature to 1900
NAS 133A	Ethnohistory of Native Peoples of Mexico & Central America to 1500	4	SPA 151	Survey of Latin American Literature 1900 to Present
NAS 133B	Ethnohistory of Native Peoples of Mexico & Central America 1500 to 2000	4	SPA 157	Great Works of Latin American Literature/Culture
NAS 184	Contemporary Indigenous Literature of Mexico	4	SPA 159	Special Topics in Latin American Literature & Culture
			SPA 159S	Special Topics in Latin American Literature & Culture
<b>Group 5</b>				
			SPA 117	Teaching Spanish as a Native Tongue in the U.S.: Praxis & Theory
			SPA 174	Chicano Culture
			SPA 176	Literature in Spanish Written in the United States
			SPA 177	California & Latin America
				One upper division Spanish (SPA) elective. (p. 1335)
Consult a departmental advisor if any of these courses are to be taken abroad.				
<b>Total Units</b>				<b>23-24</b>

## Educational Objectives

- Linguistics.* Demonstrate knowledge of the Spanish speaking world's linguistic diversity through the comprehension of Spanish in a variety of situations, discursive modes and historical, regional or social variations. Demonstrates analytic, interpretative, and critical thinking skills; SPA 111N, SPA 113, SPA 115/SPA 115S, SPA 116, SPA 117, SPA 118, SPA 180.
- Literature.* Demonstrate analytic, interpretative and critical thinking skills with respect to literary texts from Latin America, Spain, the United States and other countries in which there is a literary production in Spanish; SPA 100/SPA 100S, SPA 130, SPA 131N, SPA 134A/SPA 134B, SPA 142 (Spain); SPA 150N, SPA 151, SPA 157, SPA 159/SPA 159S (Latin America); SPA 117, SPA 174, SPA 176, SPA 177 (United States).
- Culture.* Demonstrate cultural awareness with respect to the diversity of cultural products and manifestations produced in the Spanish speaking world (Latin America, Spain, the United States and other countries in which there is a cultural production in Spanish; SPA 100/SPA 100S, SPA 141/SPA 141S, SPA 170/SPA 170S, SPA 174).
- Film & Art.* Demonstrate analytic interpretative and critical thinking skills with respect to linguistics, literature and cultural studies.

## Spanish, Minor

### College of Letters & Science

Ana Peluffo, Ph.D., Chairperson of the Department

Code	Title	Units
Choose one in each of the following five areas:		23-24
<b>Group 1</b>		
SPA 100	Principles of Hispanic Literature & Criticism	
SPA 100S	Principles of Hispanic Literature & Criticism	
SPA 141	Introduction to Spanish Culture	
SPA 141S	Introduction to Spanish Culture	
SPA 170	Introduction to Latin American Culture	
SPA 170S	Introduction to Latin American Culture	
<b>Group 2</b>		
SPA 111N	The Structure of Spanish: Sounds & Words	
SPA 115	History of the Spanish Language	
SPA 116	Applied Spanish Linguistics	
<b>Group 3</b>		
SPA 130	Survey of Spanish Literature to 1700	
SPA 131N	Survey of Spanish Literature: 1700 to Present	
SPA 134A	Don Quijote I	
SPA 142	Special Topics in Spanish Cultural & Literary Studies	
<b>Group 4</b>		

## Spanish, Master of Arts

### College of Letters & Science

### Department Office

210 Sproul Hall; 530-752-2239; Graduate Program (<https://spanish.ucdavis.edu/graduate-program/>)

### Graduate Study

The Department offers courses leading to the M.A. degree in Spanish to students who have completed with distinction the A.B. degree in Spanish, or the equivalent. Candidates will be recommended for admission to graduate studies in Spanish provided they meet the requirements of the Graduate Studies office and the Department of Spanish & Portuguese. The Department also offers programs of study and research leading to the Ph.D. degree. Detailed information may be obtained by writing to the Chairperson or the Graduate Director of the Spanish & Portuguese Department.

### Graduate Advisor

Claudia Sanchez-Gutierrez (<https://spanish.ucdavis.edu/people/claudia-sanchez-gutierrez/>)

## Spanish, Doctor of Philosophy

### College of Letters & Science

### Department Office

210 Sproul Hall; 530-752-2239; Graduate Program (<https://spanish.ucdavis.edu/graduate-program/>)

### Graduate Study

The Department offers courses leading to the M.A. degree in Spanish to students who have completed with distinction the A.B. degree in Spanish, or the equivalent. Candidates will be recommended for admission to graduate studies in Spanish provided they meet the requirements of the

Graduate Studies office and the Department of Spanish & Portuguese. The Department also offers programs of study and research leading to the Ph.D. degree. Detailed information may be obtained by writing to the Chairperson or the Graduate Director of the Spanish & Portuguese Department.

## Graduate Advisor

Claudia Sanchez-Gutierrez (<https://spanish.ucdavis.edu/people/claudia-sanchez-gutierrez/>)

# Statistics

## College of Letters & Science

Alexander Aue, Ph.D., Chairperson of the Department; term ends June 30, 2023

The Statistics Department offers undergraduate programs in Statistics & Data Science and M.S. & Ph.D. programs in Statistics.

## Department Office

4118 Mathematical Sciences Building; Undergraduate Advising (<https://statistics.ucdavis.edu/undergrad/advising/>); Graduate Advising (<https://statistics.ucdavis.edu/grad/>); Statistics; (<https://statistics.ucdavis.edu/faculty>) (<https://statistics.ucdavis.edu/people>)

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- Statistics, Bachelor of Arts (p. 447)
- Statistics, Bachelor of Science (p. 448)
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  - Computational Statistics Track (p. )
  - General Statistics Track (p. )
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## Graduate Programs

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- Data Science, Bachelor of Science (p. 446)
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- Statistics, Bachelor of Science (p. 448)
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# Data Science, Bachelor of Science

## College of Letters & Science

**The Data Science program has a capped admission process. Information about the requirements for continuing students to change majors into Data Science can be found at Department of Statistics (<https://statistics.ucdavis.edu/undergrad/advising/change-of-major/data-science/>).**

## The Major Program

Data Science combines computational, mathematical and statistical reasoning to draw conclusions based on data. Data science techniques and methods can be applied to problems from virtually any discipline; for example, in agricultural and environmental sciences, biological sciences, engineering, medical sciences and social sciences.

## The Program

Data Science majors receive a Bachelor of Science degree. The program requires both theoretical and applied course work to underscore the strong interdependence of technical foundations in computer science, engineering, mathematics and statistics, and their applications to any field of inquiry relying on quantitative data analysis. The B.S. degree program has one track, the Foundations track.

**B.S. in Data Science-Foundations Track** emphasizes the underlying computer science, engineering, mathematics and statistics methodology and theory, and is especially recommended as preparation for graduate study in data science or related fields.

## Career Opportunities

Inferential and computational techniques are used in many fields, including the agricultural and environmental sciences, biological sciences, social sciences, and health sciences, business, and engineering. The wide applicability of data science is reflected in the strong demand for graduates with data science training in both the public and private sectors. Employment opportunities include careers in data & policy analysis in government & industry, tech industry, insurance & healthcare industry, engineering, public health, biological & pharmaceutical research, law, and education. Students with an undergraduate degree in data science may enter advanced studies in data science, computer science, applied mathematics, statistics, economics, finance, psychology, medicine, business management & analytics, and other professional school programs.

## Major Advisor

For a current list of faculty and staff advisors in the Department of Statistics, see Undergraduate Advising (<https://statistics.ucdavis.edu/undergrad/advising/>).

## Foundations Track

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Computer Science Engineering</i>		
ECS 017	Data, Logic, & Computing	4
ECS 032A	Introduction to Programming	4
ECS 032B	Introduction to Data Structures	4
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 022A	Linear Algebra	3
<i>Statistics</i>		
STA 035A	Statistical Data Science I	4
STA 035B	Statistical Data Science II	4
STA 035C	Statistical Data Science III	4
Preparatory Subject Matter Subtotal		39

<b>Depth Subject Matter</b>		
<i>Computer Science Engineering</i>		12
ECS 116	Databases for Non-Majors	
ECS 117	Algorithms for Data Science	
ECS 119	(Pending Approval)	
<i>Probability &amp; Statistics</i>		12
STA 108	Applied Statistical Methods: Regression Analysis	
STA 141A	Fundamentals of Statistical Data Science	
MAT 135A or STA 131A	Probability Introduction to Probability Theory	
<i>Machine Learning</i>		
Choose one:		4
ECS 111	Applied Machine Learning for Non-Majors (Pending Approval)	
MAT 170	Mathematics for Data Analytics & Decision Making	
STA 142A	Statistical Learning I	
<i>Mathematics</i>		8
MAT 168	Optimization	
MAT 167 or ECS 130	Applied Linear Algebra Scientific Computation	
<i>Science &amp; Technology Studies</i>		4
STS 101	Data & Society	
<b>Upper Division Electives</b>		
Three elective courses in a related discipline. A list of pre-approved electives can be found on the Department of Statistics website.		12
Depth Subject Matter Subtotal		52
<b>Total Units</b>		91

## Major Advisors

For a current list of faculty and staff advisors, see Undergraduate Advising (<https://statistics.ucdavis.edu/undergrad/advising/>).

Students are encouraged to meet with an advisor to plan a program as early as possible.

## Career Alternatives

Probability models, statistical methods, and computational techniques are used in a great many fields, including the biological, physical, social, and health sciences, business, and engineering. The wide applicability of statistics is reflected in the strong demand for graduates with statistical training in both the public and private sectors. Employment opportunities include careers in data & policy analysis in government & industry, financial management, quality control, insurance & healthcare industry, actuarial science, engineering, public health, biological and pharmaceutical research, law, and education. Students with an undergraduate degree in statistics have entered advanced studies in statistics, economics, finance, psychology, medicine, business management & analytics, and other professional school programs.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
Choose a series:		
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	9-12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
MAT 021 series preferred.		
MAT 022A	Linear Algebra	3
<i>Computer Science Engineering</i>		
ECS 032A or ECS 036A	Introduction to Programming Programming & Problem Solving	4
<i>Statistics</i>		
Choose one:		4
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
STA 032 or STA 100 preferred		
Preparatory Subject Matter Subtotal		20-23
<b>Depth Subject Matter</b>		
<i>Core Coursework</i>		
<i>Statistics</i>		
STA 106	Applied Statistical Methods: Analysis of Variance	24
STA 108	Applied Statistical Methods: Regression Analysis	
STA 130A	Mathematical Statistics: Brief Course	
STA 130B	Mathematical Statistics: Brief Course	
STA 138	Analysis of Categorical Data	

# Statistics, Bachelor of Arts

College of Letters & Science

## The Major Program

Statistics enables us to make inferences about entire populations, based on samples extracted from those populations. Statistical methods can be applied to problems from almost every discipline and they are vitally important to researchers in agricultural, biological, environmental, social, engineering, and medical sciences.

## The Program

Statistics majors may receive either a Bachelor of Arts (A.B.) or a Bachelor of Science (B.S.) degree. Both the A.B. and the B.S. programs require theoretical and applied course work and underscore the strong interdependence of statistical theory and the applications and computational aspects of statistics. The B.S. degree program has five tracks: Applied Statistics Track, Computational Statistics Track, General Track, Machine Learning Track, and the Statistical Data Science Track. The A.B. degree program has one track.

**A.B. in Statistics-Applied Statistics Track** emphasizes statistical applications. This track is recommended for students who are interested in applications of statistical techniques to various disciplines, especially the social sciences.

STA 137 or STA 141A	Applied Time Series Analysis Fundamentals of Statistical Data Science	
<b>Restricted Electives</b>		
Choose three:		12
STA 104	Applied Statistical Methods: Nonparametric Statistics	
STA 135	Multivariate Data Analysis	
STA 137	Applied Time Series Analysis	
STA 141A	Fundamentals of Statistical Data Science	
STA 141B	Data & Web Technologies for Data Analysis	
Only one of STA 141B or STA 141C can be used as an elective.		
STA 141C	Big Data & High Performance Statistical Computing	
Only one of STA 141B or STA 141C can be used as an elective.		
STA 144	Sampling Theory of Surveys	
STA 145	Bayesian Statistical Inference	
STA 160	Practice in Statistical Data Science	
MAT 168	Optimization	
With advisor approval, one of STA 194HA or STA 194HB or STA 199 may be used as an elective. The course must be taken for four units.		
STA 194HA	Special Studies for Honors Students	
STA 194HB	Special Studies for Honors Students	
STA 199	Special Study for Advanced Undergraduates	
<b>Note:</b> A course used to fulfill a core requirement cannot be used as a restricted elective.		
<b>Cluster Electives</b>		
Choose three upper division elective courses outside of Statistics.		9-12
Depth Subject Matter Subtotal		45-48
<b>Total Units</b>		<b>65-71</b>

## Statistics, Bachelor of Science

College of Letters & Science

### The Major Program

Statistics enables us to make inferences about entire populations, based on samples extracted from those populations. Statistical methods can be applied to problems from almost every discipline and they are vitally important to researchers in agricultural, biological, environmental, social, engineering, and medical sciences.

### The Program

Statistics majors may receive either a Bachelor of Arts or a Bachelor of Science degree. Both the A.B. and the B.S. programs require theoretical and applied course work and underscore the strong interdependence of statistical theory and the applications and computational aspects of statistics. The B.S. degree program has five tracks: Applied Statistics

Track, Computational Statistics Track, General Track, Machine Learning Track, and the Statistical Data Science Track.

**B.S. in Statistics-Applied Statistics Track** emphasizes statistical applications. This track is recommended for students who are interested in applications of statistical techniques to various disciplines including the biological, physical and social sciences.

**B.S. in Statistic-Computational Statistics Track** emphasizes computing. This track is recommended for students interested in the computational and data management aspects of statistical analysis.

**B.S. in Statistics-General Track** emphasizes statistical theory and is especially recommended as preparation for graduate study in statistics.

**B.S. in Statistics-Machine Learning Track** emphasizes algorithmic and theoretical aspects of statistical learning methodologies that are geared towards building predictive and explanatory models for large and complex data. It is recommended for students interested in pursuing graduate programs in statistics, machine learning, or data science, as well as for students interested in learning statistical techniques for industry.

**B.S. in Statistic-Statistical Data Science Track** emphasizes data handling skills and statistical computation. This track is recommended for students interested in statistical learning methodology, advanced data handling techniques and computational aspects of statistical analysis.

### Major Advisors

For a current list of faculty and staff advisors, see Undergraduate Advising (<https://statistics.ucdavis.edu/undergrad/advising/>).

Students are encouraged to meet with an advisor to plan a program as early as possible.

### Career Alternatives

Probability models, statistical methods, and computational techniques are used in a great many fields, including the biological, physical, social, and health sciences, business, and engineering. The wide applicability of statistics is reflected in the strong demand for graduates with statistical training in both the public and private sectors. Employment opportunities include careers in data & policy analysis in government & industry, financial management, quality control, insurance & healthcare industry, actuarial science, engineering, public health, biological & pharmaceutical research, law, and education. Students with an undergraduate degree in statistics have entered advanced studies in statistics, economics, finance, psychology, medicine, business management & analytics, and other professional school programs.

### Applied Statistics Track

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
Choose a series:		9-12
MAT 016A & MAT 016B & MAT 016C	Short Calculus and Short Calculus and Short Calculus	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	

MAT 021A	Calculus		<i>Cluster Electives</i>	
& MAT 021B	and Calculus		Choose four upper division elective courses outside of statistics:	12-16
& MAT 021C	and Calculus		Cluster electives are chosen with and must be approved by the major advisor. A list of pre-approved electives can be found on the Statistics Department website. Electives must follow a coherent sequence in one single discipline/cluster where statistical methods and models are applied. At least three of the cluster electives must cover the quantitative aspects of the discipline.	
MAT 021 series preferred.				
MAT 022A	Linear Algebra	3		
<i>Computer Science Engineering</i>				
ECS 032A or ECS 036A	Introduction to Programming Programming & Problem Solving	4		
<i>Statistics</i>				
Choose one:		4	Depth Subject Matter Subtotal	48-52
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics		Total Units	75-83
STA 032	Gateway to Statistical Data Science			
STA 100	Applied Statistics for Biological Sciences			
STA 032 or STA 100 preferred.				
<i>Cluster Elective Prerequisites</i>				
Two introductory courses serving as the prerequisites to the chosen Cluster Electives (see <b>Cluster Electives</b> section below).		7-8		
<b>Note:</b> Additional coursework beyond this requirement may be needed to fulfill the Cluster Elective prerequisites.				
Preparatory Subject Matter Subtotal		27-31		
<b>Depth Subject Matter</b>				
<i>Core Coursework</i>				
Statistics		24		
STA 106	Applied Statistical Methods: Analysis of Variance			
STA 108	Applied Statistical Methods: Regression Analysis			
STA 130A	Mathematical Statistics: Brief Course			
STA 130B	Mathematical Statistics: Brief Course			
STA 138	Analysis of Categorical Data			
STA 141A	Fundamentals of Statistical Data Science			
<i>Restricted Electives</i>				
Choose three:		12		
STA 104	Applied Statistical Methods: Nonparametric Statistics		Preparatory Subject Matter Subtotal	27-28
STA 135	Multivariate Data Analysis			
STA 137	Applied Time Series Analysis			
STA 141B	Data & Web Technologies for Data Analysis			
Only one of STA 141B or STA 141C can be used as an elective.				
STA 141C	Big Data & High Performance Statistical Computing			
Only one of STA 141B or STA 141C can be used as an elective.				
STA 144	Sampling Theory of Surveys			
STA 145	Bayesian Statistical Inference			
STA 160	Practice in Statistical Data Science			
MAT 168	Optimization			
With advisor approval, one of STA 194HA or STA 194HB or STA 199 may be used as an elective. The course must be taken for four units.				
STA 194HA	Special Studies for Honors Students			
STA 194HB	Special Studies for Honors Students			
STA 199	Special Study for Advanced Undergraduates			
<i>Cluster Electives</i>				
Choose four upper division elective courses outside of statistics:		12-16		
Cluster electives are chosen with and must be approved by the major advisor. A list of pre-approved electives can be found on the Statistics Department website. Electives must follow a coherent sequence in one single discipline/cluster where statistical methods and models are applied. At least three of the cluster electives must cover the quantitative aspects of the discipline.				
<i>Depth Subject Matter Subtotal</i>		48-52		
<b>Total Units</b>		75-83		
<b>Computational Statistics Track</b>				
<b>Code</b>	<b>Title</b>		<b>Units</b>	
<b>Preparatory Subject Matter</b>				
<i>Mathematics</i>				
MAT 021A	Calculus		4	
MAT 021B	Calculus		4	
MAT 021C	Calculus		4	
MAT 021D	Vector Analysis		4	
MAT 022A	Linear Algebra		3	
<i>Computer Science Engineering</i>				
Choose one:			4-5	
ECS 034	Software Development in UNIX & C++			
ECS 036C	Data Structures, Algorithms, & Programming			
Or the equivalent.				
<i>Statistics</i>				
Choose one:			4	
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics			
STA 032	Gateway to Statistical Data Science			
STA 100	Applied Statistics for Biological Sciences			
STA 032 or STA 100 preferred.				
Preparatory Subject Matter Subtotal			27-28	
<b>Depth Subject Matter</b>				
<i>Statistics</i>				
STA 106	Applied Statistical Methods: Analysis of Variance		4	
STA 108	Applied Statistical Methods: Regression Analysis		4	
STA 131A	Introduction to Probability Theory		4	
STA 131B	Introduction to Mathematical Statistics		4	
STA 141A	Fundamentals of Statistical Data Science		4	
Choose two:			8	
STA 104	Applied Statistical Methods: Nonparametric Statistics			
STA 135	Multivariate Data Analysis			
STA 137	Applied Time Series Analysis			
STA 138	Analysis of Categorical Data			
STA 142A	Statistical Learning I			
STA 142B	Statistical Learning II			
STA 144	Sampling Theory of Surveys			

STA 145	Bayesian Statistical Inference	<b>Statistics</b>
STA 160	Practice in Statistical Data Science	Choose one:
	With advisor approval, one of STA 194HA or STA 194HB or STA 199 may be used as an elective. The course must be taken for four units.	4
STA 194HA	Special Studies for Honors Students	STA 013 Elementary Statistics or STA 013Y Elementary Statistics
STA 194HB	Special Studies for Honors Students	STA 032 Gateway to Statistical Data Science
STA 199	Special Study for Advanced Undergraduates	STA 100 Applied Statistics for Biological Sciences STA 032 or STA 100 preferred.
<i>Programming, Data Management &amp; Data Technologies</i>		Preparatory Subject Matter Subtotal
ECS 130	Scientific Computation	27-28
or ECS 145	Scripting Languages & Their Applications	
ECS 165A	Database Systems	Depth Subject Matter
<i>Scientific Computational Algorithm &amp; Visualization</i>		<b>Core Coursework</b>
Choose two:	8	Statistics
ECS 122A	Algorithm Design & Analysis	STA 106 Applied Statistical Methods: Analysis of Variance
ECS 129	Computational Structural Bioinformatics	STA 108 Applied Statistical Methods: Regression Analysis
ECS 140A	Programming Languages	STA 131A Introduction to Probability Theory
ECS 158	Programming on Parallel Architectures	STA 131B Introduction to Mathematical Statistics
ECS 163	Information Interfaces	STA 131C Introduction to Mathematical Statistics
STA 141B	Data & Web Technologies for Data Analysis	STA 138 Analysis of Categorical Data
STA 141C	Big Data & High Performance Statistical Computing	<b>Mathematics</b>
<i>Mathematics</i>		16
Choose two:	8	MAT 108 Introduction to Abstract Mathematics or MAT 127C Real Analysis
MAT 124	Mathematical Biology	MAT 127A Real Analysis
MAT 128A	Numerical Analysis	MAT 127B Real Analysis
MAT 128B	Numerical Analysis in Solution of Equations	MAT 167 Applied Linear Algebra
MAT 129	Fourier Analysis	<b>Restricted Electives</b>
MAT 145	Combinatorics	Choose three: 12
MAT 148	Discrete Mathematics	STA 104 Applied Statistical Methods: Nonparametric Statistics
MAT 170	Mathematics for Data Analytics & Decision Making	STA 135 Multivariate Data Analysis
MAT 165	Mathematics & Computers	STA 137 Applied Time Series Analysis
MAT 167	Applied Linear Algebra	STA 141A Fundamentals of Statistical Data Science
MAT 168	Optimization	STA 141B Data & Web Technologies for Data Analysis
Depth Subject Matter Subtotal		Only one of STA 141B or STA 141C can be used as an elective.
Total Units	79-80	STA 141C Big Data & High Performance Statistical Computing
<b>General Statistics Track</b>		Only one of STA 141B or STA 141C can be used as an elective.
<b>Code</b>	<b>Title</b>	<b>Units</b>
<b>Preparatory Subject Matter</b>		
<i>Mathematics</i>		
MAT 021A	Calculus	4
MAT 021B	Calculus	4
MAT 021C	Calculus	4
MAT 021D	Vector Analysis	4
MAT 022A	Linear Algebra	3-4
or MAT 067	Modern Linear Algebra	
<i>Computer Science Engineering</i>		
ECS 032A	Introduction to Programming	4
or ECS 036A	Programming & Problem Solving	
<i>Related Elective Course</i>		

One upper division course outside of Statistics approved by major advisor. A list of pre-approved electives can be found on the <b>Statistics Department website</b> . The Related Elective should be in mathematics, computer science or cover quantitative aspects of a substantive discipline.		3-4	STA 137	Applied Time Series Analysis		
Depth Subject Matter Subtotal		55-56	STA 138	Analysis of Categorical Data		
<b>Total Units</b>		<b>82-84</b>	STA 141B	Data & Web Technologies for Data Analysis		
			STA 141C	Big Data & High Performance Statistical Computing		
			STA 144	Sampling Theory of Surveys		
			STA 145	Bayesian Statistical Inference		
			MAT 127A	Real Analysis		
			MAT 128A	Numerical Analysis		
			MAT 170	Mathematics for Data Analytics & Decision Making		
			ECS 122A	Algorithm Design & Analysis		
			ECS 158	Programming on Parallel Architectures		
			ECS 163	Information Interfaces		
			ECS 160	Software Engineering		
			ECS 170	Introduction to Artificial Intelligence		
			ECS 174	Computer Vision		
Note: Additional coursework in Python is strongly recommended; e.g., ECS 032B.			With advisor approval, one of STA 194HA or STA 194HB or STA 199 may be used as an elective. The course must be taken for four units.			
			STA 194HA	Special Studies for Honors Students		
			STA 194HB	Special Studies for Honors Students		
			STA 199	Special Study for Advanced Undergraduates		
			<b>Note:</b> A course used to fulfill the core requirement cannot be used as an elective.			
Preparatory Subject Matter Subtotal		27	Depth Subject Matter Subtotal			
<b>Total Units</b>		<b>79</b>				
<b>Machine Learning Track</b>						
<b>Code</b>	<b>Title</b>	<b>Units</b>				
<b>Preparatory Subject Matter</b>						
<i>Mathematics</i>						
MAT 021A	Calculus	4				
MAT 021B	Calculus	4				
MAT 021C	Calculus	4				
MAT 021D	Vector Analysis	4				
MAT 022A	Linear Algebra	3				
<i>Computer Science Engineering</i>						
ECS 032A or ECS 036A	Introduction to Programming Programming & Problem Solving	4				
Note: Additional coursework in Python is strongly recommended; e.g., ECS 032B.						
<i>Statistics</i>						
Choose one:		4				
STA 013 or STA 013Y	Elementary Statistics Elementary Statistics					
STA 032	Gateway to Statistical Data Science					
STA 100	Applied Statistics for Biological Sciences					
STA 032 or STA 100 preferred.						
Preparatory Subject Matter Subtotal		27	Depth Subject Matter Subtotal			
<b>Depth Subject Matter</b>			<b>Total Units</b>			
<i>Core Coursework</i>						
<i>Statistics</i>						
STA 106	Applied Statistical Methods: Analysis of Variance					
STA 108	Applied Statistical Methods: Regression Analysis					
STA 131A	Introduction to Probability Theory					
STA 131B	Introduction to Mathematical Statistics					
STA 131C	Introduction to Mathematical Statistics					
STA 141A	Fundamentals of Statistical Data Science					
STA 142A	Statistical Learning I					
STA 142B	Statistical Learning II					
STA 144	Sampling Theory of Surveys					
or STA 145	Bayesian Statistical Inference					
<i>Mathematics</i>		4				
MAT 167 or MAT 168	Applied Linear Algebra Optimization					
<i>Restricted Electives</i>						
Choose three:		12	Preparatory Subject Matter Subtotal			
STA 104	Applied Statistical Methods: Nonparametric Statistics		<b>Depth Subject Matter</b>			
STA 135	Multivariate Data Analysis		<i>Core Coursework</i>			

Statistics		36
STA 106	Applied Statistical Methods: Analysis of Variance	
STA 108	Applied Statistical Methods: Regression Analysis	
STA 131A or STA 130A	Introduction to Probability Theory Mathematical Statistics: Brief Course	
STA 131B or STA 130B	Introduction to Mathematical Statistics Mathematical Statistics: Brief Course	
STA 135	Multivariate Data Analysis	
STA 141A	Fundamentals of Statistical Data Science	
STA 141B	Data & Web Technologies for Data Analysis	
STA 141C	Big Data & High Performance Statistical Computing	
STA 160	Practice in Statistical Data Science	
Machine Learning		4
STA 142A or ECS 171	Statistical Learning I Machine Learning	
Mathematics		4
MAT 167 or MAT 168	Applied Linear Algebra Optimization	
<i>Restricted Electives</i>		
Choose two:		8
STA 104	Applied Statistical Methods: Nonparametric Statistics	
STA 137	Applied Time Series Analysis	
STA 138	Analysis of Categorical Data	
STA 142A	Statistical Learning I	
STA 142B	Statistical Learning II	
STA 144	Sampling Theory of Surveys	
STA 145	Bayesian Statistical Inference	
MAT 128A	Numerical Analysis	
MAT 170	Mathematics for Data Analytics & Decision Making	
ECS 122A	Algorithm Design & Analysis	
ECS 158	Programming on Parallel Architectures	
ECS 163	Information Interfaces	
ECS 165A	Database Systems	
With advisor approval, one of STA 194HA or STA 194HB or STA 199 may be used as an elective. The course must be taken for four units.		
STA 194HA	Special Studies for Honors Students	
STA 194HB	Special Studies for Honors Students	
STA 199	Special Study for Advanced Undergraduates	
<b>Note:</b> A course used to fulfill a core requirement cannot be used as a restricted elective.		
Depth Subject Matter Subtotal		52
Total Units		79

## The Program

The Department offers a minor program in Statistics that consists of five upper division level courses focusing on the fundamentals of mathematical statistics and of the most widely used applied statistical methods.

### Minor Advisors

For a current list of faculty and staff advisors, see Undergraduate Advising (<https://statistics.ucdavis.edu/undergrad/advising/>).

Code	Title	Units
<i>Preparatory Coursework; not counted towards minor units</i>		
Choose one:		
STA 013/013Y	Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
Additional preparatory courses will be needed based on the course prerequisites listed in the catalog. At minimum, calculus at the level of MAT 016C or 017C or 021C is required.		
<i>Minor Requirements</i>		
STA 106	Applied Statistical Methods: Analysis of Variance	4
STA 108	Applied Statistical Methods: Regression Analysis	4
Choose a series:		8
STA 130A & STA 130B	Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course	
STA 131A & STA 131B	Introduction to Probability Theory and Introduction to Mathematical Statistics	
Choose one:		4
STA 101	Advanced Applied Statistics for the Biological Sciences	
STA 104	Applied Statistical Methods: Nonparametric Statistics	
STA 135	Multivariate Data Analysis	
STA 137	Applied Time Series Analysis	
STA 138	Analysis of Categorical Data	
STA 141A	Fundamentals of Statistical Data Science	
STA 141B	Data & Web Technologies for Data Analysis	
STA 141C	Big Data & High Performance Statistical Computing	
STA 142A	Statistical Learning I	
STA 142B	Statistical Learning II	
STA 144	Sampling Theory of Surveys	
STA 145	Bayesian Statistical Inference	
STA 160	Practice in Statistical Data Science	

**Total Units** 20

## Statistics, Master of Science

### College of Letters & Science

Alexander Aue, Ph.D., Chairperson of the Program  
Jie Peng, Ph.D., Vice Chairperson for Graduate Affairs

## Statistics, Minor

College of Letters & Science

## Graduate Study

The Graduate Program in Statistics offers programs of study and research leading to M.S. and Ph.D. degrees. The M.S. gives students a strong foundation in the theory of statistics as well as substantial familiarity with the most widely used statistical methods. Facility in computer programming is essential for some of the course work. The supervised statistical consulting required of all M.S. students has proven to be a valuable educational experience. The Ph.D. program combines advanced course work in statistics and probability with the opportunity for in-depth concurrent study in an applied field. For detailed information contact the Chairperson of the Program or the Graduate Advisor.

**Standard Track.** 32 units of core coursework and 12 units of electives are required for a total of 44 units.

**Emphasis in Data Science Track.** 36 units of core coursework and 12 units of electives are required for a total of 48 units.

Master's Program Information (<https://statistics.ucdavis.edu/grad/ms/>)

### Preparation

Preparation for the graduate program requires a year of calculus, a course in linear algebra, facility with a programming language and upper division coursework in mathematics and/or statistics.

Master's Program Admissions Information (<https://statistics.ucdavis.edu/grad/admissions/>)

### Graduate Advisor

Jie Peng (Statistics)

## Statistics, Doctor of Philosophy

### College of Letters & Science

Alexander Aue, Ph.D., Chairperson of the Program

Jie Peng, Ph.D., Vice Chairperson for Graduate Affairs

## Graduate Study

The Graduate Program in Statistics offers programs of study and research leading to M.S. and Ph.D. degrees. The M.S. gives students a strong foundation in the theory of statistics as well as substantial familiarity with the most widely used statistical methods. Facility in computer programming is essential for some of the course work. The supervised statistical consulting required of all M.S. students has proven to be a valuable educational experience. The Ph.D. program combines advanced course work in statistics and probability with the opportunity for in-depth concurrent study in an applied field. For detailed information contact the Chairperson of the Program or the Graduate Advisor.

Ph.D. Program Information (<https://statistics.ucdavis.edu/grad/phd/>)

### Preparation

Preparation for the Ph.D. program requires a year of calculus, a course in linear algebra, facility with a programming language and upper division coursework in mathematics and/or statistics, and at least one semester/two quarters of advanced calculus.

Ph.D. Program Admissions Information (<https://statistics.ucdavis.edu/grad/admissions/>)

## Graduate Advisor

Jie Peng (Statistics)

## Textiles (Graduate Group)

### Graduate Studies

You-Lo Hsieh, Ph.D., Chairperson of the Group

### Group Office

1204 RMI South; 530-752-3250; Jordan Dade; BFTV Advising (<https://www.bftv.ucdavis.edu/functional-area/advising/>)

- Textiles, Master of Science (p. 453)

## Textiles, Master of Science

### Graduate Studies

As of August 31, 2021, admissions to the program are suspended.

## Graduate Study

The Graduate Group in Textiles offers a program of study and research leading to the M.S. degree. Students in the program are trained in an interdisciplinary approach emphasizing the physical and behavioral science aspects of textiles. Research areas include chemical, physical, biochemical, and mechanical properties of fibers and polymers as well as fibrous assemblies, including fabrics, composites, paper, and nonwovens; and psychological and sociological factors relating to perception and consumption of textiles and apparel. Extensive specialized fiber, polymer, and textiles research facilities and a behavioral research laboratory are available. For detailed information regarding the program, contact the Chairperson of the Group.

### Graduate Advisors

Y.L. Hsieh, G. Sun, G. Berk

## Theatre & Dance

### College of Letters & Science

Margaret L. Kemp, M.F.A., Chairperson of the Department; term ends June 30, 2025

## Department Office

101 Art Building; 530-752-0888; Fax 530-752-8818; Theatre & Dance (<http://arts.ucdavis.edu/theatre-dance/>); Faculty (<http://arts.ucdavis.edu/theatre-dance-faculty/>)

- Dramatic Art, Master of Fine Arts (p. 453)
- Theatre & Dance, Bachelor of Arts (p. 454)
- Theatre & Dance, Minor (p. 457)

## Dramatic Art, Master of Fine Arts

### College of Letters & Science

## Department of Theatre & Dance

216A Art Building; 530-752-8710; Dramatic Art M.F.A. (<http://arts.ucdavis.edu/mfa-dramatic-art/>); Faculty (<http://arts.ucdavis.edu/theatre-dance-faculty/>)

## Graduate Study

The Department of Theatre & Dance offers programs of study and research leading to the M.F.A. in Dramatic Art (the interdisciplinary weaving of acting, directing, design, choreography and practice and research) and contributing to the Graduate Group Ph.D. in Performance Studies (p. 362). Detailed information may be obtained by contacting the Graduate Program Administrators: for the M.F.A. in Theatre & Dance, 530-752-8710; Graduate Group in Performance Studies (p. 362), 530-754-6973.

## Theatre & Dance, Bachelor of Arts

### College of Letters & Science

The A.B. degree in Theatre & Dance provides students with an appreciation for an understanding of performance and its role in culture and society. Students build skills in specific areas as well as a broad knowledge of theatre and dance.

## Productions & Facilities

Each year's schedule includes opportunities to work with professional artists (directors, choreographers and writers) in Granada Artists-in Residence productions, faculty and student-led workshops and productions, and the Film Festival at UC Davis. These productions are staged in our proscenium (Main), thrust (Wyatt), black box (Arena), performance studio (Della Davidson Performance Studio) and intimate laboratory theatre (Lab A). These productions are part of the academic program of the department and serve an important purpose in the study of theatre and dance. Participation is open to all students.

## Production Requirements

All students completing a major in Theatre & Dance must participate in productions, including work in at least two of the following three areas: performance (acting/dance), design, and directing/playwriting/stage management, as well as crew assignments and work in production labs.

## Graduate Study

The Department of Theatre & Dance offers programs of study and research leading to the M.F.A. in Dramatic Art (**admissions currently suspended**) and contributing to the Graduate Group Ph.D. in Performance Studies (<https://catalog.ucdavis.edu/departments-programs-degrees/performance-studies-graduate-group/>). Detailed information may be obtained by contacting the Graduate Program Administrator for the Graduate Group in Performance Studies (<https://catalog.ucdavis.edu/departments-programs-degrees/performance-studies-graduate-group/>), 530-754-6973.

## Major Requirements

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose DRA 021A or 4 units from DRA 040A, 040B, 042A, 042B:		4
DRA 021A      Fundamentals of Acting		
<b>OR 4 units from:</b>		
DRA 040A	Beginning Modern Dance	

DRA 040B	Intermediate Modern Dance	
DRA 042A	Beginning Ballet	
DRA 042B	Intermediate Ballet	
DRA 024	Visual Aspects of Dramatic Art	
DRA 028	Entertainment Engineering & Management: Stagecraft to Stage Management	
Choose three:		12
DRA 055	Contemporary Local, National & Global Theatre, Dance & Performance	
DRA 056A	History of Theatre & Dance I: Myth, Magic & Madness	
DRA 056B	History of Theatre & Dance II: Romance, Revenge & Rebellion	
DRA 056C	History of Theatre & Dance III: Sex, Society & the State	
Preparatory Subject Matter Subtotal		16
<b>Depth Subject Matter</b>		
Choose two:		8
DRA 142	History of Modern Dance	
DRA 150	American Theatre & Drama	
DRA 155	Representing Race in Performance	
DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean	
DRA 156A	Performance Analysis	
DRA 156B	Theatre in History & Place: Local, National & Global Conditions for Production	
DRA 156C	Modern Aesthetic Movements in Performance	
DRA 156D	Theatre History Through Shakespeare	
DRA 158	Performance Studies Undergraduate Seminar	
DRA 159	Contemporary Experimental Performance, Theatre & Drama	
Choose one:		4
DRA 124A	Principles of Theatrical Design: Scenery	
DRA 124B	Principles of Theatrical Design: Scenery	
DRA 124C	Principles of Theatrical Design: Lighting	
DRA 124D	Principles of Theatrical Design: Costume	
DRA/CTS 124E	Costume Design for Film	
DRA 126	Principles of Performing Arts Stage Management	
DRA 126A	Topics in Entertainment Engineering	
DRA 128	Principles of Theatre Sound	
Choose one:		4
DRA 120	Intermediate Acting/Gateway: The Actor's Toolkit	
DRA 141	Introduction to the Fundamentals of Movement	
DRA 144A	Introduction to Traditional Chinese Embodied Culture	
DRA 146A	Professional Track Modern Dance I	
Choose one:		4
DRA 127A	Principles of Directing	
DRA 140A	Dance Composition	

DRA 160A	Principles of Playwriting		DRA 156B	Theatre in History & Place: Local, National & Global Conditions for Production
Choose 8 units:		8	DRA 156C	Modern Aesthetic Movements in Performance
DRA 114	Theatre on Film		DRA 156D	Theatre History Through Shakespeare
DRA 115	Advanced Study of Major Film Makers		DRA 158	Performance Studies Undergraduate Seminar
DRA/CTS 116	Design on Screen		DRA 159	Contemporary Experimental Performance, Theatre & Drama
DRA 120	Intermediate Acting/Gateway: The Actor's Toolkit		DRA 160A	Principles of Playwriting
DRA 121A	Advanced Acting: Scene Study & Script Analysis		DRA 160B	Principles of Playwriting
DRA 121B	Advanced Acting: Rehearsal Processes & Practices		DRA 170	Media Theatre
DRA 121C	Advanced Acting: Character & Style		DRA 174/CDM 107	Acting for Camera
DRA 122A	Advanced Acting: Devising & Collaboration		DRA/TCS 175	Small Scale Film Production
DRA 122B	Advanced Acting: Shakespeare & His Contemporaries		DRA 185A	Special Topics: Artist in Residence-Seminar
DRA 122C	Advanced Acting: Special Topics in Acting		DRA 185B	Special Topics: Artist in Residence-Studio
DRA 124A	Principles of Theatrical Design: Scenery		Choose 6 units from at least two of:	
DRA 124B	Principles of Theatrical Design: Scenery		DRA 145	Directed Choreography Projects
DRA 124C	Principles of Theatrical Design: Lighting		DRA 180A	Theatre Laboratory: Performance
DRA 124D	Principles of Theatrical Design: Costume		DRA 180B	Theatre Laboratory: Design
DRA/CTS 124E	Costume Design for Film		DRA 180C	Theatre Laboratory: Management, Directing, other Production Team
DRA 125	Scenic Painting: Studio		Choose 4 units:	
DRA 126	Principles of Performing Arts Stage Management		DRA 180D	Theatre Laboratory: Crew
DRA 126A	Topics in Entertainment Engineering		Choose 2 units:	
DRA 127A	Principles of Directing		DRA 180E	Theatre Laboratory: Scenic
DRA 127B	Principles of Directing		DRA 180F	Theatre Laboratory: Costume
DRA 128	Principles of Theatre Sound		DRA 180G	Theatre Laboratory: Lighting/Sound/Projection
DRA 130	Approaches to Theatrical Design: Practice & Theory		DRA 195	Senior Capstone Experience
DRA 135	Voice in Performance		Depth Subject Matter Subtotal	40
DRA 140A	Dance Composition		Total Units	56
DRA 140B	Dance Composition			
DRA 140C	Dance Composition			
DRA 141	Introduction to the Fundamentals of Movement			
DRA 142	History of Modern Dance			
DRA 143	Dance & Movement Studio			
DRA 144A	Introduction to Traditional Chinese Embodied Culture			
DRA 144B	Traditional Chinese Physical Culture			
DRA 144C	Daoist Philosophy in Traditional Chinese Movement Culture			
DRA 146A	Professional Track Modern Dance I			
DRA 146B	Professional Track Modern Dance II			
DRA 146C	Professional Track Modern Dance III			
DRA 150	American Theatre & Drama			
DRA 151	Musicals: History, Practice & Production			
DRA 153	Latinx Theatre & Performance			
DRA 154	Asian Theatre & Drama: Contexts & Forms			
DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean			
DRA 156A	Performance Analysis			

## Honors Major Requirements

Code	Title	Units
<b>Preparatory Subject Matter</b>		
Choose DRA 021A or 4 units from DRA 040A, 040B, 042A, 042B:		4
DRA 021A	Fundamentals of Acting	
OR 4 units from:		
DRA 040A	Beginning Modern Dance	
DRA 040B	Intermediate Modern Dance	
DRA 042A	Beginning Ballet	
DRA 042B	Intermediate Ballet	
DRA 024	Visual Aspects of Dramatic Art	4
DRA 028	Entertainment Engineering & Management: Stagecraft to Stage Management	4
Choose three:		12
DRA 055	Contemporary Local, National & Global Theatre, Dance & Performance	
DRA 056A	History of Theatre & Dance I: Myth, Magic & Madness	
DRA 056B	History of Theatre & Dance II: Romance, Revenge & Rebellion	

DRA 056C	History of Theatre & Dance III: Sex, Society & the State		DRA 180D	Theatre Laboratory: Crew
Preparatory Subject Matter Subtotal		24	Choose one:	
<b>Depth Subject Matter</b>			DRA 180E	Theatre Laboratory: Scenic
Choose two:		8	DRA 180F	Theatre Laboratory: Costume
DRA 114	Theatre on Film		DRA 180G	Theatre Laboratory: Lighting/Sound/Projection
DRA/CTS 116	Design on Screen		Choose 16 units:	16
DRA 142	History of Modern Dance		At least 8 of these units must be in a specific area determined in consultation with a faculty advisor and reflecting preparation for the honors project. Courses from other departments may be used to fulfill this requirement with permission of Chair and faculty advisor. Consult the Theatre & Dance advisor for alternative course options for fulfilling this requirement	
DRA 150	American Theatre & Drama		DRA 114	Theatre on Film
DRA 151	Musicals: History, Practice & Production		DRA 115	Advanced Study of Major Film Makers
DRA 153	Latinx Theatre & Performance		DRA/CTS 116	Design on Screen
DRA 154	Asian Theatre & Drama: Contexts & Forms		DRA 120	Intermediate Acting/Gateway: The Actor's Toolkit
DRA 155	Representing Race in Performance		DRA 121A	Advanced Acting: Scene Study & Script Analysis
DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean		DRA 121B	Advanced Acting: Rehearsal Processes & Practices
DRA 156A	Performance Analysis		DRA 121C	Advanced Acting: Character & Style
DRA 156B	Theatre in History & Place: Local, National & Global Conditions for Production		DRA 122A	Advanced Acting: Devising & Collaboration
DRA 156C	Modern Aesthetic Movements in Performance		DRA 122B	Advanced Acting: Shakespeare & His Contemporaries
DRA 156D	Theatre History Through Shakespeare		DRA 122C	Advanced Acting: Special Topics in Acting
DRA 158	Performance Studies Undergraduate Seminar		DRA 124A	Principles of Theatrical Design: Scenery
DRA 159	Contemporary Experimental Performance, Theatre & Drama		DRA 124B	Principles of Theatrical Design: Scenery
Choose one:		4	DRA 124C	Principles of Theatrical Design: Lighting
DRA 124A	Principles of Theatrical Design: Scenery		DRA 124D	Principles of Theatrical Design: Costume
DRA 124B	Principles of Theatrical Design: Scenery		DRA/CTS 124E	Costume Design for Film
DRA 124C	Principles of Theatrical Design: Lighting		DRA 126	Principles of Performing Arts Stage Management
DRA 124D	Principles of Theatrical Design: Costume		DRA 126A	Topics in Entertainment Engineering
DRA/CTS 124E	Costume Design for Film		DRA 127A	Principles of Directing
DRA 126	Principles of Performing Arts Stage Management		DRA 127B	Principles of Directing
DRA 126A	Topics in Entertainment Engineering		DRA 128	Principles of Theatre Sound
DRA 128	Principles of Theatre Sound		DRA 130	Approaches to Theatrical Design: Practice & Theory
Choose one:		4	DRA 135	Voice in Performance
DRA 120	Intermediate Acting/Gateway: The Actor's Toolkit		DRA 140A	Dance Composition
DRA 141	Introduction to the Fundamentals of Movement		DRA 140B	Dance Composition
DRA 144A	Introduction to Traditional Chinese Embodied Culture		DRA 140C	Dance Composition
DRA 146A	Professional Track Modern Dance I		DRA 141	Introduction to the Fundamentals of Movement
Choose one:		4	DRA 142	History of Modern Dance
DRA 127A	Principles of Directing		DRA 143	Dance & Movement Studio
DRA 140A	Dance Composition		DRA 144A	Introduction to Traditional Chinese Embodied Culture
DRA 160A	Principles of Playwriting		DRA 144B	Traditional Chinese Physical Culture
Choose 6 units from at least two of:		6	DRA 144C	Daoist Philosophy in Traditional Chinese Movement Culture
DRA 145	Directed Choreography Projects			
DRA 180A	Theatre Laboratory: Performance			
DRA 180B	Theatre Laboratory: Design			
DRA 180C	Theatre Laboratory: Management, Directing, other Production Team			
Choose 4 units:		4		

DRA 146A	Professional Track Modern Dance I	DRA 158	Performance Studies Undergraduate Seminar
DRA 146B	Professional Track Modern Dance II	DRA 159	Contemporary Experimental Performance, Theatre & Drama
DRA 146C	Professional Track Modern Dance III		
DRA 150	American Theatre & Drama	Choose 8 units:	
DRA 151	Musicals: History, Practice & Production	DRA 114	Theatre on Film
DRA 153	Latinx Theatre & Performance	DRA 115	Advanced Study of Major Film Makers
DRA 154	Asian Theatre & Drama: Contexts & Forms	DRA/CTS 116	Design on Screen
DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean	DRA 120	Intermediate Acting/Gateway: The Actor's Toolkit
DRA 156A	Performance Analysis	DRA 121A	Advanced Acting: Scene Study & Script Analysis
DRA 156B	Theatre in History & Place: Local, National & Global Conditions for Production	DRA 121B	Advanced Acting: Rehearsal Processes & Practices
DRA 156C	Modern Aesthetic Movements in Performance	DRA 121C	Advanced Acting: Character & Style
DRA 156D	Theatre History Through Shakespeare	DRA 122A	Advanced Acting: Devising & Collaboration
DRA 158	Performance Studies Undergraduate Seminar	DRA 122B	Advanced Acting: Shakespeare & His Contemporaries
DRA 159	Contemporary Experimental Performance, Theatre & Drama	DRA 122C	Advanced Acting: Special Topics in Acting
DRA 160A	Principles of Playwriting	DRA 124A	Principles of Theatrical Design: Scenery
DRA 160B	Principles of Playwriting	DRA 124B	Principles of Theatrical Design: Scenery
DRA 170	Media Theatre	DRA 124C	Principles of Theatrical Design: Lighting
DRA 174/CDM 107	Acting for Camera	DRA 124D	Principles of Theatrical Design: Costume
DRA/TCS 175	Small Scale Film Production	DRA/CTS 124E	Costume Design for Film
DRA 185A	Special Topics: Artist in Residence-Seminar	DRA 125	Scenic Painting: Studio
DRA 185B	Special Topics: Artist in Residence-Studio	DRA 126	Principles of Performing Arts Stage Management
DRA 194HA	Special Study for Honors Students	DRA 126A	Topics in Entertainment Engineering
DRA 194HB	Special Study for Honors Students	DRA 127A	Principles of Directing
DRA 195	Senior Capstone Experience	DRA 127B	Principles of Directing
Depth Subject Matter Subtotal		DRA 128	Principles of Theatre Sound
<b>Total Units</b>	<b>80</b>	DRA 130	Approaches to Theatrical Design: Practice & Theory
		DRA 135	Voice in Performance
		DRA 140A	Dance Composition
		DRA 140B	Dance Composition
		DRA 140C	Dance Composition
		DRA 141	Introduction to the Fundamentals of Movement
		DRA 142	History of Modern Dance
		DRA 143	Dance & Movement Studio
		DRA 144A	Introduction to Traditional Chinese Embodied Culture
		DRA 144B	Traditional Chinese Physical Culture
		DRA 144C	Daoist Philosophy in Traditional Chinese Movement Culture
		DRA 146A	Professional Track Modern Dance I
		DRA 146B	Professional Track Modern Dance II
		DRA 146C	Professional Track Modern Dance III
		DRA 150	American Theatre & Drama
		DRA 151	Musicals: History, Practice & Production
		DRA 153	Latinx Theatre & Performance
		DRA 154	Asian Theatre & Drama: Contexts & Forms
		DRA 155	Representing Race in Performance

## Theatre & Dance, Minor

College of Letters & Science

Code	Title	Units
Choose two:		8
DRA 114	Theatre on Film	
DRA/CTS 116	Design on Screen	
DRA 142	History of Modern Dance	
DRA 150	American Theatre & Drama	
DRA 151	Musicals: History, Practice & Production	
DRA 153	Latinx Theatre & Performance	
DRA 154	Asian Theatre & Drama: Contexts & Forms	
DRA 155	Representing Race in Performance	
DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean	
DRA 156A	Performance Analysis	
DRA 156B	Theatre in History & Place: Local, National & Global Conditions for Production	
DRA 156C	Modern Aesthetic Movements in Performance	
DRA 156D	Theatre History Through Shakespeare	

DRA/AAS 155A	African American Dance & Culture in the United States, Brazil & the Caribbean
DRA 156A	Performance Analysis
DRA 156B	Theatre in History & Place: Local, National & Global Conditions for Production
DRA 156C	Modern Aesthetic Movements in Performance
DRA 156D	Theatre History Through Shakespeare
DRA 158	Performance Studies Undergraduate Seminar
DRA 159	Contemporary Experimental Performance, Theatre & Drama
DRA 160A	Principles of Playwriting
DRA 160B	Principles of Playwriting
DRA 170	Media Theatre
DRA 174/CDM 107	Acting for Camera
DRA/TCS 175	Small Scale Film Production
DRA 185A	Special Topics: Artist in Residence-Seminar
DRA 185B	Special Topics: Artist in Residence-Studio
Choose 2 units:	2
DRA 180D	Theatre Laboratory: Crew
Choose 4 units:	4
DRA 145	Directed Choreography Projects
DRA 180A	Theatre Laboratory: Performance
DRA 180B	Theatre Laboratory: Design
DRA 180C	Theatre Laboratory: Management, Directing, other Production Team
DRA 180E	Theatre Laboratory: Scenic
DRA 180F	Theatre Laboratory: Costume
DRA 180G	Theatre Laboratory: Lighting/Sound/Projection
Total Units	22

## Transportation Technology & Policy (Graduate Group)

### Graduate Studies

Susan Handy (<https://its.ucdavis.edu/people/susan-handy/>), Ph.D., Chairperson of the Group

Annemarie Schaaf, Graduate Program Coordinator

### Group Office

Institute of Transportation Studies (<https://its.ucdavis.edu/>), West Village, 1605 Tilia Street, Suite 100; 530-752-0247; Transportation Technology & Policy Graduate Group (<https://its.ucdavis.edu/transportation-technology-policy-graduate-group/>); Faculty (<https://its.ucdavis.edu/transportation-technology-policy-graduate-group/people/transportation-technology-policy-graduate-group-faculty/>)

- Transportation Technology & Policy, Master of Science (p. 458)
- Transportation Technology & Policy, Doctor of Philosophy (p. 458)

## Transportation Technology & Policy, Master of Science

### Graduate Studies

### Graduate Study

The Graduate Group in Transportation Technology & Policy offers the M.S. (Plan I—thesis; and Plan II—exam), and Ph.D. degrees. Students complete three core courses in technology, policy, and data science and choose one of three tracks: Vehicles & Fuels, Demand & Behavior or Infrastructure & Operations. The curriculum draws on multiple disciplines including civil, mechanical, and environmental engineering, economics, statistics, political science, psychology, sociology, geography, and urban planning.

### Preparation

Applicants will normally be expected to have completed two courses in calculus and one course each in calculus level statistics and microeconomics.

### Program of Study

M.S. students complete three core courses, two track courses, two skills courses plus electives. Ph.D. students take the same plus an additional skill course and additional electives. Master's degrees require a minimum of 36 quarter units and doctoral degrees require a minimum of 54 units. M.S. Plan I students may replace up to 6 units of regular course work with research (course 299) units. At least two thirds of all credits must be at the graduate level.

### Graduate Advisors

Susan Handy; Gil Tal (Admissions)

## Transportation Technology & Policy, Doctor of Philosophy

### Graduate Studies

### Graduate Study

The Graduate Group in Transportation Technology & Policy offers the M.S. (Plan I—thesis; and Plan II—exam), and Ph.D. degrees. Students complete three core courses in technology, policy, and data science and choose one of three tracks: Vehicles & Fuels, Demand & Behavior or Infrastructure & Operations. The curriculum draws on multiple disciplines including civil, mechanical, and environmental engineering, economics, statistics, political science, psychology, sociology, geography, and urban planning.

### Preparation

Applicants will normally be expected to have completed two courses in calculus and one course each in calculus level statistics and microeconomics.

### Program of Study

M.S. students complete three core courses, two track courses, two skills courses plus electives. Ph.D. students take the same plus an additional skill course and additional electives. Master's degrees require a minimum of 36 quarter units and doctoral degrees require a minimum of 54 units. M.S. Plan I students may replace up to 6 units of regular course work with

research (course 299) units. At least two thirds of all credits must be at the graduate level.

## Graduate Advisors

Susan Handy; Gil Tal (Admissions)

# University Writing Program

College of Letters & Science

John Marx, Ph.D., Interim Program Director

## Program Office

109 Voorhies Hall; 530-752-6283; University Writing Program (<http://writing.ucdavis.edu>)

## The Program

The University Writing Program (UWP) offers writing courses and seeks to improve writing instruction across campus through a variety of programs. The UWP coordinates first year, intermediate, and advanced writing courses that satisfy college composition requirements and offers courses in writing across the curriculum, writing in specific disciplines, and writing in the professions. The Professional Writing Minor serves students from all majors who are planning careers as professional writers or editors, as well as those whose academic and professional careers demand advanced writing skills. The Program offers graduate courses in the teaching of writing and in composition theory, history, and research. The Designated Emphasis in Writing, Rhetoric, and Composition Studies offers Ph.D. students in affiliated programs the opportunity to prepare for leadership roles in writing research, teaching, and program administration. The UWP also administers the English Composition Examination, an alternative way to satisfy the advanced writing requirement. The UWP publishes an annual anthology of exemplary student writing, *Prized Writing*, and a journal for writing instructors, *Writing on the Edge*. The Writing in the Disciplines Workshop Program presents workshops on teaching writing for faculty and TAs and workshops on writing for students. The Writing Ambassadors Program trains advanced undergraduates and places them as interns in K-12 classrooms to improve writing instruction.

- Professional Writing, Minor (p. 459)

# Professional Writing, Minor

College of Letters & Science

Faculty (<https://writing.ucdavis.edu/people/directory/faculty/>)

## The Program

The University Writing Program (UWP) offers writing courses and seeks to improve writing instruction across campus through a variety of programs. The UWP coordinates first year, intermediate, and advanced writing courses that satisfy college composition requirements and offers courses in writing across the curriculum, writing in specific disciplines, and writing in the professions. The Professional Writing Minor serves students from all majors who are planning careers as professional writers or editors, as well as those whose academic and professional careers demand advanced writing skills. The Program offers graduate courses in the teaching of writing and in composition theory, history, and research. The Designated Emphasis in Writing, Rhetoric, & Composition Studies offers Ph.D. students in affiliated programs

the opportunity to prepare for leadership roles in writing research, teaching, and program administration. The UWP also administers the English Composition Examination, an alternative way to satisfy the advanced writing requirement. The UWP publishes an annual anthology of exemplary student writing, *Prized Writing*, and a journal for writing instructors, *Writing on the Edge*. The Writing in the Disciplines Workshop Program presents workshops on teaching writing for faculty and TAs and workshops on writing for students. The Writing Ambassadors Program trains advanced undergraduates and places them as interns in K-12 classrooms to improve writing instruction.

Code	Title	Units
The professional writing minor consists of 20 units of course work. Of these, 12 must be UWP courses. Students complete 8 units from Group A and/or B, 4 units from Group C, and 4 units from Group A, B, or C, accounting for 16 units. Students complete 4 additional units from Group D.		
Choose two courses from Group A and/or B: 8		
<i>Group A: Writing in Academic Settings</i>		
ENL 100NF	Creative Writing: Non-Fiction	
UWP 101 or UWP 101V or UWP 101Y	Advanced Composition	
UWP 102A	Writing in the Disciplines: Special Topics	
UWP 102B	Writing in the Disciplines: Biology	
UWP 102C	Writing in the Disciplines: History	
UWP 102D	Writing in the Disciplines: International Relations	
UWP 102E	Writing in the Disciplines: Engineering	
UWP 102F	Writing in the Disciplines: Food Science & Technology	
UWP 102G	Writing in the Disciplines: Environmental Writing	
UWP 102H	Writing in the Disciplines: Human Development & Psychology	
UWP 102I	Writing in the Disciplines: Ethnic Studies	
UWP 102J	Writing in the Disciplines: Fine Arts	
UWP 102K	Writing in the Disciplines: Sociology	
UWP 102L	Writing in the Disciplines: Film Studies	
UWP 102M	Writing in the Disciplines: Community & Regional Development	
<i>Group B: Writing in the Professions</i>		
UWP 104A or UWP 104AY	Writing in the Professions: Business Writing	
UWP 104B	Writing in the Professions: Law	
UWP 104C	Writing in the Professions: Journalism	
UWP 104D	Writing in the Professions: Elementary & Secondary Education	
UWP 104E	Writing in the Professions: Science	
UWP 104F or UWP 104FY	Writing in the Professions: Health	
UWP 104I	Writing in the Professions: Internships	
UWP 104J	Writing in the Professions: Writing for Social Justice	

UWP 104T	Writing in the Professions: Technical Writing	
UWP 110	Specialized Genres in Professional Writing	
UWP 111A	Specialized Topics in Journalism	
UWP 111B	Specialized Topics in Journalism: Investigative Journalism	
UWP 111C	Specialized Topics in Journalism: Science Journalism	
UWP 112A	Introduction to Professional Editing	
Choose one course from Group C:		4
<i>Group C: Theory, History, &amp; Design</i>		
ANT 120	Language & Culture	
CLA 110	Origins of Rhetoric	
CMN 101 or CMN 101Y	Communication Theories	
CMN 112	Theories of Persuasion	
CMN 123	Intercultural Communication	
CMN 131	Strategic Communication in Public Relations	
CMN 136	Organizational Communication	
CMN 178	Persuasive Technologies	
DES 145	History of Visual Communication	
DES 149	Information Design: Principles & Practice	
ENL 105	History of the English Language	
ENL/LIN/UWP 106	English Grammar	
ENL/STS 164	Writing Science	
HIS 101	Introduction to Historical Thought & Writing	
LIN 103B	Linguistic Analysis II: Morphology, Syntax, Semantics	
LIN/ENL/UWP 106	English Grammar	
LIN 141	Semantics	
PHI 137A	Philosophy of Language: Theory of Reference	
PHI 137B	Philosophy of Language: Truth & Meaning	
PHI 137C	Philosophy of Language: Semantics & Pragmatics	
STS/ANT 109	Visualization in Science: A Critical Introduction	
STS 163	History of Communication Technologies	
STS/ENL 164	Writing Science	
UWP 100	Genre Theory & Professional Writing	
UWP/ENL/LIN 106	English Grammar	
UWP 115	Writing Center Research, Theory, & Practice for Peer Writing Tutors	
UWP 120	Rhetorical Approaches to Scientific & Technological Issues	
UWP 121	History of Scientific Writing	
Choose one additional course from Groups A, B, or C:		4
Complete UWP 192: Internship in Writing from Group D:		4
<i>GROUP D: Internship in Writing (no more than 4 units will count toward the minor)</i>		
UWP 192	Internship in Writing	

## Veterinary Medicine, School of

### School of Veterinary Medicine

Mark Stetter, D.V.M., Ph.D., Dean of the School

Woutrina Smith, D.V.M., Ph.D., Associate Dean—Global Programs

Johanna Watson, D.V.M., Ph.D., Associate Dean—Professional Education

Karl E. Jandrey, D.V.M., Associate Dean—Admissions & Student Programs

John R. Pascoe, B.V.Sc., Ph.D., Executive Associate Dean

Isaac N. Pessah, Ph.D., Associate Dean—Research & Graduate Education Programs

Joshua Stern, D.V.M., Ph.D., Chief Medical Officer—Veterinary Medical Teaching Hospital

### School Office

530-752-1360; School of Veterinary Medicine (<http://www.vetmed.ucdavis.edu>)

## Viticulture & Enology

### College of Agricultural & Environmental Sciences

David E. Block, Ph.D., Chairperson of the Department

### Department Office

1162 RMI North Building; 530-752-0380; Viticulture & Enology (<http://wineserver.ucdavis.edu>); Faculty (<https://wineserver.ucdavis.edu/person-type/31/>)

- Viticulture & Enology, Bachelor of Science (p. 460)

## Viticulture & Enology, Bachelor of Science

### College of Agricultural & Environmental Sciences

### The Major Program

The Viticulture & Enology major provides an interdisciplinary education in the biological and physical principles underlying grape and wine production as well as practical knowledge of grape growing (viticulture) and wine making (enology). This program provides the knowledge base for problem-solving and decision-making in commercial grape and wine production.

### Preparatory Requirements

Before transferring into the Viticulture & Enology major, students must complete the following courses with a grade of C- or better and with a combined grade point average of at least 2.500 at the University of California (at least 3.000 for similar courses taken at community college) for these and all other preparatory courses. In addition, students' overall UC GPA must be 2.250 or higher. All courses must be taken for a letter grade.

Requirement	Units
BIS 002A	5
CHE 002A, 002B, 002C, 008A	17
MAT 016A	3
PHY 001A, 001B or 007A	4-6

## Recommendations

Completion of UC Davis equivalents of the following preparatory courses for the major are not required for entry but are highly recommended. Failure to complete these will delay entry into required upper division courses and may thus delay graduation. Some courses may be available at UC Davis during Summer Session:

Requirement	Units
CHE 008B	4
MAT 016B	3
PLS 002	4
BIS 102	3

## The Program

The curriculum builds upon a foundation of biology, chemistry, biochemistry and mathematics with specialized courses related to grape and wine production. To complete the program, students may choose to place particular emphasis on viticulture, enology or economics. Credit may also be earned for foreign language study and internships.

## Major Advisors

H. Heymann

## Related Major Programs

Food Science & Technology; Plant Sciences.

## Career Alternatives

Graduates are qualified for a variety of vineyard and winery positions, including production management, quality control and research. Additionally, they may work in related fields such as pest management, nursery production and analytical services.

## Graduate Study

Several graduate groups offer programs of study leading to advanced degrees in the fields of viticulture and enology. For the M.S. or Ph.D. degree, see Agricultural & Environmental Chemistry (Graduate Group) (p. 57), Engineering: Chemical Engineering (p. 123), Ecology (Graduate Group) (p. 189), Food Science (Graduate Group) (p. 236), Integrative Genetics & Genomics (Graduate Group) (p. 276), Horticulture & Agronomy (Graduate Group) (p. 261), Microbiology (Graduate Group) (p. 319), Plant Biology (Graduate Group) (p. 380), Plant Pathology (p. 380), Soils & Biogeochemistry (Graduate Group) (p. 441), and Viticulture & Enology (Graduate Group) (p. 463).

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
<i>Chemistry</i>		
CHE 002A	General Chemistry	21
CHE 002B	General Chemistry	
CHE 002C	General Chemistry	
CHE 008A	Organic Chemistry: Brief Course	
CHE 008B	Organic Chemistry: Brief Course	
<i>Mathematics</i>		
MAT 016A	Short Calculus	6
MAT 016B	Short Calculus	

<i>Physics; choose PHY 001A &amp; PHY 001B or PHY 007A:</i>	4-6
PHY 007A or PHY 001A & PHY 001B	General Physics Principles of Physics and Principles of Physics
<i>Plant Science</i>	7
PLS 002	Botany & Physiology of Cultivated Plants
PLS 021 or PLS 021V	Application of Computers in Technology Application of Computers in Technology
<i>Viticulture &amp; Enology</i>	5
VEN 002	Introduction to Viticulture
VEN 003	Introduction to Winemaking
Preparatory Subject Matter Subtotal	48-50
<b>Depth Subject Matter</b>	
<i>Biological Science; choose BIS 102 &amp; BIS 103 or BIS 105:</i>	
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism
<i>Microbiology</i>	5
MIC 102	Introductory Microbiology
MIC 103L	Introductory Microbiology Laboratory
Choose one:	4
PLS 120 or STA 106	Applied Statistics in Agricultural Sciences Applied Statistical Methods: Analysis of Variance
<i>Viticulture &amp; Enology</i>	36-38
VEN 101A	Viticultural Practices
VEN 101B	Viticultural Practices
VEN 101C	Viticultural Practices
VEN 110	Grapevine Growth & Physiology
VEN 118	Grapevine Pests, Diseases & Disorders
VEN 123	Analysis of Musts & Wines
VEN 124	Wine Production
VEN 125	Wine Types & Sensory Evaluation
VEN 126	Wine Stability
VEN 128	Wine Microbiology
VEN 135	Wine Technology & Winery Systems
AND	
In consultation with the advisor, choose three: (6-8)	
VEN 123L	Analysis of Musts & Wines Laboratory
VEN 124L	Wine Production Laboratory
VEN 125L	Sensory Evaluation of Wine Laboratory
VEN 126L	Wine Stability Laboratory
VEN 127L	Post-Fermentation Wine Processing Lab
VEN 128L	Wine Microbiology Laboratory
If more than three are taken, the extra courses will count as restricted electives in Area B.	
Depth Subject Matter Subtotal	48-53
<b>Restricted Electives</b>	
In consultation with advisor, choose 28 units from the following five areas. At least 12 units must be from one of the following areas: (A) Plant Science, (B) Food Science & Microbiology, or (C) Economics & Business	
(A) Plant Science Area (p. 462)	
(B) Food Science & Microbiology Area (p. 462)	

(C) Economics & Business Area (p. 462)	FST 127	Sensory Evaluation of Foods	4
(D) Language Area (p. 462)	MIC 140	Bacterial Physiology	3
(E) Internship Area (p. 463)	MIC 150	Genomes of Pathogenic Bacteria	3
Restricted Electives Subtotal	MIC 155L	Bacterial Physiology Lab	4
Total Units	VEN 111	World Viticulture	3
	VEN/FST 114	Fermented Foods	4
	VEN 140	Distilled Beverage Technology	3
	VEN 219	Natural Products of Wine	3
	VEN 235	Winery Design	4

## (A) Plant Science Area

Code	Title	Units
ABT/IAD 142	Equipment & Technology for Small Farms	2
ABT/LDA 150	Introduction to Geographic Information Systems	4
ATM 133	Biometeorology	4
BIS 101	Genes & Gene Expression	4
BIS 101D	Genes & Gene Expression Discussion	1
BIT 160	Principles of Plant Biotechnology	3
ENT 110	Arthropod Pest Management	5
HYD/ESM/ABT 110	Irrigation Systems & Water Management	4
HYD 124	Plant-Water-Soil Relationships	4
MCB/PLB 126	Plant Biochemistry	3
NEM 100	Plant Nematology	4
PLB 111	Plant Physiology	3
PLB 112	Plant Growth & Development	3
PLB/ENT/PLP 123	Plant-Virus-Vector Interaction	3
PLB 143	Evolution of Crop Plants	4
PLP 120	Introduction to Plant Pathology	4
PLS 154	Introduction to Plant Breeding	4
PLS 157	Physiology of Environmental Stresses in Plants	4
PLS 158	Mineral Nutrition of Plants	4
PLS 171	Principles & Practices of Plant Propagation	4
PLS 176	Introduction to Weed Science	4
SSC 100	Principles of Soil Science	5
SSC 102	Environmental Soil Chemistry	3
SSC 109	Sustainable Nutrient Management	4
SSC 118	Soils in Land Use & the Environment	4
VEN 112	Soils in Viticulture	3
VEN 115	Raisin & Table Grape Production	2
VEN 216	Sustainable Vineyard Development	5
VEN 217	Field & GIS Evaluation of Soils	3

## (B) Food Science & Microbiology Area

Code	Title	Units
BIS 101	Genes & Gene Expression	4
BIS 101D	Genes & Gene Expression Discussion	1
FST 102A	Malting & Brewing Science	4
FST 102B	Practical Malting & Brewing	4
FST 104	Food Microbiology	3
FST 104L	Food Microbiology Laboratory	4
FST 109	Principles of Quality Assurance in Food Processing	3
FST 110	Food Processing	4
FST 110L	Food Processing Laboratory	2

## (C) Economics & Business Area

Code	Title	Units
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption	4
ARE 112	Fundamentals of Organization Management	4
ARE 113	Fundamentals of Marketing Management	4
ARE 118	Tax Accounting	4
ARE 130	Agricultural Markets	4
ARE 140	Farm Management	4
ARE 150	Agricultural Labor	4
ECN 001A or ECN 001AV or ECN 001AY	Principles of Microeconomics	4
ECN 001B or ECN 001BV	Principles of Macroeconomics	4
MGT 011A	Elementary Accounting	4
MGT 011B	Elementary Accounting	4

## (D) Language Area

Maximum 12 units, not counting course 001, of one of the following languages: French, German, Italian, Portuguese or Spanish.

Courses taught in English will not count as restricted electives in this major. *At least one course must be Intermediate or Conversational; qualifying Intermediate or Conversational courses are listed below:*

Code	Title	Units
FRE 021	Intermediate French	5
FRE 022	Intermediate French	5
FRE 023	Intermediate French	5
GER/COM 011	Travel & the Modern World	4
GER 020	Intermediate German	4
GER 021	Intermediate German	4
GER 022	Intermediate German	4
SPA 021 or SPA 021V or SPA 021Y	Intermediate Spanish	5
SPA 022 or SPA 022V or SPA 022Y	Intermediate Spanish I	5
SPA 022	Intermediate Spanish	5
SPA 031 or SPA 031V or SPA 031Y	Intermediate Spanish II	5
SPA 032	Intermediate Spanish	5
SPA 031	Intermediate Spanish for Native Speakers I	5
SPA 032	Intermediate Spanish for Native Speakers II	5

SPA 033	Intermediate Spanish for Native Speakers III	5
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## (E) Internship Area

Code	Title	Units
Choose a maximum of 8 units:		8
	May be increased to 12 units in exceptional circumstances.	
VEN 190X	Winemaking Seminar	
VEN 192	Internship	
VEN 198	Directed Group Study	
VEN 199	Special Study for Advanced Undergraduates	
VEN 290	Seminar	
VEN 298	Group Study (may be counted as restricted electives by prior arrangement with advisor)	

## Viticulture & Enology (Graduate Group)

### Graduate Studies

Dario Cantu, Ph.D., Chairperson of the Group

### Group Office

1204 RMI South; 530-752-3250; Viticulture & Enology Graduate Group (<http://vengg.ucdavis.edu>); Faculty (<https://vengg.ucdavis.edu/person-type/faculty/>)

- Viticulture & Enology, Master of Science (p. 463)

## Viticulture & Enology, Master of Science

### Graduate Studies

### Graduate Study

The M.S. program offers advanced studies in viticulture and enology, ranging from the genetics, physiology and biochemistry of grapevines to the chemistry, microbiology and sensory science of wines and the chemical engineering of winemaking. Priority application deadline January 15, applications accepted until May 15.

Ph.D. studies are not offered by the Graduate Program in Viticulture & Enology.

### Preparation

Applicants to the program are required to have a level of competence equivalent to that of a strong science undergraduate program. This includes coursework in biology, general chemistry, organic chemistry, calculus, statistics (analysis of variance), biochemistry, microbiology, and economics.

Specific requirements are outlined in detail and may be obtained by visiting Viticulture & Enology Graduate Group (<http://vengg.ucdavis.edu>).

### Graduate Group Chair

Dario Cantu, Ph.D.

### Graduate Advisors

D. Cantu, A. Oberholster, R. Runnebaum, A. Waterhouse

## Wildlife, Fish, & Conservation Biology

### College of Agricultural & Environmental Sciences

Nann A. Fangue, Ph.D., Chairperson of the Department; term ends June 30, 2027

### Department Office

1086 Academic Surge; 530-754-9796; Wildlife, Fish, & Conservation Biology (<http://wfcb.ucdavis.edu>); Faculty (<http://wfcb.ucdavis.edu/people/faculty/>)

- Wildlife, Fish & Conservation Biology, Bachelor of Science (p. 463)
- Wildlife, Fish & Conservation Biology, Minor (p. 466)

## Wildlife, Fish & Conservation Biology, Bachelor of Science

### College of Agricultural & Environmental Sciences

### The Major Program

The Wildlife, Fish & Conservation Biology major deals with the relationships between the requirements of wildlife and the needs of people. Understanding these relationships is vital for the maintenance of ecological diversity, recreational resources, and food supplies. Students completing the major possess a broad knowledge of ecology and natural history, but with the quantitative skills to use this knowledge in critical thinking and decision-making.

### The Program

The major emphasizes broad training in biological sciences, with specialization in one of four areas. The major is designed primarily for students interested in becoming professionals in the diverse fields of wildlife, fish, & conservation biology, including veterinary & wildlife health sciences. The breadth of course requirements, when combined with electives, also make this an excellent preparatory major for secondary school teaching. Certification by professional societies such as The Wildlife Society, American Fisheries Society, or the Ecological Society of America, or preparation for graduate studies may also be achieved by careful planning of electives with a faculty advisor.

### Lead Faculty Advisor

Douglas Kelt

### Wildlife, Fish, & Conservation Biology Major Advisor

Erica Cefalo

Students transferring to UC Davis from another institution or new students declaring the major of Wildlife, Fish & Conservation Biology must consult the major advisor so that their program can be evaluated and a faculty advisor assigned. Advising is located in 1086 Academic Surge and can be reached by email at [wfcbadvising@ucdavis.edu](mailto:wfcbadvising@ucdavis.edu).

## Career Alternatives

The major prepares students to excel in the dynamic fields of environmental and conservation biology, emphasizing vertebrate animals—both native and invasive—in their natural environments, as well as resolution of conflicts between humans and wild animals. Positions now held by graduates of this major include wildlife biology, fisheries biology, wildlife damage management, and resource biologists and managers with local, state, and federal agencies, biologists or consultants with private industries such as environmental consulting firms, commercial fishing businesses, electrical utilities, sporting clubs or businesses, and aquaculture operations, as well as veterinarians, medical physicians, and professors/researchers who teach and/or conduct research in academic institutions.

Code	Title	Units	
<b>Written/Oral Expression</b>			
Completing UWP 001 or UWP 001V or UWP 001Y and CMN 001 will simultaneously satisfy the College English Composition Requirement.			
UWP 001 or UWP 001V or UWP 001Y	Introduction to Academic Literacies Introduction to Academic Literacies: Online Introduction to Academic Literacies	4	
Choose one:		4	
CMN 001	Introduction to Public Speaking		
CMN 003 or CMN 003V or CMN 003Y	Interpersonal Communication Competence Interpersonal Communication Competence Interpersonal Communication Competence		
DRA 010	Introduction to Acting		
Written/Oral Expression Subtotal		8	
<b>Preparatory Subject Matter</b>			
<i>Biological Science</i>			
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5	
BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	5	
<i>Chemistry</i>			
CHE 002A	General Chemistry	5	
CHE 002B	General Chemistry	5	
CHE 008A	Organic Chemistry: Brief Course	2	
CHE 008B	Organic Chemistry: Brief Course	4	
<i>Mathematics</i>			
MAT 016A	Short Calculus	3	
MAT 016B	Short Calculus	3	
<i>Physics</i>			
PHY 001A	Principles of Physics	3	
PHY 001B	Principles of Physics	3	
Choose one:		4	
PLS 120	Applied Statistics in Agricultural Sciences		
STA 100	Applied Statistics for Biological Sciences		
WFC 103	Applied Statistics for Wildlife Research		
<i>Wildlife, Fish &amp; Conservation Biology</i>			
Choose one:		3-4	
WFC 010	Wildlife Ecology & Conservation		
WFC 050	Natural History of California's Wild Vertebrates		
WFC 051	Introduction to Conservation Biology		
Preparatory Subject Matter Subtotal			50-51
<b>Depth Subject Matter</b>			
Students graduating with this major are required to attain at least a C average (2.000) in all courses taken at the university in depth and area of specialization subject matter.			
ESP 100 or EVE 101	General Ecology Introduction to Ecology	4	
NPB 102 or WFC 141	Animal Behavior Behavioral Ecology	3-4	
<i>Evolution &amp; Ecology</i>			
EVE 100	Introduction to Evolution	4	
<i>Wildlife, Fish, &amp; Conservation Biology</i>			
Choose WFC 100 or WFC 101 & WFC 101L or WFC 102 & WFC 102L:			4-7
WFC 100	Field Methods in Wildlife, Fish, & Conservation Biology		
OR			
WFC 101 & 101L	Field Research in Wildlife Ecology and Field Research in Wildlife Ecology: Laboratory		
OR			
WFC 102 & 102L	Field Studies in Fish Biology and Field Studies in Fish Biology: Laboratory		
WFC 121 or WFC 130	Physiology of Fishes Physiological Ecology of Wildlife	4	
WFC 122 or WFC 124	Population Dynamics & Estimation Sampling Animal Populations	4	
<i>Conservation Biology</i>			
WFC 154	Conservation Biology	4	
Choose three lecture courses and two laboratory (L) courses:			14-15
WFC 110	Biology & Conservation of Wild Mammals		
WFC 110L	Laboratory in Biology & Conservation of Wild Mammals		
WFC 111	Biology & Conservation of Wild Birds		
WFC 111L	Laboratory in Biology & Conservation of Wild Birds		
WFC 120	Biology & Conservation of Fishes		
WFC 120L	Laboratory in Biology & Conservation of Fishes		
WFC 134	Herpetology		
WFC 134L	Herpetology Laboratory		
Depth Subject Matter Subtotal			41-46
<b>Strongly Recommended, But Not Required</b>			
<i>Anatomy, Physiology &amp; Cell Biology</i>			
APC 100/NPB 123 Comparative Vertebrate Organology			
<i>Landscape Architecture</i>			
LDA/ABT 150	Introduction to Geographic Information Systems		
<i>Statistics; choosing one is recommended:</i>			

STA 104	Applied Statistical Methods: Nonparametric Statistics	Note: Students interested in certification as a Wildlife Biologist from The Wildlife Society should consider additional courses in plant sciences and statistics.
STA 106	Applied Statistical Methods: Analysis of Variance	
STA 108	Applied Statistical Methods: Regression Analysis	
<b>Restricted Electives</b>		<b>Total Units</b> 12-18
Choose one of the four Areas of Specialization:	12-24	
No course may be used to simultaneously satisfy the Depth Subject Matter and the Area of Specialization.		
No course may be used to simultaneously satisfy two Area of Specialization requirements.		
<i>Areas of Specialization</i>		
(1) Wildlife & Conservation Biology (p. 465)		
(2) Fish Biology (p. 465)		
(3) Wildlife Health (p. 465)		
(4) Individualized (p. 466)		
Restricted Electives Subtotal	12-24	
<b>Total Units</b>	<b>111-129</b>	
<b>Areas of Specialization</b>		
<b>(1) Wildlife &amp; Conservation Biology</b>		
<b>Code</b>	<b>Title</b>	<b>Units</b>
WFC 151 or WFC 168	Wildlife Ecology Climate Change Ecology	4
Choose one:	2-5	
PLB/PLS 102	California Floristics	
PLB/EVE 108	Systematics & Evolution of Angiosperms	
PLB/EVE 117	Plant Ecology	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
PLB/PLP 148	Introductory Mycology	
PLS 131	(Discontinued)	
PLS/ESM 144	Trees & Forests	
PLS 147 & 147L	California Plant Communities and California Plant Communities Field Study	
PLS 178	Biology & Management of Aquatic Plants	
Choose two:	6-9	
WFC 110	Biology & Conservation of Wild Mammals	
WFC 111	Biology & Conservation of Wild Birds	
WFC 120	Biology & Conservation of Fishes	
WFC 122	Population Dynamics & Estimation	
WFC 124	Sampling Animal Populations	
WFC 125	Tropical Ecology & Conservation	
WFC 134	Herpetology	
WFC 136	Ecology of Waterfowl & Game Birds	
WFC 152	Ecology of Human-Wildlife Conflicts	
WFC 156	Plant Geography	
WFC 157	Coastal Ecosystems	
WFC 160	Animal Coloration	
WFC 168	Climate Change Ecology	
<b>(2) Fish Biology</b>		
<b>Code</b>	<b>Title</b>	<b>Units</b>
<b>Fish Biology</b>		
WFC 120	Biology & Conservation of Fishes	3
WFC 120L	Laboratory in Biology & Conservation of Fishes	2
Choose one:	3-5	
ENT 116	(Discontinued)	
EVE 112 & EVE 112L or EVE 114:		
EVE 112 & 112L	Biology of Invertebrates and Biology of Invertebrates Laboratory	
or EVE 114	Experimental Invertebrate Biology	
Choose three courses including at least one course from each of the following two groups:		
(a) <i>Aquatic Systems</i>		
ANS 118	Fish Production	
ESM 100	Principles of Hydrologic Science	
ESP/GEL 116N	Oceanography	
ESP/GEL 150C	Biological Oceanography	
ESP 151	Limnology	
ESP 151L	Limnology Laboratory	
ESP 152	Coastal Oceanography	
ESP 155	Wetland Ecology	
EVE 115	Marine Ecology	
HYD 143	Ecohydrology	
WFC 155	Wildlife Space Use & Habitat Conservation	
(b) <i>Water Policy/Law</i>		
ESP 161	Environmental Law	
ESP 162	Environmental Policy	
ESP 166N	(Discontinued)	
ESP 169	Water Policy & Politics	
HYD 150	Water Law	
<b>Total Units</b>	<b>17-23</b>	
<b>(3) Wildlife Health</b>		
<b>Code</b>	<b>Title</b>	<b>Units</b>
Note that this Areas of Specialization recommends additional preparatory courses; prerequisites for admission to Veterinary Medicine vary among schools and students should confirm the specific requirements of the school(s) to which they wish to apply.		
WFC 151	Wildlife Ecology	4
Choose BIS 102 & BIS 103 or ABI 102 & ABI 103:		
ABI 102 & ABI 103	Animal Biochemistry & Metabolism and Animal Biochemistry & Metabolism	6-10
or		
BIS 102 & BIS 103	Structure & Function of Biomolecules and Bioenergetics & Metabolism	
Choose one:	3-5	

WFC 110	Biology & Conservation of Wild Mammals
WFC 111	Biology & Conservation of Wild Birds
WFC 120	Biology & Conservation of Fishes
WFC 122	Population Dynamics & Estimation
WFC 124	Sampling Animal Populations
WFC 125	Tropical Ecology & Conservation
WFC 134	Herpetology
WFC 136	Ecology of Waterfowl & Game Birds
WFC 141	Behavioral Ecology
WFC 144	Marine Conservation Science
WFC 152	Ecology of Human-Wildlife Conflicts
WFC 168	Climate Change Ecology
Choose one:	3-5
ANS 103	Animal Welfare
ANS 104	Principles & Applications of Domestic Animal Behavior
ANS 170	Ethics of Animal Use
APC 100	Comparative Vertebrate Organology
MCB 150	Developmental Biology
MIC 101	Introductory Microbiology
MIC 102	Introductory Microbiology
MIC 103L	Introductory Microbiology Laboratory
NPB 101	Systemic Physiology
NPB 140	Principles of Environmental Physiology
VME 158	Infectious Disease in Ecology & Conservation

birds, mammals, amphibians, reptiles, and fish, but with relevance and application to all life forms.

## Lead Faculty Advisor

Douglas Kelt

Code	Title	Units
WFC 100	Field Methods in Wildlife, Fish, & Conservation Biology	4
WFC 151	Wildlife Ecology	4
WFC 154	Conservation Biology	4
Choose one:		3
WFC 110	Biology & Conservation of Wild Mammals	
WFC 111	Biology & Conservation of Wild Birds	
WFC 120	Biology & Conservation of Fishes	
WFC 134	Herpetology	
Choose two-four upper division elective courses from the Wildlife, Fish & Conservation Biology curriculum; excluding:		5-16
WFC 190	Departmental Research Seminar	
WFC 191	Museum Science	
WFC 192	Internship	
WFC 195	Field & Laboratory Research	
WFC 197T	Tutoring in Wildlife & Fisheries	
WFC 198	Directed Group Study	
WFC 199	Special Study for Advanced Undergraduates	

Total Units 20-31

### Additional Preparatory

Recommended, not required:

BIS 101	Genes & Gene Expression
CHE 002C	General Chemistry
CHE 118A	Organic Chemistry for Health & Life Sciences
CHE 118B	Organic Chemistry for Health & Life Sciences
CHE 118C	Organic Chemistry for Health & Life Sciences
PHY 007A	General Physics
PHY 007B	General Physics
PHY 007C	General Physics

Total Units 16-24

## (4) Individualized

Students may, with prior approval of their advisor and the curriculum committee, design their own individualized specialization within the major. The specialization will consist of at least four upper division courses with a coherent theme.

# Wildlife, Fish & Conservation Biology, Minor

### College of Agricultural & Environmental Sciences

The minor in Wildlife, Fish & Conservation Biology is designed for students interested in basic training and understanding of the ecology and conservation of wild terrestrial and aquatic vertebrates, emphasizing

# ADDITIONAL EDUCATION OPPORTUNITIES

- Bodega Marine Laboratory Program (p. 467)
- First-Year Seminar Program (p. 467)
- Independent Study Program (p. 467)
- Internship Program (p. 468)
- UC Washington Program (UCDC) (p. 468)
- University Honors Program (p. 469)

## Bodega Marine Laboratory Program

Bodega Marine Laboratory  
P.O. Box 247  
Bodega Bay, CA 94923  
707-875-2211; Bodega Marine Laboratory (<http://bml.ucdavis.edu/>)

Integrative marine science courses at Bodega Marine Laboratory (BML) offer a multidisciplinary understanding of coastal systems through hands-on research, lab and field-based courses. The program includes courses during spring quarter, Summer Sessions One and Two.

### Spring Quarter Program

The spring quarter curriculum is currently under revision and a new integrated curriculum will be in place in the near future that is 12-15 units. For updates, check Bodega Marine Laboratory (<http://bml.ucdavis.edu/>). Scholarships will be available to defray the costs of housing at BML.

For more details, follow developments of the spring quarter curriculum at Bodega Marine Laboratory (<http://bml.ucdavis.edu/>).

### Summer Session Courses

This integrated program offers students a multidisciplinary understanding of coastal ecosystems and oceanography through intensive, hands on lab and field courses taught at Bodega Marine Laboratory. Students can take up to 10 units in each Summer Session. Applications are due in Spring of each year. Scholarships are available to defray the costs of housing at BML.

For more course detail, see the full description under the appropriate academic department listing or Bodega Marine Laboratory (<http://bml.ucdavis.edu/>).

### Offerings Include

#### Summer Session One

*Coastal Marine Research and Experimental Invertebrate Biology.* BIS 124, EVE 114  
*Effects of Coastal Pollution on Marine Organisms.* ETX 127/NUT 127

#### Summer Session Two

*Biological Oceanography.* GEL 150C /ESP 150C  
*Coastal Oceanography.* ESP 152  
*Global Change Ecology.* EVE 120  
*Marine & Coastal Field Ecology.* ESP 124

Course offerings, sequence structure and instructors may vary from year to year.

Bodega Marine Laboratory spring and summer programs can be residential, with students housed on the laboratory grounds. Residential students are assessed a room and board fee in addition to standard campus registration fees. Students may choose to commute for Summer Session Two. Financial aid may be available to eligible students from campus. Scholarships are available from Bodega Marine Laboratory. Applications and consent of instructors are required.

For additional information, contact 707-875-2211 or see Bodega Marine Laboratory (<http://bml.ucdavis.edu/>).

## First-Year Seminar Program

### Program Office

1350 The Grove; First-Year Seminars Program (<http://fys.ucdavis.edu>)

First-Year Seminars (<http://fys.ucdavis.edu>) are an exciting program of small, innovative classes that reflect the instructor's intellectual interests. Limited to 19 first-year undergraduate students each, these once-in-a-lifetime courses promote intellectual exchange, critical thinking, and community. Students have the opportunity to study with faculty members, often meeting in settings more informal than the ordinary classroom. For complete information, see UC Davis First-Year Seminars Program (<http://fys.ucdavis.edu>).

## Independent Study Program

Chair, Committee on Courses of Instruction, c/o Academic Senate Office; 530-752-2220.

The Independent Study Program provides an opportunity for upper division students to design and pursue a full quarter (12-15 units) of individual study in an area of special interest.

A program qualifying as Independent Study will consist of one or more courses in the 190–199 series. While the theme of such a program may be reasonably broad, a recognizable common thread should unite all the academic work you undertake during an independent study quarter. Regularly offered formal courses will only be acceptable as a part of such a program if they clearly fit its theme and contribute something essential toward the realization of its objectives. The program is not to be considered a way to take more variable-unit courses than normally permitted.

The procedure for enrolling in an Independent Study Program is as follows:

1. Develop, in general terms, a plan of study.
2. Locate a faculty sponsor or panel of sponsors and with their help and approval develop a detailed plan.
3. Complete a project proposal form (obtained from the Academic Senate office) and submit it to the Academic Senate Committee on Courses of Instruction.

The deadline for applications is the tenth day of instruction of the term before; for specific dates, see the Academic Calendar (<https://registrar.ucdavis.edu/calendar/quarter/>).

**Note.** Most courses in the 190-199 series are graded on a "Passed/Not Passed" basis unless the instructor has obtained approval for letter grading from the Academic Senate Committee on Courses of Instruction. Requests for letter grading must be received by the Senate Committee

no later than the fifteenth day of instruction in the quarter in which the course is offered.

You must report the completion or termination of the project to the Academic Senate Committee on Courses of Instruction.

## Internship Program

Marcie Kirk Holland, Executive Director

Internship & Career Center (ICC) (<http://icc.ucdavis.edu>); South Hall; 530-752-2855

### Program Areas

Agricultural & Environmental Sciences, Career Recruiting Programs, Engineering & Physical Sciences, Masters, Ph.D.s and Postdoctoral Scholars, Health & Biological Sciences, International Programs, Liberal Arts & Business, Student Employment, and Sacramento Valley College Corps.

### Internship Experience

An internship (also known as experiential learning) is a work experience that is either directly related to your major field of study or your career interest. Internships are an opportunity to develop your skills and knowledge under the supervision of a professional. The Internship and Career Center facilitates a campus-wide internship program. All internships, both credit and non-credit, can be taken for Transcript Notation with completion of required evaluation reports submitted through Handshake (<https://ucdavis.joinhandshake.com/login/>). The notation briefly describes the nature and location of the internship experience. Questions pertaining to Transcript Notation may be directed to the Internship & Career Center.

### Course Credit

**Academic credit is granted through academic departments and graduate groups. The ICC advising staff can assist you in identifying internship opportunities and provide information about academic credit.**

Internship courses (092, 192, & 292) are available for credit on a variable-unit and Passed/Not Passed (P/NP) grading basis. For most students, a maximum of 12 units of P/NP courses may be counted toward the 180-unit minimum needed for graduation. To qualify for the 192 course, students must have acquired 84 units of credit. All credited internships require approval and sponsorship by a faculty member from an appropriate discipline. Arrangements may be made through the department of the sponsoring faculty member and facilitated by the Internship & Career Center Staff.

## UC Washington Program (UCDC) UC Davis Washington Program Office

1350 The Grove; 530-752-9095; Washington Program (<http://washingtonprogram.ucdavis.edu>)

### Residential Program Location

1608 Rhode Island Avenue, NW, Washington, D.C. 20036

The University of California hosts a system-wide academic and residential program for undergraduate students attending from each of the UC campuses. Housed within the UC Washington Center (UCDC),

an 11-story, state-of-the-art facility, convenient to public transportation and located in downtown D.C., the program provide undergraduates the opportunity to enrich their education while in residence for one quarter in the nation's capital. The program's principal activities include enrollment in credit-bearing courses, participation in academic internships, and the opportunity to explore the many educational, cultural, and historical activities in the Washington D.C. area.

### Program of Study

UCDC is open to undergraduates from all majors. Preference is given to students who will have upper division standing by the start of the quarter in which they plan to participate, though 2nd-year students may participate if they have substantial work, internship, and/or volunteer experience on their resume. A GPA of at least 3.000 is recommended for admission although not required. Applicants are evaluated based on overall relevant employment, internship, and volunteer experiences, written statement, and letter(s) of recommendation (only one is required).

### Academic Year Component (11 weeks)

Students earn academic credit and continue to be registered as full-time UC Davis students during the quarter in which they participate.

- **Internship (Mandatory; 8 units).** Students work three to four days per week (24-32 hours per week) as interns in think-tanks, museums, Congress, federal agencies, interest groups, trade associations, research institutions, media corporations, or in other organizations related to the interests and objectives of individual students.
- **Core Seminar (Mandatory; 4 units).** Each student enrolls in a core seminar exploring a variety of topics related to Washington DC. Course subject matter varies from term to term but is typically related to international relations, history, political science, public policy and other social sciences; the arts and humanities; and science policy. In addition to regular instruction, seminars often include guest speakers, observations of congressional committees and federal agencies, and other relevant Washington experiences. Students who would like to fulfill major requirements may do so by following the policy of their major department for receiving course equivalency. For more information, students should speak with their major advisor.
- **Elective Seminar Course (Optional; 4 units).** Each student may optionally enroll in an additional upper division seminar course taught at UCDC. Course subject matter varies from term to term but is typically related to international relations, history, political science, public policy and other social sciences; the arts and humanities; and science policy. As with the Core Seminar, students who would like to fulfill major requirements may do so by following the policy of their major department for receiving course equivalency. For more information, students should speak with their major advisor.

Courses are taught by UCDC faculty appointed by the various UC campuses or visiting faculty from the Washington area.

Financial aid eligibility and awards as determined by the UC Davis campus are maintained while enrolled in the program, and the aid package will be adjusted to reflect the additional costs of the program.

### Summer Component (10 weeks)

UCDC also offers a 10-week Summer Program with a credit or non-credit option. The credit option allows students to receive up to 8 internship units. Students pay the summer sessions rate per credit hour plus an application fee. The non-credit option (internship only) has no enrollment fee. Both options have a required housing cost and allow students to

participate in many educational, cultural, historical and social activities while living in Washington D.C. and require students to intern for four to five days a week (32-40 hours per week).

## University Graduation Requirements

- All prospective applicants should carefully plan their course programs in order to satisfy university, college, and major/minor requirements for their degree.
- Although units and grade points earned at UCDC are incorporated into the University transcript and GPA calculation, departments and programs retain the right to determine which UCDC courses will be accepted in satisfaction of major and minor requirements.
- All degree candidates must meet the University residence requirement. Students should consult with their college Dean's office early during the UCDC planning process for information on the university residence requirement, particularly students who intend to study abroad or participate in UCDC during their senior year.

Recognizing the special value of UCDC, the faculty has approved two exceptions to the usual residence requirement for students participating in the Washington Program:

- Students planning to graduate immediately upon completion of participation in UCDC may satisfy the University residence requirement by completing at least 35 of their final 45 units on the Davis campus immediately preceding entry into UCDC.
- Students who have not finished all of their degree requirements following completion of their participation in the UCDC program may satisfy the University residence requirement by completing at least 35 units, including at least 12 units after returning from UCDC, on the Davis campus within the final 90 units earned toward the degree.

Students who will not meet the residency requirements outlined may petition their Dean's office requesting an exception to policy:

- Students may satisfy GE requirements while at UCDC but should consult with their college Dean's office prior to departure for information on the certification process.
- Students with a large number of units may participate in the UCDC program provided that (1) they will not exceed 225 units prior to their departure and (2) that all their degree requirements have been fulfilled either before they leave campus or during their time at UCDC. Participants may only return to campus from UCDC to complete any outstanding degree requirements provided that they can do so within the 225-unit restriction.

## University Honors Program

Milmon F. Harrison, Ph.D., Associate Vice Provost of Academic Programs for Undergraduate Education

### Program Office

1350 The Grove; 530-752-3225; University Honors Program

### Faculty

Includes members from various departments across colleges.

### The Program of Study

The University Honors Program (UHP) course of study is designed to enhance the undergraduate experience of high-achieving, high-potential,

and socially conscious undergraduate students from all academic pathways. The University Honors Program is an interdisciplinary, campus-wide honors program that fosters active and collaborative discovery through unique, small course opportunities, which facilitate close faculty contact and dynamic peer interaction.

General Education (GE) courses, seminars, and special study opportunities constitute the UHP course offerings. First-year and second-year UHP students complete six UHP courses during their first two years—one per quarter. Upper division and transfer students complete research and service learning projects, seminars, and education abroad opportunities. Students receive transcript notation for each program year successfully completed.

UHP courses and seminars provide a small, liberal arts college setting, coupled with the resources and opportunities of a world-class research university to engage critical thinking, affective learning, and interpersonal expression. Updated program information is available at University Honors Program. A complete list of courses is made available to admitted students through the UHP office.

Only active UHP students may register for HNR (p. 921) and IST (p. 941) course codes, except by consent of the program and instructor.

# ABOUT COURSES

Courses listed in this catalog are subject to change without notice.

Use this guide to understand course descriptions & requirements.

## Course Descriptions

Below is a sample of how a course is listed in this catalog:

### AAS 100 — Survey of Ethnicity in the US (4 units)

*Description:*

*Learning Activities:*

*Prerequisite(s):*

*Enrollment Restriction(s):*

*Credit Limitation(s):*

*Cross Listing:*

*Repeat Credit:*

*General Education:*

*Grade Mode:*

*This course version is effective from, and including:* Fall Quarter 2022

- The top line is the course subject code and course number—title; units.
- Below are the various attributes for each course. An attribute, like *Cross Listing* or *General Education*, only appears if there is data.
- **Course changes during the catalog year** appear with a warning reading *This version has ended; see updated course, below*, under the title line (see example, below). The change may be anything from a unit change to the course being discontinued.

The last line is the term the course is effective *in this configuration; not when the course is taught*. Pay attention to the effective term; this is the *first* term the change is effective or the term the course is discontinued. A course that has one or more versions in a catalog year shows the latest version at the bottom of the roll-down box (see example, below).

### NRS 224 — Developing Future Nurse Leaders (2 units)

*This version has ended; see updated course, below.*

*Course Description:* Effective decision-making, fiscal and environmental stewardship, initiating and maintaining effective working relationships, mutually respectful communication and collaboration, care coordination, delegation and supervision. Conflict resolution, leadership and interprofessional teamwork.

*Prerequisite(s):* Consent of instructor.



*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the Nursing Science & Health-Care Leadership Graduate Group or by consent of the Instructor.

*Grade Mode:* Letter.

### NRS 224 — Developing Future Nurse Leaders (3 units)

*Course Description:* Effective decision-making, fiscal and environmental stewardship, initiating and maintaining effective working relationships, mutually respectful communication and collaboration, care coordination, delegation and supervision. Conflict resolution, leadership and interprofessional teamwork.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the Nursing Science & Health-Care Leadership Graduate Group or by consent of the Instructor.

*Grade Mode:* Letter.

*This course version is effective from, and including:* Spring Quarter 2023.

## General Education (GE Credit)

For complete information, see General Education (GE) Requirement (p. 38).

## Courses Taught Abroad

Some courses carry the "May be taught abroad" designation. If so, for more details, registration requirements, and information, check with your advisor and the Global Learning Hub (<https://globallearning.ucdavis.edu/>).

## Prerequisites

Prerequisites for most undergraduate courses are checked by Schedule Builder (<https://my.ucdavis.edu/schedulebuilder/>). It is the student's responsibility to meet these requirements and the instructor's responsibility to enforce them. Students who have completed equivalent work may be admitted to the course at the instructor's discretion. For complete information, see Student Information on Prerequisites (<https://registrar.ucdavis.edu/registration/register-for-classes/prerequisites/>).

## Undergraduate Courses

Generally, courses 092, 098, 099, 190C, 192, 197T, 197TC, 198, 199, 290, 290C, 298, and 299 may be repeated for credit; see Committee on Courses of Instruction (COCI) Policy III.B.17 (<https://academicsenate.ucdavis.edu/committees/courses-of-instruction/policies-procedures/#Course>).

### 001-099, Lower Division Courses

Courses open to students for lower division credit who have met the necessary prerequisites and enrollment restrictions as indicated in Schedule Builder (<https://my.ucdavis.edu/schedulebuilder/>); designed primarily for freshmen and sophomores.

### 100-199, Upper Division Courses

Courses open to students who have met the necessary prerequisites and enrollment restrictions as indicated in Schedule Builder (<https://my.ucdavis.edu/schedulebuilder/>). Preparation generally includes completion of one lower division course in the given subject or completion of two years of college work.

### 090X/190X

Seminar courses for in-depth examination of a special topic within the subject area.

### 092/192

Internship courses enable individual students to obtain practical experience to complement their educational goals or to explore potential career interests and opportunities. Students must have completed 84 units before enrolling in course 192.

### 097T&C/197T&C

Tutoring and Tutoring in the Community courses for students who want to tutor in a subject in which they are proficient—generally in their major field—while enrolled as an undergraduate.

### 098/198

Directed Group Study courses are set up on a one-time basis for a group of students in a subject for which no regular courses have been established.

**099**

Special Study for Undergraduates courses arranged for an individual student who shares, with an instructor, an academic interest that cannot be accommodated within the formal course structure; credit is limited to a total of 5 units per term.

**190C**

Research Conference courses where advanced undergraduate students may participate in critical discussions of research activities. These one-unit courses are graded on a Passed/Not Passed basis.

**194H**

Special Study for Honors Students courses are for individual students with honor status, as determined by the department offering the course and who have completed 84 units; credit is limited to a total of 5 units per term.

**199**

Special Study for Advanced Undergraduates courses are the upper division counterparts of course 099 and involve supervised independent study and research requiring an adequate background in the subject proposed for study as well as prior completion of 84 units; credit is limited to a total of 5 units per term.

**Variable-Unit**

Subject to approval by the department chair, an instructor may arrange to give a special study course to interested students; numbers include 090X, 092, 097T, 097TC, 098, 099, 190X, 192, 194H, 197T, 197TC, 198, 199.

**Auto tutorial**

Courses where students instruct themselves at their own pace. Courses can be identified by the letters AT at the end of their course numbers; e.g., 013AT, 141AT.

**Graduate Courses****200-299**

Courses open to graduate students and to undergraduates who have completed 18 units of upper division basic work related to the subject matter of the course. However, admission is subject to the approval of the instructor in charge of the course. Grading in 290C courses and most variable-unit 299 or 299D courses is Satisfactory/Unsatisfactory (S/U). Check the course description for grading information.

**300-399, Professional Courses for Teachers & Nurse Practitioners**

Professional courses for teachers and nurse practitioners are teacher-training courses in the School of Education and in other departments and are specifically intended for teachers or prospective teachers. Courses designed to provide instruction to teaching assistants are included. Courses for certification of family nurse practitioners and physician assistants are also included. Courses are open only to students enrolled in those programs.

**400-499, Other Professional Courses**

Professional training courses. Graduate students should consult their faculty advisor or contact Graduate Studies before registering in 400 series courses to determine if graduate credit may be awarded for the course in question.

**Virtual & Hybrid Courses**

Courses where instruction is delivered on the Internet. Courses delivered completely online are identified by the letter V at the end of their course numbers, e.g., 010V, 162V. Hybrid courses are a combination of online and classroom activities and are identified by the letter Y at the end of their course numbers, e.g., 010Y, 162Y.

**Multi-Quarter Courses**

A series of course numbers followed by two or three letters (for example, Physics (PHY) 110A-110B-110C) is continued through three successive quarters; e.g., fall through spring. The first quarter course listed this way is a prerequisite to the second and the second is a prerequisite to the third. On the other hand, where A and B portions of a course are listed separately (for example, Economics (ECN) 160A & 160B), the A course is not a prerequisite to B, unless A is specifically mentioned in the list of B prerequisites.

**Cross-Listed Courses**

A cross-listed course (shown as *Cross Listing:*) is a single course offered collaboratively through two or more departments or programs. Cross-listed courses have identical content. If a student passes one course in the cross-listing, they cannot register for the partner course(s).

**Expanded Course Descriptions**

You may find that the descriptions in the General Catalog do not include all the information you would like about a course. Expanded Course Descriptions are available for on-campus use at the College dean's offices or the Biology Academic Success Center (<https://basc.biology.ucdavis.edu/>), advisors' offices, advising centers, and departmental offices.

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# Aerospace Science & Engineering (EAE)

College of Engineering

## EAE 001 – Introduction to Aerospace Science Engineering (1 unit)

*Course Description:* Description of the field of aerospace engineering with examples from industry, government, and research. Aerospace engineering principles, ethics, and responsibilities.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Pass/No Pass only.

## EAE 010 – From the Wright Brothers to Drones & Quadcopters (2 units)

*Course Description:* History of aircraft and its influence on society. Topics covered will include Unmanned Aerial Vehicles, safety considerations, economics and privacy issues. Aerodynamics, stability and control will also be introduced.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

## EAE 099 – Special Study for Undergraduates (1-5 units)

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## EAE 126 – Theoretical & Computational Aerodynamics (4 units)

*Course Description:* Development of general equations of fluid motion. Study of flow field kinematics and dynamics. Flow about a body. Thin airfoil theory. Viscous effects. Applications of numerical methods to wing analysis and design.

*Prerequisite(s):* ENG 103 C- or better; ENG 105 C- or better; (ENG 180 C- or better or EAD 115 C- or better or MAT 128C C- or better or EME 115 C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## EAE 127 – Applied Aircraft Aerodynamics (4 units)

*Course Description:* Principles, governing equations, and predictive theories for aircraft aerodynamics. Lift and drag of 2D airfoils, 3D wings, and high-lift devices.

*Prerequisite(s):* EME 106 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EAE 129 – Stability & Control of Aerospace Vehicles (4 units)**

*Course Description:* Aircraft and spacecraft stability and control. Derivation of fundamental equations of motion for aircraft/spaceship. Fundamentals of feedback. Aircraft flight control systems. Spacecraft attitude control systems.  
*Prerequisite(s):* ENG 102 C- or better.  
*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).  
*Enrollment Restriction(s):* Restricted to upper division standing.  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 130A – Aircraft Performance & Design (4 units)**

*Course Description:* Major aircraft design experience with multiple realistic constraints including aerodynamics, performance analysis, weight estimation, stability and control, and appropriate engineering standards.  
*Prerequisite(s):* (EAE 126 or EAE 127 C- or better); EAE 129 C- or better (can be concurrent).  
*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 130B – Aircraft Performance & Design (4 units)**

*Course Description:* Major aircraft design experience including detailed design, cost analysis, analysis of aircraft structure, propulsion system, aerodynamics, aircraft handling qualities, manufacturing, or meeting relevant engineering standards.  
*Prerequisite(s):* EAE 130A C- or better.  
*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).  
*Enrollment Restriction(s):* Restricted to upper division standing.  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE); Oral Skills (OL).

## **EAE 133 – Finite Element Methods in Structures (4 units)**

*Course Description:* Introduction to the aerospace structural design process. History of aircraft and spacecraft materials. Effects of loading beyond elastic limit. Deflections and stresses due to combined loading. Virtual work principles, and finite element methods. Applications to aerospace structures.  
*Prerequisite(s):* ENG 104 C- or better.  
*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).  
*Enrollment Restriction(s):* Open to College of Engineering Students.  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 135 – Aerospace Structures (4 units)**

*Course Description:* Analysis and design methods used in aerospace structures. Shear flow in open, closed and multicell beam cross-sections, buckling of flat and curved sheets, tension field beams, local buckling.  
*Prerequisite(s):* ENG 104 C- or better; EAE 126 or EAE 127 recommended.  
*Learning Activities:* Lecture 4 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 137 – Structural Composites (4 units)**

*Course Description:* Overview of materials and technology for creating structures from fiber reinforced resin matrix composite material systems. Elementary design analysis and case studies emphasizing aeronautical applications.  
*Prerequisite(s):* ENG 104 C- or better.  
*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 138 – Aircraft Propulsion (4 units)**

*Course Description:* Analysis/design of modern aircraft gas turbine engines. Development/application of cycle performance prediction techniques. Introduction to design of inlets, compressors, burners, turbines, and nozzles. Cycle design for specific applications.  
*Prerequisite(s):* EME 106 C- or better.  
*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 140 – Rocket Propulsion (4 units)**

*Course Description:* Fluid and thermodynamics of rocket engines, liquid and solid rocket propulsion. Space propulsion concepts and space mission requirements.  
*Prerequisite(s):* EME 106 C- or better.  
*Learning Activities:* Lecture 4 hour(s).  
*Enrollment Restriction(s):* Restricted to upper division standing.  
*Credit Limitation(s):* Not open for credit to students who have taken identical EAE 189A prior to Fall Quarter 2013.  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 142 – Orbital Mechanics (4 units)**

*Course Description:* Satellite orbits, multistage rockets, current global boosters, and new technologies. Design application problems include satellites, trajectory optimizations, and interplanetary trajectories.  
*Prerequisite(s):* ENG 102 C- or better.  
*Learning Activities:* Lecture 4 hour(s).  
*Enrollment Restriction(s):* Restricted to upper division standing.  
*Credit Limitation(s):* Not open for credit to students who have completed EAE 189B prior to Fall Quarter 2013.  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **EAE 143A – Space Vehicle Design (4 units)**

*Course Description:* Governing equations and operational practices of robotic and human space travel. Principles of Systems Engineering are introduced and are used as a basis for a team project in spacecraft reverse-engineering and design.  
*Prerequisite(s):* EAE 140 C- or better; EAE 142 C- or better.  
*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).  
*Grade Mode:* Letter.

**EAE 143B – Space Mission Design (4 units)**

*Course Description:* Introduction to space systems design including space project organization, requirements definition & specification, concepts formulation, system tradeoffs, and subsystem design. Prototype space mission concepts & multidisciplinary mission design.

*Prerequisite(s):* EAE 143A C- or better.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to Mechanical Engineering and Aerospace Science & Engineering majors only.

*Credit Limitation(s):* Not open for credit to students who have completed EAE 141.

*Grade Mode:* Letter.

**EAE 189C – Flight Simulation & Testing in Design of Aircraft & Spacecraft (4 units)**

*Course Description:* Teaches flight test techniques together with data analysis methods to prepare students for any type of flight testing including fixed wing, rotary wing and launch vehicles.

*Prerequisite(s):* ENG 102; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EAE 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**EAE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**African American & African Studies (AAS)**

College of Letters & Science

**AAS 010 – African-American Culture & Society (4 units)**

*Course Description:* Critical examination of the historical, political, social, and economic factors that have affected the development and status of African-American people in contemporary society.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AAS 012 – Introduction to African Studies (4 units)**

*Course Description:* Introduction to African Studies which will focus on the various disciplinary perspectives through which African society and culture are generally studied. A survey of methods, resources and conceptual tools for the study of Africa.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**AAS 015 – Introduction to African American Humanities (4 units)**

*Course Description:* Introduction to the humanist tradition developed by writers, philosophers, and artists of African descent in the West. Attention also given to African sources, as well as European, Caribbean, Latin-American, and North American variations on this tradition.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 165 students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**AAS 016 – Verbal & Performance Arts in Africa (4 units)**

*Course Description:* African verbal arts; oral texts from different African cultures. Types of critical response to oral texts, role of oral artists, context and esthetics of oral performance in Africa.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AAS 017 – Women in African Societies (4 units)**

*Course Description:* Gender relations in traditional and contemporary African society. Involvement of African women in politics, religion, the economy, the arts. African responses to feminist theory. Images of women in African literature.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**AAS 018 – Introduction to Caribbean Studies (4 units)**

*Course Description:* Introduction to the contemporary culture, peoples, politics, and societies of the Caribbean. Topics include movements of people, goods and ideas across the Atlantic world and creative productions within the Caribbean.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**AAS 050 – Black Popular Culture (4 units)**

*Course Description:* Survey of the African American images in popular culture (film, television, comedy, sports and music).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

**AAS 051 – History of Afro American Dance (4 units)**

*Course Description:* Evolution of African-American dance, tracing its history and development from West and Central Africa to the United States. Investigates the social and cultural relevance of African American dance and its artistic merits through contributions from its choreographers and performers.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL).

**AAS 052 – African Traditional Religion (4 units)**

*Course Description:* Introduction to traditional religions of the sub-Saharan African peoples: emphasis on myths, rituals and symbols in West, East, Central and South African indigenous religions. Examines themes: sacred kingship, divination system, women, prophecy, conversion and adaptation to Islam and Christianity.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**AAS 053 – Black California (4 units)**

*Course Description:* Introduction to the experiences and contributions of people of African descent in California from the early 18th century to the present.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**AAS 080 – Introduction to Black Politics (4 units)**

*Course Description:* Introduction to the analysis of Afro-American politics, using conceptual frameworks from political science and other social sciences.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**AAS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**AAS 100 – Survey of Ethnicity in the US (4 units)**

*Course Description:* Sociological and historical analysis of the experience, culture, and relations of and between groups considered racial and/or ethnic minorities in the United States.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**AAS 101 – Introduction to Research in the Afro-American Community (4 units)**

*Course Description:* Introductory survey of Afro-American Studies methods and techniques; problems and methodology in Afro-American Studies.

*Prerequisite(s):* AAS 010; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**AAS 107A – African Descent Communities & Culture in the Caribbean & Latin America (4 units)**

*Course Description:* Origin and development of African descent communities and cultures in the Caribbean, and Latin America.

Similarities and differences among African descent communities and cultures in terms of religious practices, music, and national identity.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* World Cultures (WC).

**AAS 107B – African Descent Communities & Culture in North America (4 units)**

*Course Description:* Study of the origin and development of African descent communities and cultures in the U.S.A., Canada, and Mexico.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD).

**AAS 107C – African Descent Communities & Culture in Asia (4 units)**

*Course Description:* Study of the origin and development of African Descent communities and cultures in Asia.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**AAS 107D – African Descent Communities & Cultures in Europe (4 units)**

*Course Description:* Study of the origin and development of African Descent communities and cultures in Europe.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**AAS 110 – West African Social Organization (4 units)**

*Course Description:* Ecology, population, social and political organization, and culture of West Africa in the precolonial, colonial, and post-colonial periods.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

**AAS 111 – Cultural Politics in Contemporary Africa (4 units)**

*Course Description:* Themes and style of new cultural forms in Africa as displayed in art, music, film and writing, especially in regard to blending of indigenous and foreign influences. Social and political forces shaping contemporary cultural expression.

*Prerequisite(s):* AAS 012; or upper division standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## **AAS 115 – Kingdoms in Contemporary African Politics (4 units)**

*Course Description:* Kingdoms and monarchies in sub-Saharan Africa and their role in contemporary politics through the comparative political economy approach.

*Prerequisite(s):* AAS 012 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **AAS 116 – Presidential Politics in Africa (4 units)**

*Course Description:* Political leadership in sub-Saharan Africa, focusing on historical, institutional, and biographical influences and outcomes through political economy approaches.

*Learning Activities:* Lecture/Discussion 3 hour(s); Term paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **AAS 123 – Black Female Experience in Contemporary Society (4 units)**

*Course Description:* Black female social, intellectual, and psychological development. Black women's contributions in history, literature, and social science; life experiences of Black women and philosophical underpinnings of the feminist movement.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **AAS 130 – Education in the African-American Community (4 units)**

*Course Description:* Examination of the history of the education of African Americans in the United States. Examination and critique of contemporary theories concerning the schooling of African Americans. (Former AAS 140.)

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **AAS 133 – The Black Family In America (4 units)**

*Course Description:* Analysis of social science research to examine relationship between black (African-descent) family structures, patterns of functioning, and political, economic, and social conditions in the U.S.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **AAS 141 – Psychology of the African American Experience (4 units)**

*Course Description:* Introduction to the psychological issues faced by African Americans. Description of any disparities in mental health care experienced by African American and Diaspora populations in the United States. Analysis of issues from European/Western and Afrocentric frame of reference. Emphasis on Optimal Theory, a psychological theory based on an Afrocentric world view.

*Prerequisite(s):* AAS 010; or consent of instructor; upper division status.

*Learning Activities:* Discussion 1 hour(s), Lecture 3 hour(s).

*Grade Mode:* Letter.

## **AAS 145A – Black Social & Political Thought (4 units)**

*Course Description:* Exploration and analysis of Black social and political thought in the Americas.

*Prerequisite(s):* AAS 010 or AAS 080; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **AAS 145B – Black Intellectuals (4 units)**

*Course Description:* Exposition and critical analysis of selected theoretical writings of Black intellectuals, and especially political and social thinkers, in the Americas.

*Prerequisite(s):* (AAS 010, AAS 080, AAS 145A); or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

## **AAS 150A – Afro-American Visual Arts Tradition: A Historical & Cultural Study (4 units)**

*Course Description:* Afro-American visual arts tradition, folk and formal, in historical and cultural context, from 1600 through Reconstruction.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **AAS 150B – Afro-American Visual Arts Tradition: A Historical & Cultural Study (4 units)**

*Course Description:* Afro-American visual arts tradition, folk and formal, in historical and cultural context, from Reconstruction to the present.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **AAS 151 – Afro-American Vernacular Music & Verbal Arts (4 units)**

*Course Description:* Socio-political dimensions of Afro-American musical forms like spiritual, work song, minstrelsy blues, rhythm and blues, jazz, gospel, soul and contemporary pop, and related verbal arts like preaching, toasting, rapping.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

## **AAS 152 – Major Voices in Black World Literature (4 units)**

*Course Description:* Recurrence of cultural tropes in the works of major black world authors and formation of an African-oriented canon. Principal activities include critical reading and discovery of literature as a cultural resource.

*Prerequisite(s):* AAS 010 or AAS 012 or AAS 018; upper division standing.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **AAS 153 – African Literature (4 units)**

*Course Description:* Colonial and post-colonial sub-Saharan African literature and the African oral traditions from which it emerged. Genres and themes of African literature from the 19th century to the present.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* COM 154.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **AAS 155A – African-American Dance & Culture in the United States, Brazil & the Caribbean (4 units)**

*Course Description:* Comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* DRA 155A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## **AAS 156 – Language & Identity in Africa & the African Diaspora (4 units)**

*Course Description:* Relationship between language and identity in literature from Africa and the African Diaspora. Use of pidgins, Creoles, translation from African languages and impact of language policies.

*Prerequisite(s):* AAS 012; or upper division standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); World Cultures (WC).

## **AAS 157 – Literature & Society in South Africa (4 units)**

*Course Description:* Political and social developments in 20th-century South Africa as illustrated by a range of South African writing. Response of different writers to race relations, impact of government policy on types and context of writing.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **AAS 160 – African-American Folklore (4 units)**

*Course Description:* Theory and history of African American folklore and folklife, including music, material culture, oral narrative, proverbs, and humor. African and Caribbean cultural influences on New World folk genres will be probed.

*Prerequisite(s):* AAS 010.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

## **AAS 162 – Islam in Africa & the Americas (4 units)**

*Course Description:* Comparative and historical survey of Islam in the regional and cultural settings of Sub-Saharan Africa and the Americas.

*Prerequisite(s):* RST 060 or AAS 012 or AAS 110.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **AAS 163 – African Religions in the Americas (4 units)**

*Course Description:* Comparative study of African religious heritage in the Americas: Jamaica, Trinidad, Cuba, U.S.A., Haiti, and Brazil. Emphasis on the origins and development of Candomble, Santeria, Shango, Vodun, and Rastafarianism in the New World.

*Prerequisite(s):* AAS 010; AAS 015; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **AAS 165 – Afro-Christianity & the Black Church (4 units)**

*Course Description:* Examination of the historical role of Christian belief and practice as well as the institution of the Black Church in the experience of African Americans, from slavery to the present.

*Prerequisite(s):* AAS 010; AAS 015; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **AAS 168 – Black Documentary: History & Practice (4 units)**

*Course Description:* Study of Black documentary history and understanding of the use of the documentary form for political purposes. Discussion of documentary theory. Each student, singly or in a team, will create and carefully edit a documentary project.

*Prerequisite(s):* FMS 001; AAS 170; and consent of instructor; AAS 050 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

## AAS 169 – History of African American Television (4 units)

*Course Description:* History of the representation of African Americans in television; how the representations reflect social and political forces in American society. Role of African Americans in actively shaping their representation.

*Prerequisite(s):* AAS 050 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

## AAS 170 – African-American Film & Video (4 units)

*Course Description:* Comparative approach in the study of fictional film and video dealing with the African American experience drawing on film and cultural studies to examine and discuss selected works.

*Prerequisite(s):* FMS 001; AAS 050 recommended.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

## AAS 171 – Black African & Black European Film & Video (4 units)

*Course Description:* Comparative approach in the study of dramatic films and videos that treat black life in Africa and Europe. Critical attention focused on the imaginative construction of ethnicity, race, nationality, gender, and sexuality in each particular work.

*Prerequisite(s):* AAS 015 or AAS 050 or ENL 160 or ENL 162; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## AAS 172 – Diaspora & New Black Identities (4 units)

*Course Description:* Critical analysis about what it means to be Black/African American in the United States today. Topics include old and new diasporas, immigration, national origin, language, religion, class, education, politics, identity and cultural heritage.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## AAS 175A – Black Documentary: History & Theory (4 units)

*Course Description:* Black documentary history and documentary theory. Use of black documentary for political purposes.

*Prerequisite(s):* FMS 001; AAS 170; AAS 050 recommended.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

## AAS 175B – Black Documentary Practicum (4 units)

*Course Description:* Creation of documentary projects, with students working in production crews.

*Prerequisite(s):* AAS 175A; and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

## AAS 176 – The Politics of Resources (4 units)

*Course Description:* Examination of the ways in which the processes of the extraction, purification and use of natural resources and the complex regimes of valuation and commodification they (re)produce lead to cooperation and conflict in contemporary Africa and beyond.

*Prerequisite(s):* AAS 012 or AAS 110.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## AAS 177 – Politics of Life in Africa (4 units)

*Course Description:* Existing (in)capacities in the structures of state and society in Africa for people to live well. Topics include institutions and practices that define state and civil society encounters in Africa; democracy, ethnicity, economic crisis, religion, citizenship, etc.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## AAS 178 – African Modernity & Globalization (4 units)

*Course Description:* Exploration of modernity and globalization and their dimensions and impacts in/on Africa. Examination of modern necessities and constraints in Africa in relation to (neo)colonialism, transnational encounters, technology, gender, risk, ritual, identity, culture, etc.

*Prerequisite(s):* AAS 012; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Limited to 80 students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## AAS 180 – Race & Ethnicity in Latin America (4 units)

*Course Description:* Social and political effects of racial and ethnic categorization in Latin America, including issues of economic production, citizenship, national belonging, and access to resources. Emphasis is on peoples of African, Indigenous, and Asian descent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**AAS 181 – Hip Hop in Urban America (4 units)**

*Course Description:* History, aesthetics, urban context, and economics of hip-hop in the US, and its globalization. Hip-hop's four artistic elements—rap, deejaying, breakdance, and aerosol art—allow the examination of issues of race, ethnicity, and gender in youth culture and American society.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Must have Junior or Senior level standing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL).

**AAS 182 – Hip Hop Culture & Globalization (4 units)**

*Course Description:* Investigation of hip-hop youth cultures outside the United States using globalization and Cultural Studies theories. Analysis of international hip-hop sites in Africa, Asia, Europe, South America, and the Middle East through reading, discussion, and visiting virtual sites.

*Prerequisite(s):* AAS 181 preferable, not required.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**AAS 183A – Policing, Prison, & Protest in Local Perspective (4 units)**

*Course Description:* Study of the history and current state of policing, prisons and protest movements in the U.S. through Black Studies framework and methods.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**AAS 183B – Policing, Prison, & Protest in Global Perspective (4 units)**

*Course Description:* Study of the history and current workings of police, prisons, and protest movements globally through Black Studies frameworks and methods.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**AAS 185 – Topics in African American Film (4 units)**

*Course Description:* Intensive study of special topics in African American film.

*Prerequisite(s):* AAS 170; AAS 050 recommended.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

**AAS 190 – Topics in African & African-Diaspora Studies (4 units)**

*Course Description:* Intensive treatment of a special topic or problem in African or African Diaspora Studies.

*Prerequisite(s):* Upper division standing in African American African Studies (AAS) courses or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

**AAS 192 – Internship in African-American & African Studies (1-8 units)**

*Course Description:* Supervised internship in community, government, or private institutions, in all subject areas offered by the African American & African Studies Program.

*Prerequisite(s):* Consent of instructor; completion of 12 units of upper division study in African American African Studies (AAS) courses; upper division standing.

*Learning Activities:* Internship 3-24 hour(s).

*Enrollment Restriction(s):* Restricted to African American & African Studies majors and minors.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**AAS 194HA – Special Study for Honors Students (4 units)**

*Course Description:* Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty advisor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study, Term Paper.

*Enrollment Restriction(s):* Restricted to majors in African American & African Studies with upper division standing and a GPA of 3.500 in the major.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**AAS 194HB – Special Study for Honors Students (4 units)**

*Course Description:* Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty advisor.

*Prerequisite(s):* AAS 194HA; consent of instructor.

*Learning Activities:* Independent Study, Term Paper

*Enrollment Restriction(s):* Restricted to majors in African American & African Studies with upper division standing and a GPA of 3.500 in the major.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**AAS 197T – Tutoring in Afro-American Studies (1-5 units)**

*Course Description:* Leading of small voluntary discussion groups affiliated with one of the department's regular courses.

*Prerequisite(s):* Consent of major committee; upper division standing with major in African American African Studies.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

**AAS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**AAS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**AAS 201 – Critical Foundations in African American Studies (4 units)**

*Course Description:* Introduction to history of African American Studies.

Topics include: research agendas, policy implications, debates, crises, and institutional frameworks.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**AAS 202 – Critical Foundations in African Studies (4 units)**

*Course Description:* Introduction to the history and current organization of African Studies as area of intellectual investigation. Offers an opportunity to review research agenda and policy implications, debates, crises, and institutional frameworks surrounding the production of knowledge about Africa.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**AAS 203 – Critical Foundations in African Diaspora Studies (4 units)**

*Course Description:* Integrative conceptual framework includes History, Geography, Political Economy, Culture, Aesthetics as tools to investigate the African Diaspora. Engage African Diaspora theories within student's research projects understanding issues developing from the movement of Africans to the rest of the world.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**AAS 204 – Methodologies in African American & African Studies (4 units)**

*Course Description:* Relationship between theory and methodology, with emphasis on identifying relevant methodological approaches and constructing theoretically informed research projects for studying the experience of people of African descent whether on the African continent or in the rest of the world.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**AAS 290 – Special Topics in African/African Diaspora/ African American Studies (4 units)**

*Course Description:* Intensive study in special thematic topics in Africa, African Diaspora, and African American Studies. Course materials to be selected by the instructor.

*Prerequisite(s):* AAS 201 or AAS 202 or AAS 203 or AAS 204; or consent of Instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

**AAS 298A – Directed Group Study in African American & African Diaspora Studies (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated 3 time(s) with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AAS 298B – Directed Group Study in African Studies (1-5 units)**

*Course Description:* Directed group study in African Studies.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated 3 time(s) with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AAS 299 – Directed Research (1-12 units)**

*Course Description:* Directed research.

*Learning Activities:* Variable 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AAS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Agricultural & Environmental Chemistry (AGC)**

College of Agricultural & Environmental Sciences

**AGC 290 – Seminar (1 unit)**

*Course Description:* Selected topics in agricultural and environmental chemistry, presented by students.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AGC 298 – Group Study (1-5 units)**

*Course Description:* The chemistry and biochemistry of foods, nutritional chemicals, pesticides, and other special topics as they apply to agricultural and environmental chemistry.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Letter.

**AGC 299 – Research (1-12 units)**

*Course Description:* Arrangements should be made well in advance with a faculty member of the Group in Agricultural & Environmental Chemistry.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Agricultural & Environmental Technology (TAE)

College of Agricultural & Environmental Sciences

**TAE 010 – Introduction to Agricultural & Environmental Technologies (3 units)**

*Course Description:* Technologies of agriculture and the environmental sciences. History & revolution of industrial technology and its impacts on agriculture, environment, energy, and bioproducts; types of sensing technologies; communication and information transfer technologies; artificial intelligence, technologies for control of automatic processes; technologies for the production of food, bioproducts, clean energy and water purification; gene-editing technology; wearable technologies.

*Learning Activities:* Lecture 2 hour(s); Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Agricultural & Environmental Technologies majors and students in College of Agricultural & Environmental Sciences.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL).

**TAE 020 – Sustainable Energy Technologies (4 units)**

*Course Description:* Sustainable and efficient energy technologies and their application in agriculture and other sectors. Basic principles of energy efficiency, conservation, and conversion technologies using solar, wind, water, biomass, geothermal, and other renewable sources. Environmental impacts and energy policy. Experiential learning about solar drying, controlled environment agriculture, net-zero energy building, electricity generation, energy storage, biofuels, and integrated waste management; field visits.

*Learning Activities:* Lecture/Discussion 3 hour(s), Lecture/Lab 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Agricultural & Environmental Technology and Biological Systems Engineering students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**TAE 030 – Mobile Communication & Computing Technologies for Agriculture & the Environment (4 units)**

*Course Description:* Modern computer technologies and the applications of sensing technologies and the Internet of Things (IoT) in agriculture and the environment. IoT and embedded devices; history and evolution of IoT, communication, and computing technologies; sensors and actuators; microcontrollers; data communication technology; introduction to data analysis and data visualization; designing web applications; and hands-on IoT-based projects.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to students in the College of Agricultural & Environmental Sciences.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL); Visual Literacy (VL).

**TAE 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**TAE 099 – Special Study for Lower Division Students (1-5 units)**

*Course Description:* Special study for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**TAE 100 – Smart Control Systems for Agricultural & Environmental Technologies (4 units)**

*Course Description:* Smart devices that communicate, sense their environment, and control their environment. Application examples include smart plant & animal care, and irrigation & fertigation.

Technologies include Supervisory Control & Data Acquisition (SCADA) and Programmable Logic Controllers (PLCs) for applications in agricultural, environmental, and food sciences.

*Prerequisite(s):* Upper division standing; TAE 030 recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Agricultural & Environmental Technology majors.

*Credit Limitation(s):* Only 3 units of credit if the student has taken EME 172, EEC 157A, and EEC 157B.

*Grade Mode:* Letter.

**TAE 121 – Controlled Environments for Plants & Animals (4 units)**

*Course Description:* Principles of environmental control (temperature, humidity, lighting, CO<sub>2</sub>, air circulation, air quality) for plants and animals. Psychrometrics and applications. Energy-efficient building envelopes for greenhouses, vertical farmings, and animal barns. Heating, ventilation, and air-conditioning (HVAC) systems, lighting and CO<sub>2</sub> enrichment systems, growing substrates, and irrigation systems. Control systems (sensors and sensing for automated control). Visiting controlled environment facilities.

*Prerequisite(s):* Upper division standing in Agricultural Environmental Technology; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s); Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Agricultural & Environmental Technology or Biological Systems Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

**TAE 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.>

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **TAE 199 – Special Study for Upper Division Students (1-5 units)**

*Course Description:* Special study for advanced undergraduates.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.  
*General Education:* Science & Engineering (SE).

# **Agricultural & Resource Econ (ARE)**

College of Agricultural & Environmental Sciences

## **ARE 001 – Economic Basis of the Agricultural Industry (4 units)**

*Course Description:* Agriculture and man; the agricultural industry in U.S. and world economies; production and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy emphasizing California. Not currently offered.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 001S – Economic Basis of the Agricultural Industry (4 units)**

*Course Description:* Agriculture and man; the agricultural industry in Australia and world economies; production and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy emphasizing Australia. May be taught abroad in Australia under the supervision of a UC Davis faculty member. Not currently offered.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ARE 001.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ARE 015 – Population, Environment & World Agriculture (4 units)**

*Course Description:* Economic analysis of interactions among population, environment, natural resources and development of world agriculture. Introduces students to economic thinking about population growth, its causes and consequences for world food demand, and environmental and technological limits to increasing food supplies. Not currently offered.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ARE 018 – Business Law (4 units)**

*Course Description:* General principles of business law in the areas of contracts, business organization, real property, uniform commercial code, sales, commercial paper, employment relations, and creditor-debtor against a background of the history and functioning of our present legal system.

*Prerequisite(s):* Sophomore standing.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable.  
*Enrollment Restriction(s):* Restricted to lower division students.  
*Grade Mode:* Pass/No Pass only.  
*General Education:* Social Sciences (SS).

## **ARE 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* .  
*Grade Mode:* Pass/No Pass only.  
*General Education:* Social Sciences (SS).

## **ARE 100A – Intermediate Microeconomics: Theory of Production & Consumption (4 units)**

*Course Description:* Theory of individual consumer and market demand; theory of production and supply of agricultural products, with particular reference to the individual firm; price determination, and employment of resources under pure competition.

*Prerequisite(s):* ((ECN 001A C- or better or ECN 001AY C- or better) or ECN 001AV C- or better); (ECN 001B C- or better or ECN 001BV C- or better); ((MAT 016A C- or better, MAT 016B C- or better, MAT 016C C- or better) or (MAT 017A C- or better, MAT 017B C- or better) or (MAT 021A C- or better, MAT 021B C- or better)).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM), and Textiles and Clothing (ATXC) Majors and Agricultural and Resource Economics (GARE), International Agricultural Development (GIAD), Viticulture and Enology (GVEN) and Transportation Technology and Policy (GTTP) Graduate Majors.

*Credit Limitation(s):* Not open for credit to students who have completed ECN 100.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

## **ARE 100B – Intermediate Microeconomics: Imperfect Competition, Markets & Welfare Economics (4 units)**

*Course Description:* Price determination, and employment of resources under conditions of monopoly, oligopoly, and monopolistic competition.

*Prerequisite(s):* ARE 100A C- or better; ((ECN 001A C- or better or ECN 001AY C- or better or ECN 001AV C- or better); ECN 001B C- or better or ECN 001BV C- or better); ((MAT 016A C- or better, MAT 016B C- or better, MAT 016C C- or better) or (MAT 017A C- or better, MAT 017B C- or better) or (MAT 021A C- or better, MAT 021B C- or better)); ARE 018 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics Majors (AMGE) and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

## **ARE 106 – Econometric Theory & Applications (4 units)**

*Course Description:* Statistical methods for analyzing data to solve problems in managerial economics. Topics include the linear regression model, methods to resolve data problems, and the economic interpretation of results.

*Prerequisite(s):* ARE 100A C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better; (PLS 021 C- or better or PLS 021V C- or better or ECS 032A C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics Majors (AMGE) and Agricultural & Resource Economics (GARE) Graduate Majors.

*Credit Limitation(s):* Not open for credit to students who have enrolled in or completed ECN 140.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

## **ARE 107 – Econometrics for Business Decisions (4 units)**

*Course Description:* Covers state-of-the art econometric and statistical methods for causal and predictive modeling with applications to finance and marketing.

*Prerequisite(s):* ARE 100A C- or better; ARE 106 C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics majors; Pass Two open to majors in the College of Agricultural & Environmental Sciences.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 112 – Fundamentals of Organization Management (4 units)**

*Course Description:* Role of organizational design and behavior in business and public agencies. Principles of planning, decision making, individual behavior, management, leadership, informal groups, conflict and change in the organization. May be taught abroad.

*Prerequisite(s):* Upper division standing recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 113 – Fundamentals of Marketing Management (4 units)**

*Course Description:* Nature of product marketing by the business firm. Customer-product relationships, pricing and demand; new product development and marketing strategy; promotion and advertising; product life cycles; the distribution system; manufacturing, wholesaling, retailing. Government regulation and restraints.

*Prerequisite(s):* ECN 001A or ECN 001AY or ECN 001AV. For non-majors only.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ARE 136.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 115A – Economic Development (4 units)**

*Course Description:* Major issues encountered in emerging from international poverty, problems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 115A.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ARE 115B – Economic Development (4 units)**

*Course Description:* Macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 115B.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ARE 115BY – Economic Development (4 units)**

*Course Description:* Macroeconomic issues of developing countries. Problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Issues of policy concerning international borrowing and external debt of developing countries.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 1.50 hour(s), Web Virtual Lecture 1.50 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Economics, Managerial Economics, and International Relations Majors.

*Cross Listing:* ECN 115BY.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ARE 118 – Tax Accounting (4 units)**

*Course Description:* Development and application of a framework to understand the tax effects of typical management decisions on both entities and their owners. Impacts that different methods of taxation have on business entities with emphasis on tax planning, using income and deduction strategies, retirement plans, and choice of business entity for tax minimization. Irregularly offered.

*Prerequisite(s):* MGT 011A C- or better; MGT 011B C- or better; ARE 018 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 119 – Intermediate Managerial Accounting (4 units)**

*Course Description:* Use of accounting information by managers in decision making, planning, directing and controlling operations. Focuses on managerial/cost accounting theory and practice. Covers costing systems, budgeting, and financial statement analysis.

*Prerequisite(s):* MGT 011A C- or better; MGT 011B C- or better.

*Learning Activities:* Lecture 4 hour(s), Extensive Problem Solving 8 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 120 – Agricultural Policy (4 units)**

*Course Description:* Analytical treatment of historical and current economic problems and governmental policies influencing American agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of American agriculture.

*Prerequisite(s):* ARE 100A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Animal Science & Management (AANM) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 120S – Agricultural Policy (4 units)**

*Course Description:* Analytical treatment of historical and current economic problems and governmental policies influencing agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of agriculture. May be taught abroad in Australia under the supervision of a UC Davis faculty member. Not currently offered.

*Prerequisite(s):* ARE 100A; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ARE 120.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ARE 121 – Economics of Agricultural Sustainability (4 units)**

*Course Description:* Application of economic concepts to agro-environmental issues relevant to agricultural sustainability. Topics include market efficiency, production externalities, government policies, agricultural trade, product differentiation, all linked to sustainability issues. Case studies include biofuels, genetically modified foods and geographically differentiated products.

*Prerequisite(s):* ECN 001A C- or better or ECN 001AY C- or better. or ECN 001AV C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Majors in the College of Agricultural & Environmental Sciences and Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 130 – Agricultural Markets (4 units)**

*Course Description:* Nature, function, organizational structure, and operation of agricultural markets; prices, costs, and margins; market information, regulation, and controls; cooperative marketing. Irregularly offered.

*Prerequisite(s):* ARE 106 C- or better; ARE 100A C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Animal Science & Management (AANM) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 132 – Cooperative Business Enterprises (4 units)**

*Course Description:* Study of cooperative business enterprise in the United States and elsewhere; economic theories of behavior, principles of operation, finance, decision-making, and taxation.

*Prerequisite(s):* ECN 001A C- or better or ECN 001AY C- or better or ECN 001AV C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) and Animal Science & Management Majors (AANM) and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 133 – Introduction to Behavioral Economics (4 units)**

*Course Description:* Inclusion of non-economic factors such as psychological principles in economic decisions and model predictions. Emphasis on behavioral principles, resulting strategies and implications for diverse market settings.

*Prerequisite(s):* (ECN 001A C- or better or ECN 001AY C- or better or ECN 001AV C- or better); (STA 013 C- or better or STA 013Y C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics majors.

*Grade Mode:* Letter.

## **ARE 135 – Agribusiness Marketing Plan Development (2 units)**

*Course Description:* Fundamental components required to develop a marketing plan. Appreciation of the concept of marketing plans, appropriate research required, including the use of library, Internet, survey and interview instruments, government documents, market analysis, business proposition, action planning, financial evaluation and monitoring.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

## **ARE 136 – Managerial Marketing (4 units)**

*Course Description:* Application of economic theory and econometrics to the study of marketing and consumer research. Emphasis on industry structure, history, regulatory aspects, integrated brand promotion, market segmentation, optimal product mix, message placement.

*Prerequisite(s):* ARE 100B C- or better; ARE 106 C- or better; ARE 100A C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Animal Science & Management (AANM) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 138 – International Commodity & Resource Markets (4 units)**

*Course Description:* Basic nature and scope of international trade in agricultural commodities, agricultural inputs, and natural resources. Market dimensions and policy institutions. Case studies to illustrate import and export problems associated with different regions and commodities.

*Prerequisite(s):* ARE 100A C- or better; ARE 100B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Animal Science & Management (AANM) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 139 – Futures & Options Markets (4 units)**

*Course Description:* History, mechanics, and economic functions of futures and options markets; hedging; theory of inter-temporal price formation and behavior of futures and options prices; price forecasting; futures and options as policy tools.

*Prerequisite(s):* ARE 100A C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 140 – Farm Management (4 units)**

*Course Description:* Farm organization and resources; economic and technological principles in decision making; analytical techniques and management control; problems in organizing and managing the farm business. Irregularly offered.

*Prerequisite(s):* ECN 001A C- or better or ECN 001AY C- or better or ECN 001AV C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 142 – Personal Finance (3 units)**

*Course Description:* Management of income and expenditures by the household. Use of consumer credit, savings, and insurance by households. Principles of tax, retirement, and estate planning.

*Prerequisite(s):* ECN 001B or ECN 001BV.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 143 – Investments (4 units)**

*Course Description:* Survey of investment institutions, sources of investment information, and portfolio theory. Analysis of the stock, bond and real estate markets from the perspective of the investor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to upper division Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Credit Limitation(s):* Not open for credit to students concurrently enrolled in or have completed ARE 171 or ARE 171A.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 144 – Real Estate Economics (4 units)**

*Course Description:* Economic theory, analysis, and institutions of real estate markets and related financial markets. Techniques for appraising property values. Cases drawn from the raw land, single family, multifamily, industrial and office real estate markets.

*Prerequisite(s):* ARE 100A C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 145 – Farm & Rural Resources Appraisal (4 units)**

*Course Description:* Principles and procedures of the valuation process with emphasis placed on rural real estate. Includes identification of the major physical and economic determinants of value, the three primary appraisal approaches to valuation, discussion of appraisal activity and practice.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Animal Science & Management (AANM) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 146 – Business, Government Regulation, & Society (4 units)**

*Course Description:* Variety, nature and impact of government regulation: anti-trust laws and economic and social regulation. Nature of the legislative process, promulgation of regulations, and their impact, especially as analyzed by economists.

*Prerequisite(s):* ARE 100A C- or better; ARE 100B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH).

## **ARE 147 – Resource & Environment Policy Analysis (3 units)**

*Course Description:* Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. Not currently offered.

*Prerequisite(s):* ECN 001A or ECN 001AY or ECN 001AV.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to non-majors only.

*Credit Limitation(s):* Students who have had or are taking ARE 100A, ECN 100, or the equivalent, may receive only 2 units of credit, so must enroll in ARE 147M instead.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 147M – Resource & Environmental Policy Analysis (2 units)**

*Course Description:* Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. Not currently offered.

*Prerequisite(s):* ECN 001A or ECN 001AY or ECN 001AV.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to non-majors only.

*Credit Limitation(s):* Students who have had or are taking ARE 100A, ECN 100, or the equivalent, must enroll in this course for 2 units rather than ARE 147.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 150 – Agricultural Labor (4 units)**

*Course Description:* Analysis of labor markets with focus on U.S. and world agriculture. Labor supply, demand, market equilibrium; why farm labor markets are different; global trends in farm labor; U.S. farm labor history; unions and collective bargaining; immigration policy.

*Prerequisite(s):* ARE 100A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 155 – Operations Research & Management Science (4 units)**

*Course Description:* Introduction to quantitative methods used to analyze business and economic processes: decision analysis for management, mathematical programming, competitive analysis, and other methods.

*Prerequisite(s):* ARE 100A C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) and Animal Science & Management (AANM) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

## **ARE 156 – Introduction to Mathematical Economics (4 units)**

*Course Description:* Linear algebra for economists; necessary and sufficient conditions in static optimization problems; implicit function theorem; economic methodology and mathematics; comparative statics; envelope theorem; Le Chatelier principle; applications to production and consumer models. Not currently offered.

*Prerequisite(s):* ARE 100B; ARE 155; ARE 100A C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

## **ARE 157 – Analysis for Operations & Production Management (4 units)**

*Course Description:* Application of economic theory and quantitative methods to analyze operations and production management problems including process strategy, quality management, location and plant layout, and inventory management.

*Prerequisite(s):* ARE 155 C- or better; ARE 100A C- or better; (STA 013 C- or better or STA 013Y C- or better); STA 103 C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Animal Science & Management (AANM) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 165 – Emerging Economies & Globalization (4 units)**

*Course Description:* Economic drivers and policy challenges in the major emerging markets, with an emphasis on the effects of rising incomes, population growth, urbanization, and relative wages on world markets and natural resources. Not currently offered.

*Prerequisite(s):* ARE 100A C- or better; ARE 115A; ARE 115B; completion of ARE 106 ECN 162 strongly recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics and graduate majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 166 – Economics of Global Poverty Reduction: What Works & Why (4 units)**

*Course Description:* Application of microeconomic theory and econometrics to understand causes of poverty and critically evaluate poverty alleviation policies in low income countries. Irregularly offered.  
*Prerequisite(s):* (ARE 100B C- or better or ECN 100B C- or better); (ARE 106 C- or better or ECN 140 C- or better); (ARE 115A C- or better or ECN 115A C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) and Economics (LECN) majors only.

*Grade Mode:* Letter.

## **ARE 171 – Principles of Finance (4 units)**

*Course Description:* Principles of corporate financial management. Time value of money, interest rates, principles of valuation, NPV, risk and return, and cost of capital.

*Prerequisite(s):* ARE 100A C- or better; ARE 106 C- or better; MGT 011A C- or better; MGT 011B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics Majors and Agricultural & Resource Economics Graduate Majors.

*Credit Limitation(s):* Not open for credit to students who have completed ECN 134.

*Grade Mode:* Letter.

## **ARE 172 – Financial Management of the Firm (4 units)**

*Course Description:* Financial analysis at the firm level: optimizing capital structure; minimizing the cost of capital; dividend policies; mergers and acquisitions; real options; and risk management.

*Prerequisite(s):* ARE 171 C- or better; ARE 106 C- or better; ARE 100A C- or better; MGT 011A C- or better; MGT 011B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics Majors and Agricultural & Resource Economics Graduate Majors.

*Grade Mode:* Letter.

## **ARE 173 – Capital Markets (4 units)**

*Course Description:* Introduction to asset pricing. Valuation and risk characteristics of financial assets, including stocks, bonds, futures, and options. Investors' attitudes toward risk, capital allocation, portfolio selection, the capital asset pricing model, and the efficient market hypothesis.

*Prerequisite(s):* ARE 171 C- or better; ARE 106 C- or better; ARE 100A C- or better; MGT 011A C- or better; MGT 011B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics majors and Agricultural & Resource Economics Graduate Majors.

*Grade Mode:* Letter.

## **ARE 175 – Natural Resource Economics (4 units)**

*Course Description:* Economic concepts and policy issues associated with natural resources, renewable resources (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil).

*Prerequisite(s):* ARE 100A C- or better or ECN 100A C- or better or ECN 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) and Environmental Policy Analysis & Planning (AEPP) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Cross Listing:* ESP 175.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 176 – Environmental Economics (4 units)**

*Course Description:* Role of the environment in economic activity and methods for protecting and enhancing environmental quality; implications of market failures for public policy; design of environmental policy; theory of welfare measurement; measuring the benefits of environmental improvement.

*Prerequisite(s):* ARE 100A C- or better or ECN 100A C- or better or ECN 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE) Majors and Agricultural & Resource Economics (GARE) Graduate Majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 190 – Topics in Managerial Economics (3 units)**

*Course Description:* Selected topics in managerial economics, focusing on current research.

*Prerequisite(s):* ARE 100A; STA 103; and consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated 4 time(s) when the topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ARE 192 – Internship (1-6 units)**

*Course Description:* Internship experience off and on campus in all subject areas offered in the Department of Agricultural & Resource Economics. Internships are supervised by a member of the staff.

*Learning Activities:* Internship 3-18 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

## **ARE 194HA – Special Study for Honors Students (4 units)**

*Course Description:* A program of research culminating in the writing of a senior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* ARE 100B; ARE 106; ARE 155 (can be concurrent); and consent of instructor; minimum GPA of 3.500; major in Agricultural Managerial Economics or Managerial Economics; senior standing.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **ARE 194HB – Special Study for Honors Students (4 units)**

*Course Description:* A program of research culminating in the writing of a senior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* ARE 100B; ARE 106; ARE 155 (can be concurrent); minimum GPA of 3.500; major in Agricultural Managerial Economics or Managerial Economics; senior standing.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **ARE 197T – Tutoring in Managerial Economics (1-3 units)**

*Course Description:* Undergraduates assist the instructor by tutoring students in one of the department's regularly scheduled courses.

*Prerequisite(s):* Senior standing in Managerial Economics and consent of Department Chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

## **ARE 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

## **ARE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

## **ARE 200A – Microeconomic Theory (4 units)**

*Course Description:* Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 200A.

*Grade Mode:* Letter.

## **ARE 200B – Microeconomic Theory (4 units)**

*Course Description:* Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure.

*Prerequisite(s):* ARE 200A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 200B.

*Grade Mode:* Letter.

## **ARE 200C – Microeconomic Theory (4 units)**

*Course Description:* Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly informed.

*Prerequisite(s):* ARE 200B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 200C.

*Grade Mode:* Letter.

## **ARE 202A – Introduction to Applied Research Methods (4 units)**

*Course Description:* Study of philosophy and methodology of applied research in agricultural economics. Methods of conceptualization of researchable topics. Method of communication and constructive criticism.

*Prerequisite(s):* ARE 204A; ARE 200A (can be concurrent); ARE 256A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 202B – Applied Microeconomics: Consumer & Producer Behavior (4 units)**

*Course Description:* Application of consumer and producer theory in models of individual behavior and market-level phenomena. Implications of consumer and producer theory for specification of empirical models of supply and demand for inputs and outputs and market equilibrium displacement models.

*Prerequisite(s):* ARE 200A; ARE 200B (can be concurrent); ARE 202A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 202C – Research Design for Applied Microeconomics (4 units)**

*Course Description:* Third of three courses in the Ph.D. level applied microeconomics sequence. Examines the design of empirical research and the application of econometric theory.

*Prerequisite(s):* ARE 202B; ARE 240A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 204A – Microeconomic Analysis I (4 units)**

*Course Description:* Behavior of consumers and producers and their interactions; tools and methods needed to analyze economic behavior in the marketplace. Application of those methods to real-world problems.

*Prerequisite(s):* ARE 100B or ECN 100; advanced undergraduates with consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 204B – Microeconomic Analysis II (4 units)**

*Course Description:* Behavior in imperfectly competitive markets—monopoly and price discrimination; oligopoly. Introduction to noncooperative game theory. Analysis of decisions made under risk and uncertainty and imperfect information. The economics of externalities and public goods.

*Prerequisite(s):* ARE 204A; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ARE 214 – Development Economics (4 units)**

*Course Description:* Review of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts.

*Prerequisite(s):* ARE 100A; ARE 100B; ECN 101; ARE 204A and ECN 160A; ECN 160B recommended.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* ECN 214.

*Grade Mode:* Letter.

**ARE 215A – Microdevelopment Theory & Methods I (4 units)**

*Course Description:* Agricultural development theory, with a focus on microeconomics. Agricultural household behavior with and without imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts.

*Prerequisite(s):* ARE 200A or ARE 204A; ARE 240A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 215A.

*Grade Mode:* Letter.

**ARE 215B – Open Macroeconomics of Development (4 units)**

*Course Description:* Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt are discussed in the macroeconomic framework of an open developing country. Basic analytical focus is real exchange rate and its impact on sectoral allocation of resources.

*Prerequisite(s):* (ARE 200A or ARE 204A); (ARE 214 or ARE 215A); (ARE 200D or ARE 205).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 215B.

*Grade Mode:* Letter.

**ARE 215C – Microdevelopment Theory & Methods II (4 units)**

*Course Description:* Extension of development theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multisectoral, including village and regional models.

Computable general equilibrium methods and applications.

*Prerequisite(s):* ARE 215A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 215C.

*Grade Mode:* Letter.

**ARE 215D – Environmental & Economic Development (4 units)**

*Course Description:* Interdisciplinary course drawing on theoretical and empirical research on interactions between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and development economics.

*Prerequisite(s):* ARE 200A; (ARE 204A or ARE 275).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 215D.

*Grade Mode:* Letter.

**ARE 222 – International Agricultural Trade & Policy (4 units)**

*Course Description:* Analysis of country interdependence through world agricultural markets. Partial equilibrium analysis is used to study the impacts of national intervention on world markets, national policy choice in an open economy and multinational policy issues.

*Prerequisite(s):* (ARE 100B or ARE 204A); ECN 160A; or the equivalent of ECN 160A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ARE 223 – Economics of Agriculture (4 units)**

*Course Description:* Analytic treatment of the historical development and contemporary role of agriculture in the global, U.S. and California economies. Uses economic reasoning and evidence to develop historical and conceptual understanding of the economics of agriculture, agricultural issues, and related government policies.

*Prerequisite(s):* ARE 204A (can be concurrent); ARE 256A (can be concurrent); or equivalent course(s) completed or concurrent required.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to M.S. students in Agricultural & Resource Economics; Ph.D. students in Agricultural & Resource Economics and qualified students from other UC Davis graduate groups/programs.

*Grade Mode:* Letter.

**ARE 231 – Supply & Demand for Agricultural Products (4 units)**

*Course Description:* Analysis of supply and demand for agricultural commodities emphasizing the effective use of microeconomic theory with econometric methods, and other empirical procedures, in conducting applied analysis of supply and demand at the firm and industry level.

*Prerequisite(s):* ARE 200A; ARE 202A; ARE 240A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ARE 232 – Agricultural Commodity Markets (4 units)**

*Course Description:* Economic analysis of industries that produce, market, transport, store, and process basic commodities. Analysis of market equilibrium under perfect and imperfect competition, with and without government involvement.

*Prerequisite(s):* ARE 200A; ARE 202A; ARE 240A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ARE 233 – Agricultural Policy (4 units)**

*Course Description:* Nature, formation, evolution, and institutions of economic policy applied to food, agricultural, and rural issues. Examples for detailed consideration include food security, commodity issues, and trade policy. Analytical approaches include static and dynamic welfare analysis, policy design, and political-economic analysis.

*Prerequisite(s):* ARE 200A; ARE 202A; ARE 240A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ARE 239 – Econometric Foundations (4 units)**

*Course Description:* Prepares students for econometric theory and empirical work by examining the statistical foundation of econometrics. Special attention is paid to problems specific to non-experimental data common to social sciences. Topics from matrix algebra are also covered.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 239.

*Grade Mode:* Letter.

**ARE 240A – Econometric Methods (4 units)**

*Course Description:* Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedasticity; autocorrelation; lagged dependent variables.

*Prerequisite(s):* ARE 239; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 240A.

*Grade Mode:* Letter.

**ARE 240B – Econometric Methods (4 units)**

*Course Description:* Topics include asymptotic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, errorcorrection models, and qualitative and limited dependent variable models.

*Prerequisite(s):* ARE 240A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 240B.

*Grade Mode:* Letter.

**ARE 240C – Time Series Econometrics (4 units)**

*Course Description:* Probability theory; estimation, inference and forecasting of time series models; trends and non-standard asymptotic theory; vector time series methods and cointegration; time series models for higher order moments and transition data; state-space modeling; the Kalman filter.

*Prerequisite(s):* ARE 240B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 240C.

*Grade Mode:* Letter.

**ARE 240D – Cross Section Econometrics (4 units)**

*Course Description:* Estimation and inference for nonlinear regression models for cross-section data; models for discrete data and for limited dependent variables; models for panel data; additional topics such as bootstrap and semiparametric regression.

*Prerequisite(s):* ARE 240B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 240D.

*Grade Mode:* Letter.

**ARE 240E – Topics in Time Series Econometrics (4 units)**

*Course Description:* Modern econometric techniques for time series data. Expand on topics covered in ECN 240A, ECN 240B and ECN 240C. Contents vary from year to year.

*Prerequisite(s):* ARE 240C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 240E.

*Grade Mode:* Letter.

**ARE 240F – Topics in Cross Section Econometrics (4 units)**

*Course Description:* Modern econometrics techniques for cross-section data. Expand on topics covered in ECN 240A, ECN 240B and ECN 240D. Contents vary from year to year.

*Prerequisite(s):* ARE 240D; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECN 240F.

*Grade Mode:* Letter.

**ARE 252 – Optimization with Economic Applications (4 units)**

*Course Description:* Microeconomic topics in the framework of mathematical programming.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ARE 254 – Dynamic Optimization Techniques with Economic Applications (4 units)**

*Course Description:* Necessary and sufficient conditions in the calculus of variations and optimal control, economic interpretations, the dynamic envelope theorem and transversality conditions, infinite horizon problems and phase diagrams, local stability and comparative statics of the steady state, comparative dynamics.

*Prerequisite(s):* Elementary knowledge of ordinary differential equations.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ARE 255 – Applied Dynamic Structural Econometric Modeling (4 units)**

*Course Description:* Covers structural econometric models of static games of incomplete information, single-agent dynamic optimization problems and multi-agent dynamic games, with a focus on applications to issues relevant to the environment, energy, natural resources, agriculture, and development.

*Prerequisite(s):* ARE 254.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ARE 256A – Applied Econometrics I (4 units)**

*Course Description:* First of two courses in the Masters-level econometrics sequence. The linear regression model and generalizations are applied to topics in applied economics. Tools for empirical research for problems requiring more sophisticated tools than standard regression models are emphasized.

*Prerequisite(s):* ARE 106 or ECN 140; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ARE 256B – Applied Econometrics II (4 units)**

*Course Description:* Second of two courses in the Masters-level econometrics sequence. The linear regression model and generalizations are applied to a variety of topics in applied economics. Tools for empirical research for problems requiring more sophisticated tools than standard regression models are emphasized.

*Prerequisite(s):* ARE 256A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ARE 258 – Demand & Market Analysis (4 units)**

*Course Description:* Application of theoretical material covered in ECN 204A and ECN 204B, with particular focus on production theory/factor demand and imperfect competition/market power. Use of theoretical models as a foundation for empirical economic analysis, and empirical exercises. Independent research on chosen topics, with empirical application.

*Prerequisite(s):* ARE 204B; ARE 256B; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 271 – Financial Economics (4 units)**

*Course Description:* Risk, aversion, choice under uncertainty. Arrow-Debreu securities. Valuation and risk characteristics of financial assets, capital allocation, portfolio selection, Capital Asset Pricing Model, efficient market hypothesis. Applications to topics in agricultural, resource and development economics.

*Prerequisite(s):* ARE 204A; ARE 256A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 275 – Economic Analysis of Resource & Environmental Policies (4 units)**

*Course Description:* Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economic models. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain.

*Prerequisite(s):* ARE 204A.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* ESP 275.

*Grade Mode:* Letter.

## **ARE 276A – Environmental Economics: Externalities (4 units)**

*Course Description:* Introduces fundamental and recent research in environmental economics, focusing on the design, implementation and evaluation of environmental policy instruments to correct market failures. Exposure to economic theories and empirical techniques frequently used in this field.

*Prerequisite(s):* Students should have completed the first year graduate level sequence in microeconomics and econometrics.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 276B – Environmental Economics: Non-Market Valuation (4 units)**

*Course Description:* Second Ph.D. field course in environmental economics, covering theory and econometrics of methods for valuing non-market goods and environmental quality changes. Topics include revealed preference (travel cost, hedonics, sorting equilibrium) and stated preference (contingent valuation, choice experiments, conjoint analysis) techniques.

*Prerequisite(s):* Students should have completed the first year graduate level sequence in microeconomics and econometrics.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 277 – Natural Resource Economics (4 units)**

*Course Description:* Application of capital theory and dynamic methods to issues of optimal use of renewable and nonrenewable resources. Examination of policy issues associated with forests, fisheries, groundwater, energy resources, watersheds, soil, global climate, and wildlife.

*Prerequisite(s):* ARE 254; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ARE 290 – Topics in Agricultural & Resource Economics (3 units)**

*Course Description:* Selected topics in agricultural and resource economics, focusing on current research.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Letter.

## **ARE 293 – Analysis of California Agriculture & Resources (3 units)**

*Course Description:* Review and analysis of production, marketing, and resource issues facing agricultural firms in California. Application of economic theory and measurement to individual firm and industry decisions in an applied setting. Fieldwork-45 hours total, including one five-day summer field trip.

*Learning Activities:* Lecture 1.50 hour(s), Fieldwork 45 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ARE 298 – Directed Group Study (1-5 units)**

*Course Description:* Advanced study through special seminars, informal group studies, or group research on problems for analysis and experimentation. Sections:(1) Managerial Economics; (2) Agricultural Policy; (3) Community & Regional Development; (4) Natural Resources; (5) Human Resources; (6) Research Methods & Quantitative Analysis.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **ARE 299 – Individual Study (1-12 units)**

*Course Description:* Sections: (1) Managerial Economics; (2) Agricultural Policy; (3) Community & Regional Development; (4) Natural Resources; (5) Human Resources; (6) Research Methods & Quantitative Analysis; and (7) Dissertation Research Prospectus.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ARE 299D – Special Study for Doctoral Dissertation (1-12 units)**

*Course Description:* Special study for doctoral dissertation.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ARE 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Agricultural Education (AED)**

## **College of Agricultural & Environmental Sciences**

### **AED 092 – Internship (1-12 units)**

*Course Description:* Supervised internship off and on campus in areas of agricultural education.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

### **AED 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **AED 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* AED support moved to ANS, informed July 2018 by Lisa Holmes. Subject moved in ICMS, took some time.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **AED 100 – Concepts in Agricultural & Environmental Education (3 units)**

*Course Description:* Philosophy and nature of formal and non-formal agricultural and environmental education programs. Emphasis on understanding the role of the teacher and observing a variety of programs.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

### **AED 160 – Vocational Education (3 units)**

*Course Description:* Philosophy and organization of vocational education, with particular reference to educational principles for agriculture commerce, home economics, and industry.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **AED 171 – Audiovisual Communications (2 units)**

*Course Description:* Theory and principles of audiovisual communications. Comparison of audiovisual materials such as transparencies, slides, computer-generated graphics, and videos. Operation and use of audiovisual equipment is stressed.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

### **AED 172 – Multimedia Productions (3 units)**

*Course Description:* Design and production of educational, technical, and professional multimedia presentations. Instructional or professional presentations using a variety of media, including slides, video, transparencies, and computer-generated graphics.

*Prerequisite(s):* AED 171 recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

### **AED 178 – Capstone for Agricultural & Environmental Education Majors (4 units)**

*Course Description:* Critical thinking in reference to undergraduate coursework. Assessment of Agricultural & Environmental Education Student Learning Outcomes. Preparation to utilize these concepts and skills professionally.

*Learning Activities:* Lecture 3 hour(s); Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students with upper division standing only.

*Grade Mode:* Letter.

### **AED 190 – Seminar in Agricultural Education (2 units)**

*Course Description:* Discussion of selected critical issues in agricultural education.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Pass/No Pass only.

### **AED 192 – Internship (1-12 units)**

*Course Description:* Supervised internship off and on campus in areas of agricultural education.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

### **AED 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **AED 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## AED 300 – Directed Field Experience in Teaching (2 units)

*Course Description:* Experience as teaching assistant in agriculture or home economics programs in public schools.

*Prerequisite(s):* AED 100.

*Learning Activities:* Discussion 1 hour(s), Fieldwork 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## AED 301 – Planning for Instructional Programs (3 units)

*Course Description:* Major paradigms in program planning and development. Emphasis on key steps in curriculum development, including selection and organization of educational objectives, learning experiences and teaching materials and resources.

*Prerequisite(s):* AED 100; AED 300 (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## AED 302 – Teaching Methods in Agricultural Education (3 units)

*Course Description:* Development of teaching strategies with special emphasis on the designing of learning experiences, instructional execution, and use of teaching aids in agricultural education.

*Prerequisite(s):* AED 100; AED 300 (can be concurrent).

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

## AED 306A – Field Experience with Future Farmers of America & Supervised Experience Programs (4 units)

*Course Description:* Develop an understanding of the Future Farmers of America and supervised occupational experience programs through planning, conducting, and evaluating actual programs.

*Prerequisite(s):* AED 306B (can be concurrent); acceptance into a teacher education program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 6 hour(s).

*Grade Mode:* Letter.

## AED 306B – Field Experience in Teaching Agriculture (5-18 units)

*Course Description:* Directed teaching including supervision of occupational experience programs and youth activities in secondary schools or community colleges.

*Prerequisite(s):* AED 306A (can be concurrent); AED 100; AED 300; AED 301; AED 302; and consent of instructor; acceptance into a teacher education program.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 18 unit(s).

*Grade Mode:* Letter.

## AED 323 – Resource Development: Agricultural Education (3 units)

*Course Description:* Selection and implementation of community resources in teaching.

*Prerequisite(s):* AED 306A; AED 306B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## AED 390 – Seminar: Issues in Agricultural Education (2 units)

*Course Description:* Discussion and evaluation of current issues, theories and research in agricultural education.

*Prerequisite(s):* AED 306A; AED 306B; acceptance into a teacher education program.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

# American Studies (AMS)

College of Letters & Science

## AMS 001C – American Lives Through Autobiography (4 units)

*Course Description:* American culture as understood through the individual life stories told by Americans, with attention to the roles of gender, race, ethnicity, social class, and sexual orientation in the individual's life course.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## AMS 001E – Nature & Culture in America (4 units)

*Course Description:* Uses and abuses of nature in America; patterns of inhabitation, exploitation, appreciation, and neglect; attention to California; emphasis on metaphor as a key to understanding ourselves and the natural world; attention to models of healing: stewardship, ecology, the "rights" movement.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## AMS 004 – Freshman Seminar (2 units)

*Course Description:* Investigation of a special topic in American Studies through shared readings, discussions, written assignments, and special activities (such as fieldwork, site visits). Emphasis on student participation in learning.

*Prerequisite(s):* Open only to students who have completed fewer than 40 quarter units.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Grade Mode:* Letter.

## AMS 005 – Technology in American Lives (4 units)

*Course Description:* Technology as both a material cultural force and a symbol in American culture; the lives of engineers at work and play; images of the engineer and technology in popular culture; social political and ethical issues raised by technology.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**AMS 010 – Introduction to American Studies (4 units)**

*Course Description:* Ideals, conflicts, and realities defining American Cultures through study of popular music, advertising, and other media. Themes include Imagining America, Citizenship and Belonging, and Cultural/Spatial Practices.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AMS 012 – U.S. Disability Culture & Medicine (4 units)**

*Course Description:* Disability as a form of social exclusion; disability as social and cultural identity; intersections of disability with race, gender, class, and sexuality; popular culture, art, television, film, and literature by disabled people; critiques of medicine by people with disabilities; health disparities; ways to make medicine more inclusive.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AMS 021 – Objects & Everyday Life (4 units)**

*Course Description:* Material culture (objects and artifacts ranging from everyday objects like toys and furnishings to buildings and constructed landscapes) as evidence for understanding the everyday (vernacular) lives (gender, social class, ethnicity, region, age, and other factors; collecting and displaying material).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AMS 025 – United States as a Business Culture (4 units)**

*Course Description:* Business as a cultural system and its relation to religion, politics, arts, science, technology, and material culture; business themes of success, creativity, invention, and competition in American autobiographies, fiction, advice literature, film, and television; cultures of the workplace; multinational business.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AMS 030 – Images of America & Americans in Popular Culture (4 units)**

*Course Description:* Investigation of verbal and visual discourses about American identity in various popular culture products, including film, television, radio, music, fiction, art, advertising, and commercial experiences; discourses about the United States in the popular culture of other societies.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AMS 055 – Food in American Culture (4 units)**

*Course Description:* Relationship between food and culture; relationship between food and the social order; influences on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* FST 055.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AMS 059 – Music & American Culture (4 units)**

*Course Description:* Examination of music and American culture.

Studies will explore music in its cultural contexts, which may include examinations of recording and broadcasting, of race, class, and gender, the role of technology, and relationships between musical production, consumption and listening.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**AMS 095 – Careers & Identity in American Culture (2 units)**

*Course Description:* Defining one's identity through the career. Life course, preparation, and choices. Personality and career. Ethics. Gender, ethnicity, sexuality, and social class in the workplace. Transnational workplace. Conflicts between the career and other social roles.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**AMS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**AMS 099 – Individual Study for Undergraduates (1-5 units)**

*Course Description:* Individual study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**AMS 100 – Methods in American Studies (4 units)**

*Course Description:* Design and implementation of interdisciplinary research, analysis and writing for American Studies and other cultural studies fields. Library and Internet research skills, project/problem definition, methods for study of texts, individuals, communities. Hand-on, skill-building, focused reading, discussion.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **AMS 101A – Special Topics: Popular Culture Studies (4 units)**

*Course Description:* Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **AMS 101B – Special Topics: Queer & Trans Studies (4 units)**

*Course Description:* Intensive reading, writing, and special projects in queer and/or transgender studies. Specific topic depends on research interests of the instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **AMS 101C – Special Topics: Material Aspects of American Culture (4 units)**

*Course Description:* Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **AMS 101E – Special Topics: American Lives Through Autobiography (4 units)**

*Course Description:* Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **AMS 101F – Special Topics: Interrelationship Between Arts & Ideas (4 units)**

*Course Description:* Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **AMS 101G – Special Topics: New Directions in American Culture Studies (4 units)**

*Course Description:* Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **AMS 101H – Special Topics: Problems in Cross-Cultural American Studies (4 units)**

*Course Description:* Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **AMS 110 – A Decade in American Civilization (4 units)**

*Course Description:* Close examination of a single decade in American civilization; the connections between the history, literature, arts, customs, and ideas of Americans living in the decade. Issues and representations of race, class, gender, age, and sexuality in the decade.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Repeat Credit:* May be repeated when studied decades differ.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 125 – Corporate Cultures (4 units)**

*Course Description:* Exploration of the small group cultures of American corporate workplaces, including the role of environment, stories, jokes, rituals, ceremonies, personal style, and play. The effects of cultural diversity upon corporate cultures, both from within and in contact with foreign corporations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

## **AMS 130 – American Popular Culture (4 units)**

*Course Description:* American popular expression and experience as a cultural system, and the relationship between this system and elite and folk cultures. Exploration of theories and methods for discovering and interpreting patterns of meaning in American popular culture.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 139 – Feminist Cultural Studies (4 units)**

*Course Description:* Histories, theories, and practices of feminist traditions within cultural studies.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* GSW 139.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 150 – Interdisciplinary Approaches to Environmental Justice/Injustice (4 units)**

*Course Description:* Environmental justice through interdisciplinary lenses. Frameworks that analyze environmental issues through the lens of social justice and human inequality, specifically categories of race, class, gender, nature and nation. Particular focus on California and the Central Valley.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 151 – American Landscapes & Places (4 units)**

*Course Description:* Comparative study of several American cultural populations inhabiting a region, including their relationship to a shared biological, physical, and social environment, their intercultural relations, and their relationships to the dominant American popular and elite culture and folk traditions.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 152 – The Lives of Children in America (4 units)**

*Course Description:* Experience of childhood and adolescence in American culture, as understood through historical, literary, artistic, and social scientific approaches.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 153 – The Individual & Community in America (4 units)**

*Course Description:* Interdisciplinary examination of past and present tensions between the individual and the community in American experience, as those tensions are expressed in such cultural systems as folklore, public ritual, popular entertainment, literature, fine arts, architecture, and social thought.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 154 – The Lives of Men in America (4 units)**

*Course Description:* Interdisciplinary examination of the lives of boys and men in America, toward understanding cultural definitions of masculinity, the ways individuals have accepted or resisted these definitions, and the broader consequences of the struggle over the social construction of gender.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 155 – Eating in America (4 units)**

*Course Description:* Interdisciplinary examination of the culture of food in America. Exploration of eating as a richly symbolic event integral to how Americans express and negotiate values, politics and identity.

*Learning Activities:* Lecture 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 156 – Race, Culture & Society in the United States (4 units)**

*Course Description:* Interdisciplinary examination of the significance of race in the making of America; how race shapes culture, identities and social processes in the United States; the interweaving of race with gender, class and nationhood in self and community.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 157 – Animals in American Culture (4 units)**

*Course Description:* Animals as symbols in American thought, as found in folklore, popular culture, literature, and art; customs and stories around human-animal interactions, including hunting, religion, foodways, pets, zoos, circuses, rodeos, theme parks, and scientific research on animals.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **AMS 158 – Technology & the Modern American Body (4 units)**

*Course Description:* History and analysis of relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have taken TCS 158.

*Cross Listing:* CDM 158.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **AMS 160 – Undergraduate Seminar in American Studies (4 units)**

*Course Description:* Intensive reading, discussion, research, and writing by small groups in selected topics of American Studies scholarship; emphasis on theory and its application to American material.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One restricted to American Studies majors; limited enrollment.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

**AMS 190A – Senior Thesis Research Seminar (4 units)**

*Course Description:* Research and prospectus writing for senior thesis.  
*Learning Activities:* Seminar 2 hour(s), Extensive Writing.  
*Grade Mode:* Letter.

**AMS 190B – Senior Thesis (4 units)**

*Course Description:* In consultation with advisor, student writes an extended research paper on a topic proposed in AMS 190A.  
*Prerequisite(s):* AMS 190A; consent of instructor.  
*Learning Activities:* Independent Study 12 hour(s).  
*Grade Mode:* Letter.

**AMS 192 – Internship in American Studies (1-12 units)**

*Course Description:* Supervised internship and study in social & community organizations, schools, cultural institutions (e.g., libraries, museums, and archives), or other work sites. Final written report and other assignments as per contract with supervisor.  
*Prerequisite(s):* Consent of instructor; enrollment dependent on availability of intern positions, with priority to American Studies majors.  
*Learning Activities:* Internship.  
*Repeat Credit:* May be repeated 12 unit(s).  
*Grade Mode:* Pass/No Pass only.

**AMS 197T – Tutoring in American Studies (1-5 units)**

*Course Description:* Tutoring in lower division American Studies courses, usually in small discussion groups. Periodic meetings with the instructor in charge; reports and readings.  
*Prerequisite(s):* Consent of Chairperson of American Studies Program.  
*Learning Activities:* Tutorial 1-5 hour(s).  
*Repeat Credit:* May be repeated when the tutoring is for a different course.  
*Grade Mode:* Pass/No Pass only.

**AMS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.

**AMS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.  
*Prerequisite(s):* Consent of instructor and chairperson of American Studies Program.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.

**AMS 220 – American Folklore & Folklife (4 units)**

*Course Description:* Theory and methods for the study of the folklore and the folk customary behavior of Americans; contributions of folklore studies to scholarship in humanities and social science disciplines.  
*Prerequisite(s):* Graduate standing or consent of instructor.  
*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

**AMS 250 – Cultural Study of Masculinities (4 units)**

*Course Description:* Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structure.  
*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Cross Listing:* WMS 250.  
*Grade Mode:* Letter.

**AMS 255 – Food in American Culture (4 units)**

*Course Description:* Interdisciplinary theories and methods for the study of food in American culture; food studies in relation to issues of identity (age, gender, ethnicity, religion, region, etc.), social relations, systems of production, and cultures of consumption.  
*Prerequisite(s):* Graduate standing or consent of instructor.  
*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Enrollment Restriction(s):* Graduate standing or advanced undergraduate with consent of instructor.  
*Grade Mode:* Letter.

**AMS 298 – Group Study (1-5 units)**

*Course Description:* Group study.  
*Learning Activities:* Variable 1-5 hour(s).  
*Grade Mode:* Pass/No Pass only.

**AMS 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.  
*Learning Activities:* Variable 1-12 hour(s).  
*Grade Mode:* Pass/No Pass only.

**AMS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.  
*Prerequisite(s):* Graduate standing.  
*Learning Activities:* Variable 1-4 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Pass/No Pass only.

**Anatomy, Physiology, & Cell Biology (APC)**

School of Veterinary Medicine

**APC 092 – Internship (1-12 units)**

*Course Description:* Internship experience off and on campus in all subject areas offered in the Department of Anatomy, Physiology & Cell Biology. Internships are supervised by a member of the faculty.  
*Prerequisite(s):* Consent of instructor; lower division standing.  
*Learning Activities:* Internship 3-36 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Pass/No Pass only.

**APC 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable 3-15 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Pass/No Pass only.

**APC 100 – Comparative Vertebrate Organology (4 units)**

*Course Description:* Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions.

*Prerequisite(s):* (BIS 001A, BIS 001B) or (BIS 002A, BIS 002B).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* NPB 123.

*Grade Mode:* Letter.

**APC 192 – Internship (1-15 units)**

*Course Description:* Internship experience off and on campus in all subject areas offered in the Department of Anatomy, Physiology & Cell Biology.

Internships are supervised by a member of the faculty.

*Prerequisite(s):* Upper division standing; approval of internship.

*Learning Activities:* Internship 3-45 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**APC 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**APC 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**APC 286 – Basics of Microscopy & Cellular Imaging (2 units)**

*Course Description:* Practical applications of basic microscope techniques used to image cells and tissues with the goal of using these techniques to generate publication quality images. Principles of light, epifluorescent, confocal and electron microscopy, their applications and limitations.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture 1 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Grade Mode:* Letter.

**APC 290 – Seminar (1 unit)**

*Course Description:* Discussion and critical evaluation of advanced topics and current trends in research.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**APC 291 – Topics in Biology of Respiratory System (1 unit)**

*Course Description:* Topics concerning structure and function of respiratory system. Possible topics include: lung growth, pulmonary reaction to toxicants, pulmonary inflammation, lung metabolism, biology of lung cells, tracheobronchial epithelium, nasal cavity structure and function.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**APC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 6-15 hour(s).

*Grade Mode:* Letter.

**APC 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 6-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Anesthesiology (ANE)****School of Medicine****ANE 192 – Internship in Anesthesiology (1-6 units)**

*Course Description:* Supervised work experience in anesthesia and related fields.

*Prerequisite(s):* Upper division standing; approval of project prior to period of internship by preceptor.

*Learning Activities:* Internship 3-18 hour(s), Project.

*Grade Mode:* Pass/Fail only.

**ANE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ANE 430 – Intro to Anesthesiology & Perioperative Medicine (3-6 units)**

*Course Description:* Introduction to anesthesiology during the MS3 year, with emphasis on introduction to the field of anesthesiology and the day-to-day practice of an anesthesiologist in the perioperative setting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**ANE 435 – Primary Care Multidisciplinary Pain Management (3 units)**

*Course Description:* Rotation will give 3rd year primary-care bound students an overview of the scope of Pain Medicine.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**ANE 455 – Externship in Anesthesiology (3-6 units)**

*Course Description:* Away clinical rotation in Anesthesiology or Pain Medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **ANE 460 – Anesthesiology Clinical Clerkship (3-18 units)**

*Course Description:* In-depth exposure to anesthesia through informal lectures and mentoring by anesthesiologists. Emphasis on understanding and applying anesthetic principles in managing administration of general, regional, and specialized areas.

*Prerequisite(s):* Consent of instructor; medical student.

*Learning Activities:* Variable 30 hour(s), Practice 10 hour(s), Discussion 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **ANE 461 – Perioperative Medicine (3-12 units)**

*Course Description:* Two week rotation provides a broad exposure to various patient care services within the Department of Anesthesiology and Pain Medicine to apply medical knowledge to safely care for patients.

*Prerequisite(s):* Successful completion of third-year clerkships; consent of instructor of record.

*Learning Activities:* Clinical Activity 30 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **ANE 462 – Perioperative Management of the Obstetric Patient (3-6 units)**

*Course Description:* Perioperative Management of Obstetric Patient advanced clinical clerkship will offer the medical student the chance to understand and be able to apply the principles of basic science into major improvements in obstetric anesthesia patient care.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **ANE 463 – Multidisciplinary Pain Management (3-6 units)**

*Course Description:* Senior clerkship to expose students to all facets of treating pain in all aspects of clinical care: outpatient and inpatient settings, acute and chronic pain, end of life issues, pediatrics, rehabilitation, etc. Daily clinics, rounds, and lectures.

*Prerequisite(s):* Senior medical student in good standing.

*Learning Activities:* Clinical Activity 30 hour(s), Lecture/Discussion 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **ANE 464 – Multidisciplinary Approach to the Neurosurgical Patient (3-9 units)**

*Course Description:* Participate in the perioperative care of patients undergoing neurosurgical procedures while under the supervision of anesthesia, neurology and neurosurgical ICU residents and attending physicians.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **ANE 465 – Away Acting Internship in Anesthesiology (3-18 units)**

*Course Description:* Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management.

*Prerequisite(s):* Consent of instructor; satisfactory completion of Anesthesiology Clerkship.

*Learning Activities:* Clinical Activity 40 hour(s), Variable 3-18 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **ANE 480 – Brief Introduction to Clinical Anesthesiology & Chronic Pain Management (3 units)**

*Course Description:* Daily experience in clinical anesthesiology at the preoperative screening unit, operating room, post anesthesia care unit, chronic pain management clinic with daily clinical correlation case discussions, and one-on-one interaction with faculty anesthesiologists.

*Prerequisite(s):* Second-year medical student.

*Learning Activities:* Clinical Activity 30 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **ANE 490 – A Pain in the Neck: Assessment & Management of Spinal Pain (3 units)**

*Course Description:* Designed to assess and treat spinal pain. Reviews the pathophysiology, clinical assessment, and management of: lumbar spinal pain, cervical spinal pain, differential diagnosis & differentiation between sacroiliac/hip/shoulder joint pain, medication management with risk assessment, and non-pharmacological treatments including interventional pain procedures, acupuncture, and psychological support.

*Learning Activities:* Seminar.

*Grade Mode:* Pass/Fail only.

## **ANE 493A – Applied Physiology & Pharmacology (6 units)**

*Course Description:* Review and demonstrate the application of basic physiology and pharmacology to patient care. There will be an in-depth analysis of the physiology and pharmacology of the cardiovascular, pulmonary, nervous, renal and endocrine systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **ANE 493B – Interdisciplinary Medicine in Pain Care (6 units)**

*Course Description:* Integrate applied and practical neuroanatomy, physiology, pharmacology, psychology/psychiatry and social medicine in the care of patients who are receiving care for pain caused by acute or chronic medical disease or trauma.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **ANE 493C – Applied Physiology & Pharmacology (3-6 units)**

*Course Description:* Review and demonstrate the application of basic physiology and pharmacology to patient care. In-depth analysis of the physiology and pharmacology of the cardiovascular, pulmonary, nervous, renal and endocrine systems.

*Learning Activities:* Variable.

*Grade Mode:* Pass/Fail only.

## **ANE 498 – Individual or Group Study (1-5 units)**

*Course Description:* Directed reading and discussion and/or laboratory investigation on selected topics.

*Prerequisite(s):* Interns and residents with consent of instructor.

*Learning Activities:* Discussion 1-5 hour(s), Laboratory 2-10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **ANE 499 – Anesthesiology Research (1-18 units)**

*Course Description:* Problems in clinical and/or laboratory research.

*Prerequisite(s):* Third- or fourth-year medical students, advanced standing undergraduate and veterinary medicine students; or consent of instructor.

*Learning Activities:* Laboratory 12-54 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Animal Behavior (ANB)**

College of Biological Sciences

## **ANB 201 – Scientific Approaches to Animal Behavior Research (3 units)**

*Course Description:* Philosophical issues, goals, strategies and tools in field and laboratory research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ANB 210 – History of Animal Behavior (1 unit)**

*Course Description:* Classic, seminal papers in animal behavior. Discussion of readings and broader historical context in which papers were written.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ANB 218A – Fundamentals of Animal Behavior (5 units)**

*Course Description:* Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science.

*Prerequisite(s):* Consent of instructor; upper division undergraduate introduction to the biology of behavior, such as PSC 101, PSC 122, PSC 123, NPB 102, NPB 150, NPB 152, WFC 141, ENT 104, or ANS 105.

*Learning Activities:* Lecture/Discussion 4 hour(s), Discussion 1 hour(s).

*Cross Listing:* PSC 218A.

*Grade Mode:* Letter.

## **ANB 218B – Fundamentals of Animal Behavior (5 units)**

*Course Description:* Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science.

*Prerequisite(s):* ANB 218A or PSC 218A; or ECL 218A; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Discussion 1 hour(s).

*Cross Listing:* PSC 218B.

*Grade Mode:* Letter.

## **ANB 221 – Animal Behavior, Ecology & Evolution (3 units)**

*Course Description:* Interface between animal behavior, ecology and evolution. New developments in behavioral ecology development and testing of hypotheses in this discipline.

*Prerequisite(s):* NPB 102; EVE 100; EVE 101; and consent of instructor, or the equivalent; graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PBG 221.

*Grade Mode:* Letter.

## **ANB 230A – Interdisciplinary Approaches to Animal Behavior (3 units)**

*Course Description:* Analysis of literature in behavior and an allied discipline or disciplines that offer the potential, in combination, to advance the understanding of a topic in animal behavior conceptually and empirically. Topics vary from year to year.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ANB 230B – Interdisciplinary Approaches to Animal Behavior (5 units)**

*Course Description:* Development of an empirical or theoretical interdisciplinary approach to research on a current topic in animal behavior.

*Prerequisite(s):* ANB 230A; taken the previous quarter.

*Learning Activities:* Workshop 4 hour(s), Discussion 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

## **ANB 270 – Research Conference in Behavioral Ecology (1 unit)**

*Course Description:* Critical presentation and evaluation of current literature and ongoing research in behavioral ecology.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Conference 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANB 287 – Advanced Animal Behavior (2 units)**

*Course Description:* Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution.

*Prerequisite(s):* NPB 102; (EVE 100 or EVE 101); and consent of instructor, or the equivalents; graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Cross Listing:* PBG 287.

*Grade Mode:* Letter.

**ANB 290 – Seminar in Animal Behavior (1-3 units)**

*Course Description:* Selected topics in animal behavior.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANB 294 – Seminar in Behavioral Ecology of Predators & Prey (3 units)**

*Course Description:* Presentation and analysis of research papers on social and foraging behavior of predatory animals, antipredator strategies of prey species, co-evolution of predators and prey, and ecology of predator-prey interactions.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Cross Listing:* WFC 294.

*Grade Mode:* Letter.

**ANB 298 – Group Study (1-5 units)**

*Course Description:* Lectures and/or discussion of current issues, problems, or techniques in animal behavior.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1-5 hour(s), Laboratory 5-15 hour(s).

*Grade Mode:* Letter.

**ANB 299 – Research (1-12 units)**

*Course Description:* Advanced research in one of the specialty areas in animal behavior.

*Learning Activities:* Laboratory 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANB 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Animal Biology (ABI)**

College of Agricultural & Environmental Sciences

**ABI 050A – Animal Biology Laboratory (2 units)**

*Course Description:* Scientific methods for answering questions in animal biology by doing exercises to demonstrate hypothesis testing and reporting, short laboratory, population and field experiments. Maintain notebooks, analyze data, interpret results and write reports.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Grade Mode:* Letter.

**ABI 050B – Animal Biology (3 units)**

*Course Description:* Basic biological disciplines important to an understanding of practical animal biology issues including the evolution of animal groups, genetic mechanisms, animal physiology as it relates to maintenance and production, and aspects of comparative anatomy, behavior and ecology.

*Prerequisite(s):* BIS 001A; BIS 001B (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ABI 050C – Animal Biology (3 units)**

*Course Description:* Animal management and conservation. Societal concerns arising from management and conservation issues, including economics, aesthetics, regulations, safety, public perspectives and advocacy.

*Prerequisite(s):* BIS 001B; BIS 001C; ABI 050A; ABI 050B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ABI 092 – Internship in Animal Biology (1-12 units)**

*Course Description:* Office, laboratory or fieldwork off or on campus in research, governmental regulation, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. All requirements of Internship Approval Request form must be met.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**ABI 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**ABI 099 – Special Study for Undergraduate (1-5 units)**

*Course Description:* Special study for undergraduate.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**ABI 102 – Animal Biochemistry & Metabolism (5 units)**

*Course Description:* Water and biological buffers; thermodynamics of metabolism; structure and function of biomolecules; enzyme kinetics and function; membrane biology; digestion and absorption; carbohydrate metabolism.

*Prerequisite(s):* (CHE 002A, CHE 002B, CHE 008A, CHE 008B) or (CHE 118A, CHE 118B).

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIS 102.

*Grade Mode:* Letter.

**ABI 103 – Animal Biochemistry & Metabolism (5 units)**

*Course Description:* Physiological function and metabolism of lipids and amino acids; integrative metabolism; biochemical basis for nutrient requirements; structure and function of vitamins; mineral metabolism and requirements.

*Prerequisite(s):* ABI 102 or BIS 102.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIS 103.

*Grade Mode:* Letter.

**ABI 187 – Animal Biology Seminar (2 units)**

*Course Description:* Seminar leading to development of the Major Proposal for the Animal Biology major.

*Learning Activities:* Seminar 1 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Junior standing.

*Grade Mode:* Letter.

**ABI 189 – Senior Practicum (2 units)**

*Course Description:* Practicum may be an experimental research project, a library research project or some other creative activity that will serve as a capstone experience for the Animal Biology major.

*Prerequisite(s):* ABI 050A; ABI 050B; ABI 050C; ABI 187; Junior standing.

*Learning Activities:* Independent Study 6 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Pass/No Pass only.

**ABI 189D – Senior Practicum Discussion (1 unit)**

*Course Description:* Helps prevent or solve problems during the students' senior practicum activity.

*Prerequisite(s):* ABI 050A; ABI 050B; ABI 050C; ABI 187; ABI 189 (can be concurrent); junior standing.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**ABI 192 – Internship in Animal Biology (1-12 units)**

*Course Description:* Office, laboratory or fieldwork off or on campus in research, governmental regulations, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. All requirements of Internship Approval Request form must be met.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ABI 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**ABI 199 – Special Study for Advanced Undergraduate (1-5 units)**

*Course Description:* Special study for advanced undergraduate.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**Animal Biology Graduate (ABG)**

College of Agricultural & Environmental Sciences

**ABG 200A – Integrated Animal Biology I (3 units)**

*Course Description:* Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies.

*Prerequisite(s):* BIS 101; or consent of instructor, or equivalent course; graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Limited to 20 students; Pass One restricted to Animal Biology Graduate Group students.

*Grade Mode:* Letter.

**ABG 200B – Integrated Animal Biology II (3 units)**

*Course Description:* Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies.

*Prerequisite(s):* ABG 200A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment; Pass One restricted to Animal Biology Graduate Group students.

*Grade Mode:* Letter.

**ABG 202 – Grant Procurement & Administration (2 units)**

*Course Description:* Topics include: structure of grants, attention to specifications, concise persuasive writing, and grant budgeting. Identify grant opportunities, write a persuasive research grant proposal, and administer grants.

*Prerequisite(s):* ABG 200B.

*Learning Activities:* Lecture 1 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Limited to 12 graduate students; Pass One restricted to Animal Biology Graduate Group students.

*Grade Mode:* Letter.

**ABG 203 – Advanced Animal Welfare (3 units)**

*Course Description:* Advanced animal welfare. Key concepts used when evaluating and understanding the welfare of animals kept by humans. Topics include animal pain, stress, cognition, motivation and emotions. Critical discussion of primary literature.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s) every other year, when topic differs.

*Grade Mode:* Letter.

**ABG 205 – Advanced Nutritional Energetics (3 units)**

*Course Description:* History of nutritional energetics. Evaluation of energy transformations associated with food utilization. Energy expenditures at cellular, tissue, and animal levels as affected by diet and physiological state. Current and future feeding systems.

*Prerequisite(s):* (ABI 102, ABI 103, NPB 101); or the equivalent courses.

*Learning Activities:* Discussion/Laboratory 1 hour(s), Lecture 2 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

**ABG 211 – Advances in Animal Biotechnology & Genetics (3 units)**

*Course Description:* Introduction to advanced techniques used for assisted reproductive technologies in mammals and birds, genetic engineering, gene editing, stem cell biology. Offered in alternate years.

*Prerequisite(s):* NPB 121; BIS 101; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students.

*Grade Mode:* Letter.

## **ABG 250 – Mathematical Modeling in Biological Systems (4 units)**

*Course Description:* Model development and evaluation including sensitivity analyses using R. Four principle modeling methodologies included: algebraic functions of biological processes, physiological-based compartmental models, linear programming and meta-analysis. Fundamental background and understanding of mathematical modeling principles in biological systems.

*Prerequisite(s):* MAT 016A; MAT 016B; STA 100; or equivalents required; graduate standing; MAT 016C or equivalent recommended; more than one course in statistics recommended; ABI 102 or BIS 102 recommended or equivalent course in biochemistry.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **ABG 251 – Gastrointestinal Microbiology of Livestock (3 units)**

*Course Description:* Microbiology of the gastrointestinal tract of ruminants and other livestock species; its relation to improving livestock production.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ABG 255 – Physiology of the Stress Response (2 units)**

*Course Description:* Definition of Stress; Physiological mechanisms of adaptation to stress; Hormonal control of the systemic stress response; Mechanisms of the cellular stress response; Discussion of current trends in stress physiology and current methods for studying the stress response.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* MCP 255.

*Grade Mode:* Letter.

## **ABG 290 – Seminar in Animal Biology (1 unit)**

*Course Description:* Seminar on advanced topics in animal biology. Presentations by members of the Animal Biology Graduate Group and guest speakers.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ABG 290C – Research Conference (1 unit)**

*Course Description:* Student presentations of research in Animal Biology and discussions among participating students and Animal Biology faculty.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ABG 298 – Group Study in Animal Biology (1-5 units)**

*Course Description:* Group study in Animal Biology.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

## **ABG 299 – Research (1-11 units)**

*Course Description:* Research with a faculty member in Animal Biology Graduate Group.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion/Laboratory 3-33 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ABG 300 – Methods in Teaching Animal Biology (2 units)**

*Course Description:* Practical experience in the methods and problems of teaching animal biology. Includes analysis of laboratory exercises, discussion of teaching techniques, grading scientific essays, preparing for and conducting discussion or laboratory sections, formulating quiz and exam questions under instructor supervision.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ABG 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ABG 401 – Ethics & Professionalism in Animal Biology (2 units)**

*Course Description:* Case studies and discussion of ethical and professional issues for animal biologists, including the use of animals in research and teaching, patenting and intellectual property, consulting and conflict of interest, scientific integrity, dealing with the media, and mentoring relationships.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing; Pass One restricted to Animal Biology graduate group students.

*Grade Mode:* Letter.

## **Animal Genetics (ANG)**

**College of Agricultural & Environmental Sciences**

### **ANG 101 – Animal Cytogenetics (3 units)**

*Course Description:* Principles and techniques of cytogenetics applied to animal systems; chromosome harvest techniques, analysis of mitosis and meiosis, karyotyping, chromosome banding, cytogenetic mapping, chromosome structure and function, comparative cytogenetics.

*Prerequisite(s):* BIS 101; BIS 102; or equivalent of BIS 102.

*Learning Activities:* Discussion/Laboratory 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ANG 105 – Horse Genetics (3 units)**

*Course Description:* Coat color, parentage testing, medical genetics, pedigrees, breeds, the gene map and genus Equus. Emphasis on understanding horse genetics based on the unity of mammalian genetics and making breeding decisions based on fundamental genetic concepts.

*Prerequisite(s):* BIS 101; ANS 015 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ANG 107 – Genetics & Animal Breeding (5 units)**

*Course Description:* Principles of quantitative genetics applied to improvement of livestock and poultry. Effects of mating systems and selection methods are emphasized with illustration from current breeding practices.

*Prerequisite(s):* BIS 101.

*Learning Activities:* Lecture 4 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science or Animal Science & Management majors in senior standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ANG 111 – Molecular Biology Laboratory Techniques (4 units)**

*Course Description:* Introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology.

*Prerequisite(s):* BIS 002C; BIS 101; (BIS 102 or ABI 102); (BIS 103 or ABI 103).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors in Senior standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**ANG 185 – Science of Captive Breeding & Reintroduction (1 unit)**

*Course Description:* Explore peer-reviewed literature surrounding the latest advances in captive breeding and reintroduction biology.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**ANG 198 – Directed Group Study (1-5 units)**

*Course Description:* Selected topics relating to animal genetics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ANG 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study.

*Grade Mode:* Pass/No Pass only.

**ANG 204 – Theory of Quantitative Genetics (3 units)**

*Course Description:* Theoretical basis of quantitative genetics and the consequences of Mendelian inheritance. Concepts used to estimate quantitative genetic differences and basis for partitioning the phenotypic variance.

*Prerequisite(s):* ANG 107; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ANG 206 – Advanced Domestic Animal Breeding (3 units)**

*Course Description:* Procedures for the genetic evaluation of individuals to include selection indices and mixed model evaluation for single and multiple traits. Methods of estimating genetic trends.

*Prerequisite(s):* ANG 107; ANS 205; ANG 204 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ANG 208 – Estimation of Genetic Parameters (3 units)**

*Course Description:* General methods for the estimation of components of variance and covariance and their application to the estimation of heritability, repeatability and genetic correlations are considered. Specific emphasis is given to procedures applicable to livestock populations under selection.

*Prerequisite(s):* ANG 107; ANS 205; ANG 204 and ANG 108 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ANG 211 – Genetic Engineering of Animals (2 units)**

*Course Description:* Review of techniques for the genetic engineering of animals and their limitations and applications. Student-led discussions of recent papers in the field and possible future applications of genetically engineered animals in basic research and applied agricultural and medical research.

*Learning Activities:* Lecture 1 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANG 212 – Sequence Analysis in Molecular Genetics (2 units)**

*Course Description:* Use of computer algorithms and on-line databases to analyze nucleic acid and protein sequences in molecular genetics research.

*Prerequisite(s):* BIS 101; or the equivalent; graduate standing or consent of instructor.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

**ANG 298 – Group Study (1-5 units)**

*Course Description:* Lectures and discussions of advanced topics in animal genetics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANG 299 – Research in Animal Genetics (1-12 units)**

*Course Description:* Research in Animal Genetics.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Animal Science (ANS)

College of Agricultural & Environmental Sciences

## ANS 001 – Domestic Animals & People (4 units)

**Course Description:** Animal domestication and factors affecting their characteristics and distribution. Animal use for food, fiber, work, drugs, research and recreation; present and future roles in society. Laboratory exercises with beef and dairy cattle, poultry, sheep, swine, laboratory animals, fish, horses, meat and dairy products.

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s).

**Enrollment Restriction(s):** Pass One restricted to lower division students majoring in Agricultural & Environmental Education (AAEE), Animal Science & Management (AANM), Animal Science (AANS), or Sustainable Agriculture & Food Systems (ASAF).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## ANS 002 – Introductory Animal Science (4 units)

**Course Description:** Growth, reproduction, lactation, inheritance, nutrition, and disease control in domesticated animals and species used in aquaculture; the application of sciences to animal production.

**Prerequisite(s):** ANS 001 and BIS 002A recommended.

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s).

**Enrollment Restriction(s):** Open to students in Animal Science, Animal Science and Management, Agricultural and Environmental Education, and Sustainable Agriculture and Food Systems majors.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## ANS 012 – Animal Science: Basic Principles & Application (3 units)

**Course Description:** Overview of domestic and global animal industries. Exploration of production systems, animal biology, genetics, anatomy, physiology, reproduction, health, behavior, research, biotechnology and welfare.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## ANS 015 – Introductory Horse Husbandry (3 units)

**Course Description:** Introduction to care and use of light horses emphasizing the basic principles for selection of horses, responsibilities of ownership, recreational use and raising of foals.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## ANS 017 – Canine Behavior: Learning & Cognition (3 units)

**Course Description:** Domestic dog behavior from basic principles of learning to complex cognitive behaviors; interaction between learning and cognition including how these processes contribute to interactions with humans; basic genetic correlates of learning and cognition.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## ANS 018 – Introductory Aquaculture (4 units)

**Course Description:** Historical and contemporary aquacultural practices. Interaction between the aqueous culture environment and the biology of aquatic animals. Impact of economics and governmental policies on the development of aquaculture. Interaction of aquacultural practices with larger societal goals.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## ANS 021 – Livestock & Dairy Cattle Judging (2 units)

**Course Description:** Evaluation of type as presently applied to light horses, meat animals and dairy cattle. Relationship between form and function, form and carcass quality, and form and milk production.

**Prerequisite(s):** ANS 001 or ANS 002 recommended.

**Learning Activities:** Laboratory 6 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Oral Skills (OL).

## ANS 022A – Animal Evaluation (2 units)

**Course Description:** Attendance at 3 one-day weekend field trips required. Domestic livestock species with emphasis on visual appraisal, carcass evaluation, and application of performance information. Emphasis on accurate written and oral descriptions of evaluations. Prerequisite to intercollegiate judging competition.

**Prerequisite(s):** ANS 021; or equivalent.

**Learning Activities:** Laboratory 3 hour(s), Fieldwork 30 hour(s).

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE); Oral Skills (OL).

## ANS 022B – Animal Evaluation (2 units)

**Course Description:** Attendance at three one-day weekend field trips required. Continuation of ANS 022A with emphasis on specific species: swine, beef cattle and sheep. Application of animal science principles to selection and management problem-solving scenarios. Prerequisite to intercollegiate judging competition.

**Prerequisite(s):** ANS 022A; or equivalent.

**Learning Activities:** Laboratory 3 hour(s), Fieldwork 30 hour(s).

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE); Oral Skills (OL).

## ANS 041 – Domestic Animal Production (2 units)

**Course Description:** Principles of farm animal management, including dairy and beef cattle, sheep, and swine. Industry trends, care and management, nutrition, and reproduction.

**Learning Activities:** Lecture 2 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## ANS 041L – Domestic Animal Production Laboratory (2 units)

**Course Description:** Animal production principles and practices, including five field trips to dairy cattle, beef cattle, sheep, and swine operations and campus labs.

**Prerequisite(s):** ANS 041 (can be concurrent).

**Learning Activities:** Discussion 1 hour(s), Laboratory 3 hour(s).

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ANS 042 – Introductory Companion Animal Biology (4 units)**

*Course Description:* Companion animal domestication. Historical, contemporary perspectives. Legislation concerning companion animals. Selected topics in anatomy, physiology, genetics, nutrition, behavior and management. Scientific methods in studying the human-animal bond. Discussions: application of biological concepts to problems related to companion animals.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Writing Experience (WE).

## **ANS 049A – Animal Management Practices: Aquaculture (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049B – Animal Management Practices: Beef (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049C – Animal Management Practices: Dairy (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049D – Animal Management Practices: Goats (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049E – Animal Management Practices: Horses (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049F – Animal Management Practices: Laboratory Animals (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049G – Animal Management Practices: Meats (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049H – Animal Management Practices: Poultry (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049I – Animal Management Practices: Sheep (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049J – Animal Management Practices: Swine (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 049K – Animal Management Practices: Captive & Companion Avian (2 units)**

*Course Description:* Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 090C – Research Group Conference (1 unit)**

*Course Description:* Weekly conference on research problems, progress and techniques in the animal sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to lower division standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **ANS 092 – Internship in Animal Science (1-12 units)**

*Course Description:* Internship off and on campus in dairy, livestock, and aquaculture production, research and management; or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Approval form must be met.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-18 hour(s).

*Enrollment Restriction(s):* Restricted to lower division standing.

*Grade Mode:* Pass/No Pass only.

## **ANS 092D – Internship in Animal Science Discussion (1 unit)**

*Course Description:* Provides opportunities to meet and discuss with staff and/or faculty the biological concepts that are the basis for the care and management programs used with animals during their lower division internship.

*Prerequisite(s):* ANS 092 (can be concurrent); consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students with lower division standing only; must be concurrently enrolled in the corresponding ANS 092.

*Repeat Credit:* May be repeated for credit up to 6 unit(s); repeat credit is allowed when corresponding to different ANS 092 internships.

*Grade Mode:* Passed/Not Passed only.

## **ANS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Enrollment Restriction(s):* Restricted to lower division standing.

*Grade Mode:* Pass/No Pass only.

## **ANS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to lower division standing.

*Grade Mode:* Pass/No Pass only.

## **ANS 100 – Animal Physiology (5 units)**

*Course Description:* Basic principles of animal physiology in domesticated and captive animals with a comparative approach. Molecular, biochemical, chemical and physical aspects and their influences on function of physiological systems in animals.

*Prerequisite(s):* BIS 002A; CHE 002B.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to students in the Animal Science and Animal Science and Management majors.

*Credit Limitation(s):* Not open for credit to students who have taken NPB 101.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 103 – Animal Welfare (4 units)**

*Course Description:* Application of principles of animal behavior and physiology to assessment and improvement of the welfare of wild, captive, and domestic animals. Topics include animal pain, stress, cognition, motivation, emotions, and preferences, as well as environmental enrichment methods.

*Prerequisite(s):* ANS 104 or NPB 102 or WFC 141; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **ANS 104 – Principles & Applications of Domestic Animal Behavior (4 units)**

*Course Description:* Basic principles of animal behavior as applied to domesticated species. Emphasis placed on application of the principles of animal behavior.

*Prerequisite(s):* ANS 002 or BIS 002B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Animal Science majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 106 – Domestic Animal Behavior Laboratory (3 units)**

*Course Description:* Research experience with the behavior of large domestic animals. Experimental design, methods of data collection & analysis, and reporting of experimental results.

*Prerequisite(s):* ANS 104 or NPB 102; or consent of instructor.

*Learning Activities:* Laboratory 6 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science (AANS) majors in Senior standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Writing Experience (WE).

## **ANS 107 – Zoo Biology & Research (3 units)**

*Course Description:* Introduction to the modern zoo, including history, staffing structure, aspects of animal care such as housing, social management, and enrichment, research in genetics, health, nutrition, behavior, cognition, and guest perceptions. Requires a visit to the Sacramento Zoo and development of a project research proposal based on a specific exhibit at the zoo.

*Prerequisite(s):* BIS 002B.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 108 – Equine Behavior & Welfare (3 units)**

*Course Description:* Improve the understanding and application of good welfare practices when managing, training, transporting, treating, or breeding equine. Recognize changes in behavior or causes related to comprised health or welfare.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ANS 112 – Sustainable Animal Agriculture (3 units)**

*Course Description:* Current applications of sustainable animal agriculture including the challenges of animal production, animal needs, animal well-being, and protection of the environment and resources for future food supply systems. Various scenarios for meeting sustainability objectives are evaluated using computing modeling.

*Prerequisite(s):* BIS 002B or ANS 001; STA 100 or PLS 120 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Quantitative Literacy (QL).

## **ANS 113 – Meat Safety & Hazard Analysis & Critical Control Points (2 units)**

*Course Description:* Fundamentals of meat safety and Hazard Analysis Critical Control Points (HACCP). Principles, development, implementation of HACCP. Control of physical, chemical, biological hazards assuring meat/food safety via programs (Good Manufacturing Practices, Sanitation Standard Operating Procedures), hazard analysis critical control points. Regulations, focusing on HACCP implementation in meat & seafood products. Value, shortcomings of sampling, and microbial testing in meat safety assurance programs.

*Prerequisite(s):* ANS 002 or consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 115 – Advanced Horse Production (4 units)**

*Course Description:* Feeding, breeding, and management of horses; application of the basic principles of animal science to problems of production of all types of horses. Designed for students who wish to become professionally involved in the horse industry.

*Prerequisite(s):* ANS 015; BIS 101; NUT 115; (ANS 100 or NPB 101); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Writing Experience (WE).

## **ANS 118 – Fish Production (4 units)**

*Course Description:* Current practices in fish production; relationship between the biological aspects of a species and the production systems, husbandry, management, and marketing practices utilized. Emphasis on species currently reared in California.

*Prerequisite(s):* WFC 120.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 119 – Invertebrate Aquaculture (4 units)**

*Course Description:* Management, breeding and feeding of aquatic invertebrates; application of basic principles of physiology, reproduction, and nutrition to production of mollusks and crustaceans for human food; emphasis on interaction of species biology and managerial techniques on production efficiencies.

*Prerequisite(s):* BIS 002B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 120 – Principles of Meat Science (3 units)**

*Course Description:* Anatomical, physiological, developmental, and biochemical aspects of muscle underlying the conversion of muscle to meat. Includes meat processing, preservation, microbiology, and public health issues associated with meat products.

*Prerequisite(s):* ANS 002.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 120L – Meat Science Laboratory (2 units)**

*Course Description:* Laboratory exercises and student participation in transformation of live animal to carcass and meat, structural and biochemical changes related to meat quality, chemical and sensory evaluation of meat, and field trips to packing plant and processing plant.

*Prerequisite(s):* ANS 002; ANS 120 (can be concurrent).

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 123 – Animal Growth & Development (4 units)**

*Course Description:* Growth and development of animals from conception to maturity, viewed from practical and biological perspectives; includes genetic, metabolic, nutritional control of cell and organism function.

*Prerequisite(s):* (ABI 103 or BIS 103); (ANS 100 or NPB 101).

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **ANS 124 – Lactation (4 units)**

*Course Description:* Biochemical, genetic, physiological, nutritional, and structural factors relating to mammary gland development, the initiation of lactation, the composition of milk and lactational performance.

*Prerequisite(s):* (NPB 101 or ANS 100); (ABI 103 (can be concurrent) or BIS 103 (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science (AANS) students in senior standing only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **ANS 125 – Equine Exercise Physiology (3 units)**

*Course Description:* Basic and applied physiology of the exercising horse. Includes physiological systems, gait analysis, lameness, pharmacology, sports medicine; sport horse performance evaluation and conditioning.

*Prerequisite(s):* (NPB 101 or ANS 100); ANS 015.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 126 – Equine Nutrition (3 units)**

*Course Description:* Equine digestion, digestive physiology, diet development and evaluation, and the relationship of the topics to recommended feeding practices and nutritional portfolios.

*Prerequisite(s):* ANS 015; NUT 115.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 127 – Advanced Equine Reproduction (3 units)**

*Course Description:* Reproductive physiology, anatomy and endocrinology of the mare and stallion. Emphasis on structure/function relationships as they are applied to improving equine reproductive management and efficiency.

*Prerequisite(s):* ANS 115; (ANS 100 or NPB 101).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **ANS 128 – Agricultural Applications of Linear Programming (4 units)**

*Course Description:* Applications of linear programming in agriculture, emphasizing resource allocation problems and decision making. Problems include crop production, ration formulation, and farm management. Hands-on experience in developing linear programs and interpreting the results.

*Prerequisite(s):* (PLS 021 or PLS 021V) or ECS 015; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **ANS 129 – Environmental Stewardship in Animal Production Systems (3 units)**

*Course Description:* Management principles of environmental stewardship for grazing lands, animal feeding, operations and aquaculture operations; existing regulations, sample analyses, interpretation and utilization of data, evaluation of alternative practices, and policy development.

*Prerequisite(s):* (BIS 010 or (BIS 002A, BIS 002B)), CHE 002A, CHE 002B, (CHE 008A, CHE 008B) or (CHE 118A, CHE 118B); and consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **ANS 130 – Endocrinology Laboratory (3 units)**

*Course Description:* Experimental approaches used in animal endocrinology research. Introductions to a variety of topics to help assimilate many ideas from physiology courses, experimental approaches, and skills reading and interpreting scientific papers.

*Prerequisite(s):* ANS 100 or NPB 101.

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science (AANS) majors in Senior standing.

*Grade Mode:* Letter.

## **ANS 131 – Reproduction & Early Development in Aquatic Animals (4 units)**

*Course Description:* Physiological and developmental functions related to reproduction, breeding efficiency and fertility of animals commonly used in aquaculture.

*Prerequisite(s):* MCB 150; WFC 120; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 132 – Microbiology of Animal Systems Laboratory (3 units)**

*Course Description:* Basic microbiology techniques and the ability to produce recombinant proteins from genomic information. Importance of carbohydrate degrading enzymes in animal systems. Animal systems of interest range from the digestive tract of animals (e.g. rumen) to animal waste (e.g. manure).

*Prerequisite(s):* (BIS 002A or BIS 002B); (CHE 008B or CHE 118B).

*Learning Activities:* Laboratory 6 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors in Senior standing.

*Grade Mode:* Letter.

## **ANS 133 – Animal Cell Culture Laboratory (4 units)**

*Course Description:* Design, conduct, analyze, and present a research project involving cell culture.

*Prerequisite(s):* ABI 102; ABI 103; (ANS 100 or NPB 101); or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science (AANS) majors in Senior standing.

*Grade Mode:* Letter.

## **ANS 134 – Animal Nutrition Laboratory (3 units)**

*Course Description:* Animal nutrition research experience for senior-level students. Forming a valid hypothesis, designing treatments, preparing for experiments, recording measurements in the field, summarizing results. Emphasis on developing essential research skills & proper techniques for collecting, summarizing, and presenting data.

*Prerequisite(s):* ABI 103 (can be concurrent); (ANS 100 (can be concurrent) or NPB 101 (can be concurrent)); (STA 100 or PLS 120).

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One restricted to Animal Science (AANS) majors in Senior standing.

*Grade Mode:* Letter.

## **ANS 135 – Production Animal Laboratory (3 units)**

*Course Description:* Biochemical methods for developing and conducting research with production animals, and interpreting and presenting data. Laboratory focus course which uses sheep as model. There may be one or two mandatory all day Saturday field trips.

*Prerequisite(s):* ABI 102; ABI 103; (NPB 101 or ANS 100).

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s), Fieldwork.

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors in senior standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 136 – Techniques & Practices of Fish Culture (3 units)**

*Course Description:* Daily care and maintenance of fish in residential aquariums, research and commercial facilities. Biological and environmental factors important to sound management of fish. Laboratories focus on fish culture including growth trials and biochemical assays.

*Prerequisite(s):* ANS 002; BIS 002A; BIS 002B; BIS 002C; ((CHE 008A, CHE 008B) or (CHE 118A, CHE 118B)).

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors in Senior standing.

*Credit Limitation(s):* Not open for credit to students who have previously completed ANS 136A or ANS 137.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ANS 137 – Techniques & Practices of Avian Culture (3 units)**

*Course Description:* Daily care and maintenance of birds for research, commercial production and companion or hobby uses. Biological and environmental factors important to sound management of birds. Laboratories focus on bird husbandry, management and care and include growth trials and biochemical assays.

*Prerequisite(s):* ANS 002; BIS 002A; BIS 002B; BIS 002C; ((CHE 008A, CHE 008B) or (CHE 118A, CHE 118B)).

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors in senior standing.

*Credit Limitation(s):* Not open for credit to students who have previously completed ANS 136B or ANS 137.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ANS 138 – Meat Quality & Safety Laboratory (3 units)**

*Course Description:* Advanced hands-on experience with meat and food related research. Development of laboratory skills in chemistry, biochemistry, microbiology, and meat science.

*Prerequisite(s):* CHE 002B; ANS 120 recommended.

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors with Senior standing.

*Grade Mode:* Letter.

## **ANS 139 – Experimental Animal Physiology (3 units)**

*Course Description:* Combination of theory and hands-on experiences in animal physiology using various experimental techniques. Practical laboratory skill development from cellular level to whole animal, in areas such as genetics, endocrinology, histology and physiological function.

*Prerequisite(s):* ABI 102; BIS 101; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors in senior standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **ANS 140 – Management of Laboratory Animals (4 units)**

*Course Description:* Laboratory animal management procedures in view of animal physiology, health and welfare, government regulations, and experimental needs. Clinical techniques using rodents and rabbits as models.

*Prerequisite(s):* NPB 101 or ANS 100.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 141 – Equine Enterprise Management (4 units)**

*Course Description:* Examination of the concepts and principles involved in the operation of an equine enterprise. Essential aspects of equine enterprise management, including equine law, marketing, cash flow analysis, and impact of state and federal regulations.

*Prerequisite(s):* ANS 115; ECN 001A and ECN 001B recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ANS 142 – Companion Animal Care & Management (4 units)**

*Course Description:* Management and production of companion animals. Integration of the disciplinary principles of behavior, genetics, nutrition, and physiology as related to the care of companion animals.

*Prerequisite(s):* ANS 042; BIS 101; (NPB 101 or ANS 100); ((ABI 102 or BIS 102) and (ABI 103 or BIS 103)) recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Animal Science or Animal Science & Management majors in senior standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ANS 143 – Pig & Poultry Care & Management (4 units)**

*Course Description:* Care and management of swine, broilers and turkeys as related to environmental physiology, nutrition and metabolism, disease management and reproduction. Saturday field trips.

*Prerequisite(s):* NUT 115; (NPB 101 or ANS 100); ANS 041; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **ANS 144 – Beef Cattle & Sheep Production (4 units)**

*Course Description:* Genetics, physiology, nutrition, economics and business in beef cattle and sheep production. Resources used, species differences, range and feedlot operations. Emphasis on integration and information needed in methods for management of livestock enterprises. One or two Saturday field trips.

*Prerequisite(s):* ANS 041; NUT 115; or consent of instructor; ANG 107 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Fieldwork 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ANS 145 – Meat Processing & Marketing (4 units)**

*Course Description:* Distribution, processing and marketing of meat and meat products. Meat and meat animal grading and pricing. Government regulations and social/consumer concerns. Future trends and impact on production management practices. Includes poultry.

*Prerequisite(s):* ANS 002; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 146 – Dairy Cattle Production (5 units)**

*Course Description:* Scientific principles from genetics, nutrition, physiology, and related fields applied to conversion of animal feed to human food through dairy animals. Management and economic decisions are related to animal biology considering the environment and animal well-being. Mandatory Saturday field-trip.

*Prerequisite(s):* NUT 115; or consent of instructor; ANG 107 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Fieldwork 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ANS 147 – Dairy Processing & Marketing (3 units)**

*Course Description:* Examination of distribution systems, processing practices, product quality, impact of government policy (domestic and foreign), marketing alternatives, and product development.

*Prerequisite(s):* ANS 002; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 148 – Enterprise Analysis in Animal Industries (4 units)**

*Course Description:* Examination and application of decision making and problem solving in the production enterprise. Areas of production analysis, problem solving, risk analysis and cost-benefit analysis will be examined in terms of the total enterprise.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to students with upper division standing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Quantitative Literacy (QL); Writing Experience (WE).

## **ANS 149 – Farrier Science (3 units)**

*Course Description:* In-depth examination of the structure-function relationship of the equine hoof and how it relates to conformation, injury and performance.

*Prerequisite(s):* ANS 115.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANS 149L – Farrier Science Laboratory (1 unit)**

*Course Description:* Art and science of horseshoeing in equine related fields. Proper use of the tools, materials and techniques in the fabrication of shoes and safe preparation of the hoof for application of shoes.

*Prerequisite(s):* ANS 149 (can be concurrent); or consent of instructor.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ANS 150 – Animal Health & Disease (4 units)**

*Course Description:* Basic concepts of animal immunology, microbiology, parasitology, epidemiology, vaccination, and how the knowledge can be used to improve animal health and prevent animal infection & disease. Includes relevant health and disease issues.

*Prerequisite(s):* ANS 002 or BIS 002B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ANS 160A – Stress & Reproduction I (2 units)**

*Course Description:* Evaluation of the impact of chronic stress on male reproductive development. Isolation stress tests on young animals. Data collection of treatment and control groups. Biological laboratory techniques and analysis. Two-quarter course.

*Prerequisite(s):* NPB 121 (can be concurrent); (ANS 104 (can be concurrent) or NPB 102 (can be concurrent)).

*Learning Activities:* Laboratory 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One restricted to Animal Science majors in Senior standing.

*Grade Mode:* Letter.

## **ANS 160B – Stress & Reproduction II (2 units)**

*Course Description:* Evaluation of the impact of chronic stress on male reproductive development. Isolation stress tests on young animals. Data collection of treatment and control groups. Biological laboratory techniques and analysis. Two-quarter course.

*Prerequisite(s):* ANS 160A.

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

## **ANS 170 – Ethics of Animal Use (4 units)**

*Course Description:* Ethical issues relating to animal use in contemporary society. Integration of philosophical theories with scientific evidence relating to animal behavior, mentality, and welfare. Uses of animals in agriculture, research, and as companions. Ethical responsibilities regarding wildlife and the environment.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y or CMN 001 or COM 001 or COM 002 or COM 003 or COM 004 or ENL 003 or NAS 005.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One Open to Animal Science (AANS) majors with upper division standing only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

## **ANS 190C – Research Group Conference (1 unit)**

*Course Description:* Weekly conference on research problems, progress and techniques in the animal sciences.

*Prerequisite(s):* Consent of instructor; advanced standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ANS 192 – Internship in Animal Science (1-12 units)**

*Course Description:* Internship off and on campus in dairy, livestock and aquaculture production, research and management; or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Approval Form must be met.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**ANS 192D – Internship in Animal Science Discussion (1 unit)**

*Course Description:* Weekly meeting with staff and/or faculty to discuss the biological concepts that are the basis for the care and management programs used with animals during their internship.

*Prerequisite(s):* ANS 192 (can be concurrent); consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students with upper division standing only; must be enrolled concurrently in corresponding ANS 192.

*Repeat Credit:* May be repeated for credit up to 6 unit(s); repeat credit is allowed when corresponding to different ANS 192 internships.

*Grade Mode:* Passed/Not Passed only.

**ANS 194 – Research in Animal Science (3 units)**

*Course Description:* Research with a faculty mentor. Weekly discussion and laboratory on specific research topic. May include a seminar to research group. Choose from sections: (1) Animal Behavior; (2) Animal Genetics; (3) Animal Nutrition; (4) Animal Physiology.

*Prerequisite(s):* ANS 106 or ANS 135 or ANS 136 or ANS 137 or ANS 139 or ANG 111; or ANS 133; and consent of instructor.

*Learning Activities:* Laboratory 6 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Letter.

**ANS 194HA – Undergraduate Honors Thesis in Animal Science (4 units)**

*Course Description:* Carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, write a thesis and present a public seminar describing his/her research.

*Prerequisite(s):* (NPB 101 or ANS 100); (ABI 103 or BIS 103); and consent of instructor; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee.

*Learning Activities:* Lecture 1 hour(s), Laboratory 9 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

**ANS 194HB – Undergraduate Honors Thesis in Animal Science (4 units)**

*Course Description:* Carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, write a thesis and present a public seminar describing his/her research.

*Prerequisite(s):* (NPB 101 or ANS 100); (ABI 103 or BIS 103); and consent of instructor; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee.

*Learning Activities:* Lecture 1 hour(s), Laboratory 9 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ANS 194HC – Undergraduate Honors Thesis in Animal Science (4 units)**

*Course Description:* Carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, write a thesis and present a public seminar describing his/her research.

*Prerequisite(s):* (NPB 101 or ANS 100); (ABI 103 or BIS 103); and consent of instructor; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee.

*Learning Activities:* Lecture 1 hour(s), Laboratory 9 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ANS 197T – Tutoring in Animal Science (1-4 units)**

*Course Description:* Tutoring of students in courses taught by instructors in the Department of Animal Science; weekly conference with instructor(s) in charge of the course; written critiques of teaching procedures; assist in preparation and development of instructional materials.

*Prerequisite(s):* Consent of instructor; animal Science or related major; upper division standing.

*Learning Activities:* Tutorial 3-6 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

**ANS 198 – Directed Group Study (1-5 units)**

*Course Description:* Selected topics relating to the animal sciences. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ANS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to students with upper division standing.

*Grade Mode:* Pass/No Pass only.

**ANS 200 – Strategies in Animal Production (4 units)**

*Course Description:* Examines the forces and issues in animal agriculture through the strategic management process.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**ANS 206 – Models in Agriculture & Nutrition (3 units)**

*Course Description:* Basic model building principles and techniques for statistical and systems simulation models. Optimization techniques for non-linear experimental designs and management models are presented. Quantitative analysis and evaluation of linear and non-linear equations used in agriculture and nutrition.

*Prerequisite(s):* MAT 016B; STA 108.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ANS 259 – Literature in Animal Science (1 unit)**

*Course Description:* Critical presentation and analysis of recent journal articles in animal science.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 9 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANS 290 – Seminar (1 unit)**

*Course Description:* Reports and discussions of topics of interest in genetics, nutrition, and physiology as they apply to animal science.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANS 290C – Research Group Conference (1 unit)**

*Course Description:* Weekly conference on research problems, progress and techniques in the animal sciences.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANS 291 – Current Research in Animal Science (1 unit)**

*Course Description:* Current research in animal science explored at weekly seminars presented by guest lecturers. Discussion of research presented.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANS 297 – Supervised Teaching in Animal Science (2 units)**

*Course Description:* Practical experience in teaching Animal Science at University level; curriculum design and evaluation; preparation and presentation of material. Assistance in laboratories, discussion sections, and evaluation of student work. Evaluation letter sent to the graduate advisor with copy to the student.

*Learning Activities:* Variable 6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANS 298 – Group Study (1-5 units)**

*Course Description:* Lectures and discussions of advanced topics in the animal sciences. (Sect. 1, 2, 3-letter grading; from Sect. 4 on-S/U grading only.)

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Discussion 1-5 hour(s).

*Grade Mode:* Letter.

**ANS 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Anthropology (ANT)**

College of Letters & Science

**ANT 001 – Human Evolutionary Biology (4 units)**

*Course Description:* Processes and course of human evolution; primatology; biological and social diversity within Homo sapiens; human paleontology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ANT 001Y – Human Evolutionary Biology (Hybrid Version) (4 units)**

*Course Description:* Evolutionary theory and mechanisms of evolution; basic population and quantitative genetics; primatology; biological and cultural diversity within Homo sapiens; paleoanthropology.

*Learning Activities:* Web Virtual Lecture 1.50 hour(s), Lecture/Discussion 1.50 hour(s), Discussion/Laboratory 1 hour(s).

*Credit Limitation(s):* May not take both ANT 001 and ANT 001Y for credit.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ANT 002 – Cultural Anthropology (5 units)**

*Course Description:* Introduction to cultural diversity in its many forms and methods used by anthropologists to account for it. Relational dynamic of culture, history, and power in constituting "social facts" and "realities." Critical thinking of contemporary concerns.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**ANT 003 – Introduction to Archaeology (4 units)**

*Course Description:* Development of archaeology as an anthropological study; objectives and methods of modern archaeology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

**ANT 004 – Introduction to Anthropological Linguistics (4 units)**

*Course Description:* Exploration of the role of language in social interaction and world view, minority languages and dialects, bilingualism, literacy, the social motivation of language change. Introduction of analytical techniques of linguistics and demonstration of their relevance to language in sociocultural issues.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 013 – Scientific Method in Physical Anthropology (4 units)**

*Course Description:* Skills for scientific thinking; designing, implementing, analyzing, interpreting, presenting, and criticizing research. Collection and analysis of original data. Basic statistical methods.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **ANT 015 – From Birth to Death: The Evolution of the Human Life Cycle (5 units)**

*Course Description:* Introduction to the biology of birth, childhood, marriage, the family, old age, and death. Examines comparative characteristics of nonhuman primates and other animals as well as cross-cultural variation in humans by study of selected cases.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); World Cultures (WC); Writing Experience (WE).

## **ANT 020 – Comparative Cultures (4 units)**

*Course Description:* Introduction to the anthropological study of cultural diversity. Case studies of eight societies will be presented to illustrate and compare the distinctive features of major cultural regions of the world. Concludes with a discussion of modernization.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **ANT 021 – Zombies (2 units)**

*Course Description:* Figure of the zombie as window into ideas about race, economic exploitation, and what it means to be human. Zombie lore in the Afro-Atlantic world and its re-imagining in contemporary pop culture.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ANT 022 – Myths About Human Evolution (2 units)**

*Course Description:* Myths about human evolution. Use of evidence from evolutionary biology, geology, paleontology, archaeology, and genetics to dispel misconceptions about human evolution.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS) or Science & Engineering (SE).

## **ANT 023 – Introduction to World Prehistory (4 units)**

*Course Description:* Broadly surveys patterns and changes in the human species' physical and cultural evolution from earliest evidence for "humanness" to recent development of large-scale complex societies or "civilizations." Lectures emphasize use of archaeology in reconstructing the past.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 024 – Ancient Crops & People (4 units)**

*Course Description:* The archaeological evidence for domestication of plants and the origins of agricultural societies. Anthropological context of agriculture and the effects on sexual division of labor, social inequality, wealth accumulation, warfare, human health, and sedentism.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 025 – Ancient Animals & People (2 units)**

*Course Description:* History of human and animal relationships and how animals have influenced social and economic structures of past societies. Why, when and how humans used animals in the context of hunting, domestication, secondary products, ritual, companionship, and conservation.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ANT 026 – Mummies of the Ancient World (2 units)**

*Course Description:* Archaeological approaches for studying mummies and the process of mummification in the ancient world. Analytical techniques used, environmental factors promoting mummification, and archaeological conservation of mummified bodies.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ANT 027 – Great Adaptations: Genetic & Cultural Evolution in the Spread of Humanity (2 units)**

*Course Description:* How humans adapted to diverse ecologies through cultural and genetic changes. Illustrations include evolution in response to disease, dietary, social, and communication challenges.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); World Cultures (WC).

## **ANT 028 – Prehistoric Origins of Art (2 units)**

*Course Description:* Interdisciplinary look at the earliest evidence for art and symbolic behavior. Method and techniques to investigate Prehistoric art. Interpretative framework and relevance for understanding the role of symbolic activities in traditional societies.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ANT 029 – Vikings (2 units)**

*Course Description:* History of the Vikings through the Slavic and Mediterranean regions in the East and across the vast North Atlantic region to the west. Emphasis on archaeology and sagas to understand Viking culture from the 8th to 11th centuries.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ANT 030 – Sexualities (4 units)**

*Course Description:* Introduction to the study of sexuality, particularly to the meanings and social organization of same-sex sexual behavior across cultures and through time. Biological and cultural approaches will be compared, and current North American issues placed in a wider comparative context.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

**ANT 032 – Drugs, Science & Culture (4 units)**

*Course Description:* Drugs, politics, science, society in a cultural perspective: emphasis on roles of science, government and the media in shifting attitudes toward alcohol, marijuana, Prozac and other pharmaceuticals; drug laws, war on drugs and global trade in sugar, opium, cocaine.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* STS 032.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL); Writing Experience (WE).

**ANT 034 – Cultures of Consumerism (4 units)**

*Course Description:* Aspects of modern consumer cultures in capitalist and socialist countries. Transformations of material cultures over the past century. Case studies on the intersections of gender, class, and culture in everyday consumption practices.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

**ANT 036 – Star Trek as Social Theory (4 units)**

*Course Description:* Introduction to core concepts in anthropological and social theory using Star Trek as a teaching vehicle. Emphasis on thinking anthropologically about everyday life and popular culture.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ANT 054 – Introduction to Primatology (4 units)**

*Course Description:* Basic survey of the primates as a separate order of mammals; natural history and evolution of primates; consideration of hypotheses for their origin.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ANT 056 – Introduction to Forensic Anthropology (3 units)**

*Course Description:* Survey of anthropological techniques as applied within the legal system, including scene documentation and recovery, human identification, and trauma analysis. Examination of error and uncertainty, ethics, and human rights in forensic anthropology.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL).

**ANT 092 – Internship in Anthropology (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the Department of Anthropology under the supervision of a member of the faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**ANT 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily intended for lower division students.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ANT 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ANT 100 – Theory in Social-Cultural Anthropology (4 units)**

*Course Description:* Discussion of the theoretical and philosophical developments in cultural anthropology from the 19th century to the present.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**ANT 101 – Ecology, Nature, & Society (4 units)**

*Course Description:* Interdisciplinary study of diversity and change in human societies, using frameworks from anthropology, evolutionary ecology, history, archaeology, psychology, and other fields. Topics include population dynamics, subsistence transitions, family organization, disease, economics, warfare, politics, and resource conservation.

*Prerequisite(s):* ANT 001 or ANT 002 or ESP 030 or EVE 100 or BIS 101 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ESP 101.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 103 – Indigenous Peoples & Natural Resource Conservation (4 units)**

*Course Description:* Integration of the interests of resident and indigenous peoples with the conservation of natural resources and ecosystems, using case study examples from both the developing and developed world.

*Prerequisite(s):* ANT 002 or GEL 001 or ESP 030 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed ANT 121N. (Former ANT 121N.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **ANT 104N – Cultural Politics of the Environment (4 units)**

*Course Description:* Political economy of environmental struggles. Relationship between social inequality (based on race, class and/or gender) and ecological degradation. Articulation of local peoples, national policy, and the international global economy in the contestation over the use of environmental resources.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 134N. (Former ANT 134N.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **ANT 107 – Law, Power, Violence (4 units)**

*Course Description:* Cultural dimensions of law and political power. Colonial and postcolonial legal regimes, bureaucratic reason, legalized violence, sovereign power, and human rights.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 109 – Visualization in Science: A Critical Introduction (4 units)**

*Course Description:* Anthropological approaches to scientific visualization techniques, informatics, simulations. Examination of different visualization techniques toward understanding the work involved in producing them, critical assessment of their power and limits, especially when visualizations are used socially to make claims.

*Prerequisite(s):* ANT 002 or STS 001 or STS 020 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Cross Listing:* STS 109.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL); Writing Experience (WE).

## **ANT 117 – The Ethnographic & Literary Imagination (4 units)**

*Course Description:* The ethnographic and literary imagination. Relationship between fiction & anthropology, narrative form, modalities of ethnographic encounter, social & historical phenomena, aesthetics, poetics, language, and the question of representation.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 120 – Language & Culture (4 units)**

*Course Description:* Culture, cognition, meaning, and interpretation; language and the classification of experience; communication and learning in crosscultural perspective.

*Prerequisite(s):* ANT 004 or LIN 001 recommended; ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **ANT 121 – Special Topics in Medical Anthropology (4 units)**

*Course Description:* Introduction to critical medical anthropology. Topics include anthropological analysis of bio-medicine, psychiatry, systems of knowledge and healing, the body, emotions, and clinical encounters in a cross-cultural perspective.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* STS 121.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 122A – Economic Anthropology (4 units)**

*Course Description:* The varieties of production, exchange, and consumption behavior in precapitalist economies, their interaction with culture and social-political organization, and the theories that account for these phenomena. The effects of capitalism on precapitalist sectors.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 122. (Former ANT 122.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **ANT 122B – Capitalism & Power (4 units)**

*Course Description:* Theorizations of economy and society. The rise of modern capitalism and new social and political formations. Relationships between value and violence, subjectivity, the unconscious, money, imperialism and different understandings of exchange and the political.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 123AN – Resistance, Rebellion, & Popular Movements (4 units)**

*Course Description:* Analysis of popular protest in Third World and indigenous societies ranging from covert resistance to national revolts. Comparative case studies and theories of peasant rebellions, millenarian movements, social bandits, Indian "wars", ethnic and regional conflicts, gender and class conflicts.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 123B. (Former ANT 123B.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 124 – Religion in Society & Culture (4 units)**

*Course Description:* Discussion of anthropological theories of religion with emphasis on non-literate societies. Survey of shamanism, magic and witchcraft, ritual and symbols, and religious movements. Extensive discussion of ethnographic examples and analysis of social functions of religious institutions.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **ANT 125A – Structuralism & Symbolism (4 units)**

*Course Description:* Survey of anthropological approaches to understanding the logic of structuralism and symbolism in cultural analysis. Focus on how structural and symbolic interpretations relate to cultural and linguistic universals and to the philosophical basis of relativism in the social sciences. (Former ANT 125.)

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 125B – Postmodernism(s) & Culture (4 units)**

*Course Description:* Crucial theories of modernity and post-modernity. How postmodernism is distinct from modernism, why it is related to the collapse of certainty about our collective reality and what it reveals about the status of reason, the self, and collective experience. Readings draw from various philosophical-theoretical, artistic and political literatures.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 126A – Anthropology of Development (4 units)**

*Course Description:* Theories of development and current critiques. Colonial legacies and post-colonial realities. Roles of the state and NGOs, population migrations, changing gender identities, cash-earning strategies, and sustainability issues. Stresses importance of cultural understandings in development initiatives. Case studies emphasizing non-industrial societies.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 126. (Former ANT 126.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 126B – Women & Development (4 units)**

*Course Description:* Current Third World and Western development issues concerning women in agriculture, industry, international division of labor, political movements, revolutions, politics of health, education, family and reproduction. Impact of colonialism, capitalism, the world system, and international feminism on women and development.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No credit if taken ANT 131.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 127 – Urban Anthropology (4 units)**

*Course Description:* Survey of approaches to urban living: political structures, organization of labor, class relations, world views. The evolution of urban life and its contemporary dilemmas. Cross-cultural comparisons discussed through case studies.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 128A – Kinship & Social Organization: From Clans to Countries (4 units)**

*Course Description:* Family, marriage, household and social organization from a cross-cultural and evolutionary perspective. Emphasis on case studies that illustrate human variation, theories that account for this variation, and recent advances in the treatment of this data.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 128. (Former ANT 128.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 128B – Self, Identity, & Family (4 units)**

*Course Description:* Exploration of self, identity, and family systems cross-culturally. Impact of class, gender, race, ethnicity, ruralization, urbanization, and globalization on notions of selfhood in different social/cultural systems.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 129. (Former ANT 129.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 129 – Health & Medicine in a Global Context (4 units)**

*Course Description:* Recent works in medical anthropology and the science studies of medicine dealing with social and cultural aspects of global health issues such as AIDS, pandemics, clinical trials, cultural differences in illnesses, diabetes, organ trafficking, medical technologies, illness narratives, and others.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Cross Listing:* STS 129.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 130A – Cultural Dimensions of Globalization (4 units)**

*Course Description:* Cultural dimensions of recent economic and political developments frequently termed "globalization."

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 130BN – Migration & the Politics of Place & Identity (4 units)**

*Course Description:* Internal and international migration from an anthropological perspective, including causes, processes, and political, economic, and cultural effects of spatial mobility and displacement. Emphasizes the interplay of identity, place, and power in diverse cultural and historical contexts.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 123D. (Former ANT 123D.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 131 – Ecology & Politics (4 units)**

*Course Description:* Analysis of the complex interactions between ecological dynamics and political processes employing the emerging approach of political ecology. Case studies of environmental degradation (e.g., desertification, logging, mineral extraction, petroleum, water) from various cultural and geographic regions.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ANT 132 – Psychological Anthropology (4 units)**

*Course Description:* History of the relationship between anthropology and psychoanalysis. Exploration of anthropology of emotions, colonial psychology, contemporary ethno-psychiatry, studies on personhood, possession, magic, altered states, subjectivity, and definitions of the normal and the pathological in different contexts and cultures.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 133 – Anthropology of Ocean Worlds (4 units)**

*Course Description:* Exploration of various oceanic cultures and their engagement with the sea. Piracy, smuggling, exchange, maritime legal regimes, offshore policing, media infrastructures, and ocean ecologies.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 134 – Buddhism in Global Culture (4 units)**

*Course Description:* Buddhist meditation and ritual as a cultural system that adapts to global and local forces of change. Anthropological theory and method in understanding global culture transmission, including Buddhist reform movements in Asia and Buddhist practice in the West.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 50 students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 135 – Media Anthropology (4 units)**

*Course Description:* Examining human practices through their inscription in old and new media; evaluating the emergent fields of "cyber" and "digital" anthropology; and problematizing terms and concepts routinely deployed in studies of media worlds (platform, social media, hologram, algorithm, remediation, curation, animation).

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC).

**ANT 136 – Ethnographic Film (4 units)**

*Course Description:* Overview of the use of film in anthropology and its advantages and limitations in comparison to written ethnographic descriptions. Essential features of ethnographic films. Film production in anthropological research and problems encountered in producing films in the field.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ANT 137 – Meditation & Culture (4 units)**

*Course Description:* Study and practice of the relation between meditation and cultural conditioning; comparison of Buddhist practice with other cultural constructions of mind, body, brain, thought, emotion, and self.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 50 students.

*Grade Mode:* Letter.

**ANT 138 – Ethnographic Research Methods in Anthropology (4 units)**

*Course Description:* Basic concepts in and approaches to ethnographic field research. Problem formulation, research design, qualitative and quantitative data collection procedures, and techniques for organizing, retrieving, and analyzing information. Ethnographic description and constructed inference. Students will organize and conduct individual research projects.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 139AN – Race, Class, Gender Systems (4 units)**

*Course Description:* Comparative analysis of class/race/gender inequality, concentrating on the ways in which beliefs about descent, "blood," and biological difference interact with property and marital systems to affect the distribution of power in society.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 139. (Former ANT 139.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**ANT 139BN – Gender & Sexuality (4 units)**

*Course Description:* Gender and sexuality in foraging bands, horticultural and pastoral tribes, agricultural and industrial states. Debates on cultural evolution and distribution of gender hierarchies. Impact of politics, economics, religion, social practices, women's movements on gender and sexuality. Culture, nature and sexuality.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 130. (Former ANT 130.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**ANT 140A – Cultures & Societies of West & Central Africa (4 units)**

*Course Description:* Ethnographic survey of West Africa and Congo Basin with analyses of representative societies which illustrate problems of general theoretical concern. Major consideration will be the continuities and discontinuities between periods prior to European contact and the present.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 140B – Cultures & Societies of East & South Africa (4 units)**

*Course Description:* Ethnographic survey of Eastern and Southern Africa with analyses of selected societies which illustrate problems of interest to anthropologists. Major consideration will be given to continuities and discontinuities between periods prior to European contact and the present.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 141C – People of the Arctic: Contemporary & Historic Cultures of the Circumpolar Region (4 units)**

*Course Description:* Social, economic, political, and religious lives of Russian, American, Canadian, and Greenlandic Arctic people (Yup'ik, Iñupiat, Inuit). Topics include Arctic ecosystems, archaeological record of human occupation, ethnohistorical and ethnographic accounts, arctic people in popular culture, and contemporary issues.

*Prerequisite(s):* ANT 002 or ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ANT 142 – Peoples of the Middle East (4 units)**

*Course Description:* Peoples of the Middle East (including North Africa). Discussions of class relations, kinship organization, sex/gender systems, religious beliefs and behavior, ethnic relations, political systems. Impact of world systems, political and religious movements and social change. (Former ANT 136.)

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 143A – Ethnology of Southeast Asia (4 units)**

*Course Description:* Patterns of culture and social organization from prehistory to the present, in the context of historical, ecological, economic, and political settings. Emphasis on the relation of ethnic minorities to national states.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 144 – Contemporary Societies & Cultures of Latin America (4 units)**

*Course Description:* Introduction to contemporary social structure of Latin America. Origins, maintenance and changes in inequality: economic responses to poverty, sociocultural responses to discrimination, and political responses to powerlessness.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 145 – Performance, Embodiment, & Space in South Asia (4 units)**

*Course Description:* South Asian cultures and societies with a focus on performance, embodiment, and space from several disciplinary fields. Topics may include colonialism, nationalism, religious traditions, media, popular culture, cities, social movements, modernity, body-cultures, identity, gender, and diasporas.

*Prerequisite(s):* ANT 002; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 146N – Topics in the Anthropology of Europe (4 units)**

*Course Description:* Recent ethnographies of different nation-states and socio-political spaces in Europe. Topics include the question of old and new boundaries, historical and contemporary constructions of Europe, migration and ethnicity, citizenship, belonging, multiculturalism, and post/socialisms.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 147 – Modern South Asia Cinema (4 units)**

*Course Description:* South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* MSA 131B, CTS 146B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ANT 148A – Culture & Political Economy in Contemporary China (4 units)**

*Course Description:* Examining contemporary Chinese culture and political economy through reading ethnographic studies on recent transformations in rural and urban Chinese society. Special attention is given to state power, popular culture, spatial mobility, city space, and gender.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ANT 151 – Primate Evolution (4 units)**

*Course Description:* Origin and relationships of the prosimians, monkeys, and apes.

*Prerequisite(s):* ANT 001 or BIS 002B or BIS 002C or EVE 010 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ANT 152 – Human Evolution (5 units)**

*Course Description:* Nature and results of the evolutionary processes involved in the formation and differentiation of humankind.

*Prerequisite(s):* ANT 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ANT 153 – Human Genetics: Mutation & Migration (5 units)**

*Course Description:* Introduction to human genetics. Principles of inheritance, the human genome, population genetics, mutation, genetic diversity, using DNA to study ancient human history, personal genomics. Human genetics as a tool to understand the patterns and processes of human migration. Introduction to the major concepts in human genetic and genomic research.

*Prerequisite(s):* BIS 002B C- or better or MCB 010 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **ANT 154A – The Evolution of Primate Behavior (5 units)**

**Course Description:** Examines ecological diversity and evolution of social systems of prosimians, monkeys, and apes, placing the social behavior of the primates in the context of appropriate ecological and evolutionary theory.

**Prerequisite(s):** ANT 001 or ANT 054 or EVE 010 recommended.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

## **ANT 154B – Primate Evolutionary Ecology (5 units)**

**Course Description:** Examination of the ecology of primates within an evolutionary framework. Theoretical concepts in individual, population, and community ecology, illustrated with primate (and other vertebrate) examples, with additional discussion of primate and rainforest conservation.

**Prerequisite(s):** ANT 001 or EVE 010 recommended.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 1 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

## **ANT 154C – Primate Behavior: Methods & Experimental Design (2 units)**

**Course Description:** Scientific methods of studying, describing and analyzing the behavior and ecology of primates.

**Prerequisite(s):** (ANT 054 or ANT 154A or ANT 154B or NPB 102); (STA 013 or STA 013Y or STA 032 or STA 100 or SOC 046B); ANT 154CL (can be concurrent).

**Learning Activities:** Lecture/Discussion 2 hour(s).

**Enrollment Restriction(s):** Pass One restricted to upper division ANT majors; concurrent enrollment in ANT 154CL required.

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **ANT 154CL – Laboratory in Primate Behavior (4 units)**

**Course Description:** Design and conduct of scientific "field studies" of the behavior of group-living primates at the California National Primate Research Center.

**Prerequisite(s):** (ANT 054 or ANT 154A or ANT 154B or NPB 102); (STA 013 or STA 013Y or STA 032 or STA 100 or SOC 046B); ANT 154C (can be concurrent); concurrent enrollment with ANT 154C required.

**Learning Activities:** Laboratory 6 hour(s), Term Paper.

**Enrollment Restriction(s):** Pass One restricted to upper division Anthropology majors only.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

## **ANT 155 – Primate Conservation Biology (4 units)**

**Course Description:** Study of the taxonomic, ecological and cultural diversity of Primates and how human activities impact tropical ecosystems. Emphasis on case studies and applied research methods. Includes discussion about career opportunities in conservation.

**Prerequisite(s):** ANT 001 or ANT 054 recommended.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Quantitative Literacy (QL); Scientific Literacy (SL).

## **ANT 156A – Human Osteology (4 units)**

**Course Description:** Human skeleton from archaeological, forensic, and paleontological perspectives, including anatomical nomenclature, variation with sex and age, function, evolution, growth, and development of bones and teeth. Hands-on study and identification of human skeletal remains.

**Prerequisite(s):** ANT 001 or ANT 001Y recommended.

**Learning Activities:** Lecture 2 hour(s), Laboratory 4 hour(s).

**Enrollment Restriction(s):** Not open to students who have previously completed ANT 156.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **ANT 156B – Advanced Human Osteology (4 units)**

**Course Description:** Human skeletons from archaeological, forensic, and paleontological contexts. Bone and tooth structure, growth, and development; measurement, statistics, and biomechanics; assessment of age, sex, weight, height, and ancestry; and indicators of illness, injuries, diet, and activities.

**Prerequisite(s):** ANT 156A; or equivalent.

**Learning Activities:** Lecture 2 hour(s), Laboratory 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **ANT 157 – Advanced Human Genetics (2 units)**

**Course Description:** Advanced concepts in human genetics and genomics. Identification of genes underlying human health and disease. Use of genomic data in clinical settings and examination of biases associated with "personalized medicine." Emphasis on current human genomic technology and critical reading of scientific papers.

**Prerequisite(s):** ANT 153 or BIS 101 or EVE 102 or EVE 131 or EVE 175 or MCB 162 or MCB 182.

**Learning Activities:** Lecture 2 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **ANT 157L – Advanced Human Genetics Lab (4 units)**

**Course Description:** Computer lab in human genetics and genomics. Emphasizes hands-on engagement with human genetic/genomic data. Ancestry analysis, pedigrees, de novo Mendelian disease.

**Prerequisite(s):** ANT 153 or EVE 102 or EVE 131 or EVE 175 or MCB 162 or MCB 182; concurrent enrollment in ANT 157 encouraged.

**Learning Activities:** Discussion/Laboratory 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## **ANT 158 – The Evolution of Sex: A Biological Perspective (4 units)**

**Course Description:** Current theoretical frameworks for explaining the evolution of sex differences and for understanding the interrelationship between biological processes and cultural construction of gender roles.

**Prerequisite(s):** ANT 001 recommended.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE) or Social Sciences (SS); Domestic Diversity (DD); Scientific Literacy (SL).

## **ANT 159 – Disease Outbreaks in Humans and Other Primates (4 units)**

*Course Description:* Impacts of infectious diseases on human and other primate populations, illustrated with past and present epidemiological studies from around the world. Theoretical concepts and applied questions, from local outbreaks to pandemics.

*Prerequisite(s):* ANT 001 or ANT 001Y or BIS 002B; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ANT 160 – Neandertals & Modern Human Origins (4 units)**

*Course Description:* Origins, evolution, and disappearance of Neandertals. Emergence of humans like us in both anatomy and behavior.

Interpretation of the fossil and archaeological records of Europe and Africa. Genetics of living and fossil humans.

*Prerequisite(s):* ANT 001 or ANT 001Y or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ANT 170 – Archeological Theory & Method (4 units)**

*Course Description:* Introduction to history and development of archeological theory and method, with particular emphasis on the basic dependence of the latter on the former. Stress is on historical development of archaeology in the New World.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **ANT 172 – New World Prehistory: The First Arrivals (4 units)**

*Course Description:* Survey of data relating to the peopling of the New World. Cultural adaptation and development of early inhabitants of North and South America.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 174 – European Prehistory (4 units)**

*Course Description:* Survey of the prehistory of Europe from its earliest human inhabitants, to the Neandertals and first modern humans, and through early agricultural and complex societies. Analysis and interpretation of the European archaeological record for understanding human dispersals into Europe.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 175 – Andean Prehistory: Archaeology of the Incas & Their Ancestors (4 units)**

*Course Description:* Prehistory of the Andean region, especially Peru, from the earliest hunting and gathering societies through the Inca. Focus on the use of archaeological data to reconstruct ancient human adaptations to the varied Andean environments.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 176 – California Archaeology (4 units)**

*Course Description:* Discussion and analysis of archaeology and archaeological practice in California. Emphasis on precontact periods and earliest contact, from the late Pleistocene through to time of the Spanish Missions.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s); Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **ANT 177 – African Prehistory (4 units)**

*Course Description:* Survey of prehistory of Africa from early human ancestors, through modern human origins, and into early agricultural and complex societies and the Bantu expansion. Analysis and interpretation of the African archaeological record, incorporating human paleontology and genetics.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 178 – Hunter-Gatherers (4 units)**

*Course Description:* Study and interpretation of the ancient and modern lifeway in which peoples support themselves with primitive technologies and without benefit of domesticated plants and animals.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **ANT 179 – Asian Prehistory (4 units)**

*Course Description:* Survey of the prehistory of Asia from the earliest human occupations to the rise of complex societies. Special focus on fossil and archeological records.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ANT 180 – Zooarchaeology (4 units)**

*Course Description:* Theories and methods for studying animal skeletal remains from archaeological sites. Identification and quantification of zooarchaeological material, cultural and natural processes affecting animal bones pre- and postburial, and use of faunal remains for determining past human diets and past environments.

*Prerequisite(s):* ANT 001 or ANT 003 recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to junior or senior standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ANT 181 – Archaeological Field Methods (4 units)**

*Course Description:* Survey of archeological field methods and techniques. Strategies for survey and site location, mapping of artifacts and features, geophysical techniques, and hand excavation and analysis of stratigraphy.

*Prerequisite(s):* ANT 003.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Domestic Diversity (DD); Scientific Literacy (SL).

**ANT 181L – Field Course in Archeological Methods (4 units)**

*Course Description:* On-site course using archaeological methods and techniques held at a field location in the western United States, generally California or Nevada. Incorporates basic methods of archaeological survey, mapping, and excavation.

*Prerequisite(s):* ANT 181; or consent of instructor.

*Learning Activities:* Fieldwork 18 hour(s), Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ANT 182 – Archaeometry (4 units)**

*Course Description:* Scientific techniques used to study the chemical and physical properties of archaeological materials. Types of anthropological questions that can be addressed with different methods. Preparation and analysis of archaeological materials.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**ANT 183 – Laboratory in Archeological Analysis (4 units)**

*Course Description:* Museum preparation, advanced field investigation, and guidance in preparation of museum material for publication.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s), Project.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

**ANT 184 – Prehistoric Technology: The Material Aspects of Prehistoric Adaptation (4 units)**

*Course Description:* Examination of the role of lithic, ceramic, textile and wooden implements as elements in prehistoric survival and development. Emphasis is descriptive, but the significance of material resources as factors in prehistoric adaptation, settlement patterns, and culture change are discussed.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**ANT 185 – Lithic Analysis (4 units)**

*Course Description:* Basic concepts of lithic analysis. General introduction on the place of stone tool technology in the archeological record. Physics, terminology and methodological concepts behind the study of stone tools. Review of the development of stone tool technology from its emergence.

*Prerequisite(s):* ANT 003 recommended.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ANT 186A – Museum Studies: Analysis of Native American Basketry (4 units)**

*Course Description:* Study of ethnographic and prehistoric basketry from North America, especially California and Oregon, in a multidisciplinary anthropological context. Techniques for basketry attribution and textile analysis.

*Learning Activities:* Lecture/Lab 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**ANT 187 – Cultural Resource Management in Archaeology (4 units)**

*Course Description:* Examination of legal foundations and goals of cultural resource management in the United States, with a focus on archaeological resources. Review of state and federal regulations, guidelines for assessing eligibility for listing in the National Register of Historic Places, professional practices to preserve and mitigate damage to resources, and public outreach practices.

*Prerequisite(s):* ANT 003; or consent of instructor; ANT 170 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**ANT 191 – Topics in Anthropology (4 units)**

*Course Description:* Intensive treatment of a special anthropological topic or problem.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Term Paper, Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ANT 192 – Internship in Anthropology (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the Department of Anthropology under the supervision of a member of the faculty.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Enrollment Restriction(s):* Limited to Anthropology majors.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**ANT 194H – Special Study for Honors Students (1-5 units)**

*Course Description:* Independent study of an anthropological problem involving the writing of an honors thesis.

*Prerequisite(s):* Consent of instructor; open only to majors of senior standing who qualify for honors program.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Writing Experience (WE).

**ANT 197T – Tutoring in Anthropology (1-5 units)**

*Course Description:* Leading of small voluntary discussion groups affiliated with one of the department's regular courses.

*Prerequisite(s):* Upper division standing with major in Anthropology and consent of Department Chairperson.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ANT 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed reading and group discussion of selected anthropological problems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Pass/No Pass only.

**ANT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ANT 200 – History of Anthropology (4 units)**

*Course Description:* Historical development of socio-cultural theory within anthropology, from mid-19th to mid-20th centuries. Focus on original theory texts in context of historical developments in the field as a whole.

*Learning Activities:* Lecture/Discussion 2 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 201 – Critical Readings in Ethnography (4 units)**

*Course Description:* Critical readings of selected ethnographies that examine a wide range of important topics and analytical issues in social and cultural anthropology. Emphasis on how and why ethnographic writing has changed over time and its relationship with contemporary theoretical explorations.

*Prerequisite(s):* Graduate student in Anthropology or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 202 – History & Theory of Biological Anthropology (4 units)**

*Course Description:* History of thought in biological anthropology and analysis of major theoretical problems in the field. Suggested for all first-year graduate students lacking intensive preparation in biological anthropology.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

**ANT 203 – History & Theory of Archaeology (4 units)**

*Course Description:* History of archaeology and archaeological theory and analysis of archaeological research methodology.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Generally restricted to graduate students; outstanding undergraduates with extensive training in archaeology with consent of instructor.

*Grade Mode:* Letter.

**ANT 204 – Contemporary Issues in Anthropological Theory (4 units)**

*Course Description:* Advanced consideration of fundamental issues in anthropological theory. Emphasis on critical examination of major contemporary debates between proponents of competing theories.

*Prerequisite(s):* ANT 002; ANT 137; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 205 – History & Theory in Anthropological Linguistics (4 units)**

*Course Description:* History of thought in anthropological linguistics. Consideration of the historical development of fundamental ideas in anthropological linguistics, of major theoretical issues, and of research methodology.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 206 – Research Design & Method in Social Anthropology (5 units)**

*Course Description:* Formulation of research problems and preparation of research proposals; relationships between theory and method, funding, pre-fieldwork preparations, entering the community, field research techniques, and problems of ethics; intensive work on proposal writing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**ANT 207 – Ethnographic Writing (4 units)**

*Course Description:* Relationship between conducting participant observation of others and writing it up, emphasizing the processual rift between the reality of fieldwork and its written representation. Study of various literary genres and textual strategies used in cultural anthropology.

*Prerequisite(s):* ANT 137; ANT 201; or the equivalent.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ANT 208 – Writing & Research Design in Evolutionary Anthropology (4 units)**

*Course Description:* Guided preparation of a Ph.D. dissertation proposal or MA thesis/report. Discussion of literature review, hypothesis testing, research design and grant writing as relates to anthropology. Culminates in an oral capstone presentation to the department.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **ANT 210 – Aspects of Culture Structure (4 units)**

*Course Description:* Analysis of various phases of culture, such as religion, economics, law, and folklore.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ANT 212 – Political Ecology (4 units)**

*Course Description:* Interdisciplinary seminar evaluating contributions from ecological anthropology, political economy, cultural constructivism, postmodernism, and feminism towards development of theories of political ecology. Historical relationships between local/global power structures, environmental degradation, and resistance movements. Case studies of desertification, deforestation, mining, conservation, development.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **ANT 216 – Problems in Archeological Method (4 units)**

*Course Description:* Techniques for analyzing archeological data; application to various prehistoric cultures.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **ANT 217 – Quantitative Modeling in Archaeology (4 units)**

*Course Description:* Examination of the nature of archaeological data with a focus on the quantitative and statistical techniques available to model, analyze, display, and make sense of such data.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **ANT 218 – Topics in New World Prehistory (4 units)**

*Course Description:* Advanced study on current problems in New World Prehistory and archaeology.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated only when material is unique for that student and with consent of instructor.

*Grade Mode:* Letter.

## **ANT 219 – Topics in Old World Prehistory (4 units)**

*Course Description:* Advanced study on current problems in Old World prehistory and archaeology.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated only when material is unique for that student and with consent of instructor.

*Grade Mode:* Letter.

## **ANT 220 – Field Course in Linguistics (4 units)**

*Course Description:* Techniques of eliciting, recording, and analyzing; work with a native speaker.

*Prerequisite(s):* ANT 110; ANT 111.

*Learning Activities:* Seminar 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

## **ANT 221 – Rural Transformation in Postcolonial Societies (4 units)**

*Course Description:* Problems of rural transformation arising out of political and economic interaction between national elites and rural regional and local populations under varying conditions of induced change in postcolonial societies. Attention given to the implications of this interaction for rapid economic growth.

*Prerequisite(s):* ANT 223; ANT 265; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ANT 222 – Cities & Citizenship (4 units)**

*Course Description:* Explores the nature of modern cities, urban socioeconomic life, and urban culture and politics from an anthropological perspective.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ANT 223 – Economic Anthropology (4 units)**

*Course Description:* Selected current methodological and theoretical problems in the analysis of nonindustrial economic systems.

*Prerequisite(s):* ANT 122; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **ANT 224 – Problems in Comparative Religion (4 units)**

*Course Description:* Advanced study of current problems in the anthropological study of religion.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **ANT 225 – State & Nation in the Modern World (4 units)**

*Course Description:* A presentation of current anthropological theories of the origins and nature of the modern nation-state in both the First and Third Worlds, with special reference to state ideology (nationalism) and forms of control.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **ANT 226 – Consciousness & Resistance (4 units)**

*Course Description:* Consideration of approaches to the study of social inequality, and responses of subordinated groups. Emphasis on situating approaches to contemporary social theory, concrete research problems, and political strategies. Topics: formation of consciousness and identity; collective action, accommodation to frontal resistance.

*Prerequisite(s):* Completion of first-year graduate work or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 228 – Culture & Power (4 units)**

*Course Description:* Exploration of one of the core paradigms within contemporary anthropological inquiry, "culture and power." Focus on how distinct theoretical perspectives—Marxism, post-Marxism, structuralism, post-structuralism, and feminism—have examined the mutually constitutive nature of culture and power.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

**ANT 229 – Gender, Identity, & Self (4 units)**

*Course Description:* Intersections of gender, identity, and selfhood cross-culturally and historically. How the self is feminized and masculinized, and interfaces with sexual, race, class, work, national, minority, and majority identities under different historical, cultural, and social structural conditions.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ANT 230 – Family Systems & Reproduction: Theory & Comparisons (4 units)**

*Course Description:* Comparative examination of family systems in historical context and of reproductive behaviors and strategizing. A major theme is how family-system norms specify the relative desirability of differently configured offspring sets. Cases are drawn from Western Europe and South and East Asia.

*Prerequisite(s):* Graduate standing in one of the social sciences including History.

*Learning Activities:* Lecture 1.50 hour(s), Seminar 1.50 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 232 – Political Movements (4 units)**

*Course Description:* Interdisciplinary approach to political movements of protest, reform, and revolution emphasizing historical comparison and evaluation of major theoretical approaches including world systems, resource mobilization, state & culture, rational choice, moral economy, social class and gender.

*Prerequisite(s):* Completion of first-year graduate work recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 239 – Problems in African Society & Culture (4 units)**

*Course Description:* Diachronic analyses of traditional institutions in sub-Saharan Africa.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 241 – Topics in North American Ethnology (4 units)**

*Course Description:* Advanced study on current problems in North American ethnography and culture history.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**ANT 245 – Ethnology of Northern & Central Asia (4 units)**

*Course Description:* Lectures on the culture aboriginally found north of the Caucasus-Korea line. Supervised study of the primary and secondary sources. Work with informants when available.

*Prerequisite(s):* Reading knowledge of German, Russian, Chinese, or Japanese.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 246 – Ethnology of Europe (4 units)**

*Course Description:* Supervised study of the primary and secondary sources dealing with the ethnography and ethnology of the peoples of Europe. Emphasis upon folk, peasant, and minority groups.

*Prerequisite(s):* Reading knowledge of a European language other than English.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 248 – Topics in Chinese Culture & Society (4 units)**

*Course Description:* Selected topics in the anthropology of Chinese society. Focus on one or more of the following topics: state-society dynamics, family and gender, city formation and urban life, social movement, labor politics, and religion and ideology in Chinese society.

*Prerequisite(s):* Graduate standing in the social sciences, history, or the humanities.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ANT 250 – Behavioral Ecology of Primates (4 units)**

*Course Description:* Concepts, issues, and hypotheses in primate behavioral ecology, with emphasis on the social and ecological determinants and consequences of variation in social organization for individuals.

*Prerequisite(s):* ANT 154A (can be concurrent); or the equivalent, graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ANT 252 – Human Evolution Seminar (4 units)**

*Course Description:* Study of selected topics in human evolutionary studies. Each year, focuses on one or more of the following: molecular evolution, primate evolutionary biology, Tertiary hominoids, Australopithecus, Homo erectus, archaic Homo sapiens, brain evolution.

*Prerequisite(s):* ANT 152; and consent of instructor, or the equivalent of ANT 152.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ANT 253 – Seminar in Human Genomics (3 units)**

*Course Description:* In-depth study of current topics in human genomics including genetic diversity, migration, phenotypic evolution and genetic associations with disease. Focus on population genetic theory. Topic changes yearly.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

## **ANT 254 – Current Issues in Primate Sociobiology (4 units)**

*Course Description:* Analysis of primate behavior, with particular emphasis on preparation for field studies.

*Prerequisite(s):* ANT 154B; or the equivalent.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ANT 256 – Primate Conservation Biology (4 units)**

*Course Description:* Application of understanding of primate biology to conservation of primates and their habitat. Topics include evolutionary anthropology, behavioral ecology, biogeography, macroecology, population biology, and socio-ecology of primates.

*Prerequisite(s):* ANT 154; Graduate standing, or upper division undergraduates with consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 10 students.

*Repeat Credit:* May be repeated 1 time(s) when term paper differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ANT 261 – Modeling the evolution of social behavior (4 units)**

*Course Description:* Tools and topics in modeling the evolution of social behavior in humans and other animals. Game theory, basic population genetics, animal conflict, altruism, reciprocity, signaling, and group selection.

*Prerequisite(s):* MAT 016C; or consent of instructor, or equivalent of MAT 016C.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

## **ANT 262 – Evolution & Human Behavior (4 units)**

*Course Description:* Exploration of the links between behavioral ecological theory and human cultural variation, focusing on reproduction, marriage, parental investment and family structure; implications of evolutionary theory for social organization in human communities, historical and contemporary.

*Prerequisite(s):* Graduate standing, or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **ANT 263 – Human Applications of Foraging Theory (4 units)**

*Course Description:* Foraging theory models and their use in ethnographic and archaeological analyses of human behavior, with a focus on hunter-gatherers and resource selection, patch use, population and habitat, central places, sharing, stochastic processes, population dynamics, and conservation behavior.

*Learning Activities:* Discussion 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ANT 258.

*Grade Mode:* Letter.

## **ANT 265 – Language, Performance, & Power (4 units)**

*Course Description:* Exploration of the intersection between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Political economic, sociolinguistic, and ethnographic approaches to understanding linguistic inequality.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate standing or consent of instructor.

*Cross Listing:* LIN 265.

*Grade Mode:* Letter.

## **ANT 270 – Anthropology Colloquium Seminar (1 unit)**

*Course Description:* Reports and discussions of recent advances in the four subfields of anthropology. Presented by guest speakers.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ANT 280 – Current Anthropology Journal Editorial Workshop (4 units)**

*Course Description:* Reading and offering workshop critiques of manuscripts submitted for publication, and reading and discussion of other relevant work in anthropology and human ecology. Track and edit published comments and authors' replies that accompany major features. Participation in the development of new sections for the electronic edition of the journal, including a "news and views" section and a debate section.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Workshop 1 hour(s), Independent Study 3 hour(s).

*Enrollment Restriction(s):* Students must enroll for all three quarters.

*Repeat Credit:* May be repeated 12 unit(s) with consent of instructor.

*Cross Listing:* ECL 280.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ANT 291 – Advanced Topics in Human Behavioral Ecology (4 units)**

*Course Description:* Topically focused, critical discussion of current and emerging research in the field of human behavioral ecology, giving special attention to theory, concepts, models, and methods for the evolutionary analysis of ethnographic and archaeological evidence.

*Prerequisite(s):* ANT 261 or ANT 262 or ANT 263; and consent of instructor, or comparable experience in anthropology, or related disciplines.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs & material covered is substantially different.

*Grade Mode:* Letter.

## **ANT 292 – Seminar in Linguistic Anthropology (4 units)**

*Course Description:* Selected topics in linguistic anthropology.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ANT 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ANT 299 – Research (1-12 units)***Course Description:* Research.*Learning Activities:* Variable.*Grade Mode:* Satisfactory/Unsatisfactory only.**ANT 299D – Dissertation Research (1-12 units)***Course Description:* Dissertation research.*Learning Activities:* Variable.*Repeat Credit:* May be repeated.*Grade Mode:* Satisfactory/Unsatisfactory only.**ANT 390 – Teaching Anthropology (4 units)***Course Description:* Intellectual and practical elements of college teaching in the field of Anthropology, from curriculum design and the syllabus through grading and course evaluations, including classroom and information technology methods, and problems and rewards of teaching in higher education.*Prerequisite(s):* Graduate standing in Anthropology or closely related discipline.*Learning Activities:* Seminar 3 hour(s), Practice 1 hour(s).*Grade Mode:* Letter.**ANT 396 – Teaching Assistant Training Practicum (1-4 units)***Course Description:* Teaching assistant training practicum.*Prerequisite(s):* Graduate standing.*Learning Activities:* Variable 3-36 hour(s).*Repeat Credit:* May be repeated.*Grade Mode:* Pass/No Pass only.

# Applied Biological Systems Technology (ABT)

**College of Agricultural & Environmental Sciences****ABT 015 – Wood Properties & Fabrication (2 units)***Course Description:* Study of wood properties and techniques for fabrication with wood. Gain experience working with various woods and woodworking tools for specific applications.*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).*Grade Mode:* Pass/No Pass only.*General Education:* Science & Engineering (SE); Oral Skills (OL);*Quantitative Literacy (QL); Visual Literacy (VL).***ABT 016 – Metal Properties & Fabrication (2 units)***Course Description:* Study of metal properties and of techniques for fabricating in metal. Physical principles, design considerations, effects of techniques on quality and appearance, and evaluation procedures. Experience in working with metal.*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).*Grade Mode:* Pass/No Pass only.*General Education:* Science & Engineering (SE); Quantitative Literacy (QL);*Visual Literacy (VL).***ABT 017 – Plastic Properties & Fabrication (2 units)***Course Description:* Study of the properties of plastic materials and the fundamentals of fabrication techniques. Experience in working with common plastics, with applications to biological systems.*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).*Grade Mode:* Pass/No Pass only.*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).**ABT 049 – Field Equipment Operation (2 units)***Course Description:* Operation, adjustment, and troubleshooting of farm tractors and field equipment. Principles of operation, equipment terminology and uses of tilling, cultivating, thinning, and planting equipment. Typical sequences in cropping practices.*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).*Grade Mode:* Pass/No Pass only.*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).**ABT 052 – Field Equipment Welding (2 units)***Course Description:* Intermediate welding to include hardfacing and inert gas welding. Class projects on repair and fabrication by welding. Troubleshooting and major repair of field equipment.*Prerequisite(s):* ABT 016; or consent of instructor.*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).*Grade Mode:* Pass/No Pass only.*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).**ABT 060 – Introduction to Unmanned Aerial Systems for Agriculture & Environmental Science (4 units)***Course Description:* Operation, use and impact of Unmanned Aerial Systems (UAS) for applications in agriculture and environmental assessment. Principles of unmanned flight, vehicle systems, safety, and airspace regulations for communicating spatial relationships. UAS sensors, data acquisition, management, processing, visualization and analysis. Ethics and professional responsibilities in operations and public communication, and potential impacts for agricultural and environmental policy.*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).*Enrollment Restriction(s):* Pass One restricted to College of Agricultural & Environmental Sciences students.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).**ABT 098 – Directed Group Study (1-5 units)***Starting Winter Quarter 2024, this course is no longer offered.**Course Description:* Directed group study.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Variable 1-5 hour(s).*Grade Mode:* Pass/No Pass only.*General Education:* Science & Engineering (SE).

## **ABT 099 – Special Study for Lower Division Students (1-5 units)**

Starting Winter Quarter 2024, this course is no longer offered.

*Course Description:* Special study for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ABT 101 – Engine Technology (3 units)**

*Course Description:* Principles of 2-stroke cycle, 4-stroke cycle gasoline and 4-stroke cycle diesel engine construction and operation. Engine systems, performance, troubleshooting, and overhaul.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ABT 110 – Irrigation Systems & Water Management (4 units)**

*Course Description:* Soil and plant aspects of irrigation and drainage. Soil-water principles including water storage and movement, plant response to irrigation, water use by crops, irrigation systems (i.e., micro-irrigation, sprinkler irrigation and surface irrigation), and related salinity and water quality impacts.

*Prerequisite(s):* PHY 007A; SSC 100 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ESM 110, HYD 110.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **ABT 110L – Experiments in Food Engineering (2 units)**

*Course Description:* Use of temperature sensors; measurement of thermal conductivity and heat transfer in foods; refrigeration, freezing, concentration and dehydration of foods.

*Prerequisite(s):* FST 110B (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **ABT 121 – Animal Housing & Environment Management (2 units)**

*Course Description:* Optimal structures and environments for animal growth and comfort; heat and moisture transfer principles; heating, cooling, ventilating principles and equipment; animal housing design; environmental regulations and waste management practices.

*Prerequisite(s):* ANS 001 or ANS 002.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ABT 142 – Equipment & Technology for Small Farms (2 units)**

*Course Description:* Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Cross Listing:* IAD 142.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ABT 150 – Introduction to Geographic Information Systems (4 units)**

*Course Description:* Basic concepts, principles, and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Landscape Architecture and Sustainable Environmental Design majors.

*Credit Limitation(s):* Not open for credit to students who have completed ABT 180/PLS 180 or ABT 181N.

*Cross Listing:* LDA 150.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **ABT 161 – Water Quality Management for Aquaculture (3 units)**

*Course Description:* Basic principles of water chemistry and water treatment processes as they relate to aquacultural systems.

*Prerequisite(s):* BIS 001B; MAT 016B; CHE 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ABT 163 – Aquaculture Systems Engineering (3 units)**

*Course Description:* Design of aquacultural systems: design methodology, principles of fluid mechanics, site selection and facility planning, management operations, computer modeling.

*Prerequisite(s):* ABT 161.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ABT 165 – Irrigation Practices for an Urban Environment (3 units)**

*Course Description:* Basic design, installation, and operation principles of irrigation systems for turf and landscape: golf courses, parks, highways, public buildings, etc. Emphasis on hardware association with sprinkler and drip/trickle systems.

*Prerequisite(s):* PHY 001A.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project.

*Cross Listing:* SAF 165.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ABT 181N – Concepts & Methods in Geographic Information Systems (4 units)**

*Course Description:* Data representation and analysis in geographic information systems (GIS). Creation of spatial data sets from analog and digital sources such as aerial photography and maps; data structures, data management, database design, georeferencing, georectification, surface models, analysis, and spatial data visualization.

*Prerequisite(s):* LDA 150 or ABT 150; or consent of instructor.

*Learning Activities:* Lecture/Lab 8 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

## **ABT 182 – Environmental Analysis Using GIS (4 units)**

*Course Description:* Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS.

*Prerequisite(s):* ABT 150 or LDA 150; or equivalent GIS experience and skills; general biology and/or ecology courses recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Cross Listing:* HYD 182.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ABT 190C – Research Conference for Advanced Undergraduates (1 unit)**

*Course Description:* Research conferences for specialized study in applied biological systems technology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ABT 192 – Internship in Applied Biological Systems Technology (1-5 units)**

*Course Description:* Supervised internship in applied biological systems technology.

*Prerequisite(s):* Consent of instructor; upper division standing; approval of project prior to period of internship.

*Learning Activities:* Internship 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ABT 197T – Tutoring in Applied Biological Systems Technology (1-5 units)**

*Course Description:* Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department's regular courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ABT 198 – Directed Group Study (1-5 units)**

Starting Winter Quarter 2024, this course is no longer offered.

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ABT 199 – Special Study for Advanced Undergraduates (1-5 units)**

Starting Winter Quarter 2024, this course is no longer offered.

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ABT 212 – Path to Zero Net Energy (4 units)**

*Course Description:* Zero Net Energy concepts and social, technical, economic, and environmental considerations. Multidisciplinary research and analysis for clients.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to upper division or graduate students.

*Grade Mode:* Letter.

## **ABT 233 – Pest Control Practices (3 units)**

*Course Description:* Practical and theoretical considerations of pest control systems and techniques. Design, selection, and use of mechanical systems for field, orchard, greenhouse, and vector control use. Biological, legal, and environmental considerations in pest control and pesticide application.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **ABT 289A – Selected Topic in Applied Biological Systems Technology: Agricultural & Natural Resources (1-5 units)**

*Course Description:* Special topic.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ABT 289B – Selected Topics in Applied Biological Systems Technology: Biotechnology (1-5 units)**

*Course Description:* Special topic.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ABT 289C – Selected Topics in Applied Biological Systems Technology: Food Technology (1-5 units)**

*Course Description:* Special topic.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ABT 290C – Graduate Research Conference (1 unit)**

*Course Description:* Research problems, progress, and techniques in applied biological systems technology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ABT 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ABT 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ABT 317 – Teaching Agricultural Mechanics (2 units)**

*Course Description:* Preparation of the teacher to plan, organize, and conduct an agricultural mechanics program in secondary schools.

Development of and presentation of lesson plans and teaching aids.

Review of subject matter in metal fabrication, power and machinery and agricultural structures areas.

*Prerequisite(s):* A course in physics; 6 units related to agricultural mechanics; enrolled in Agricultural Education Teacher Credential Program.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## Applied Science Engineering-Davis (EAD)

College of Engineering

**EAD 230 – Topics in Computational Fluid Dynamics (3 units)**

*Course Description:* Hands-on approach to numerical methods for compressible fluid flow. Readings and discussions of solution strategies will be complemented with programming exercises and projects to give first-hand experience with performance and accuracy of several computational methods; from upwind differencing to Godunov methods.

*Prerequisite(s):* EAD 210A; EAD 210B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**EAD 289A – Special Topics in Applied Science: Atomic, Molecular, & Optical Physics (1-5 units)**

*Course Description:* Special topic in Atomic, Molecular, and Optical Physics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

**EAD 289B – Special Topics in Applied Science: Chemical Physics (1-5 units)**

*Course Description:* Special topic in Chemical Physics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

**EAD 289C – Computational Physics: Computational Physics (1-5 units)**

*Course Description:* Special topic in Computational Physics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

**EAD 289D – Special Topics in Applied Science: Biophotonics/Biotechnology (1-5 units)**

*Course Description:* Special topic in Biophotonics/Biotechnology.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

**EAD 289E – Special Topics in Applied Science: Materials Science (1-5 units)**

*Course Description:* Special topic in Materials Science.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

**EAD 289F – Special Topics in Applied Science: Imaging Science & Photonics (1-5 units)**

*Course Description:* Special topic in Imaging Science and Photonics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

**EAD 289G – Special Topics in Applied Science: Nonlinear Optics (1-5 units)**

*Course Description:* Special topic in Nonlinear Optics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

**EAD 289H – Special Topics in Applied Science: Plasma/Fusion Energy Physics (1-5 units)**

*Course Description:* Special topic in Plasma/Fusion Energy Physics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

## **EAD 289I – Special Topics in Applied Science: Quantum Electronics (1-5 units)**

*Course Description:* Special topic in Quantum Electronics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

## **EAD 289J – Special Topics in Applied Science: Condensed Matter/Statistical Physics (1-5 units)**

*Course Description:* Special topic in Condensed Matter/Statistical Physics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

## **EAD 289K – Special Topics in Applied Science: Classical Optics (1-5 units)**

*Course Description:* Special topic in Classical Optics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

## **EAD 289L – Special Topics in Applied Science: Microwave & Millimeter-Wave Technology (1-5 units)**

*Course Description:* Special topic in Microwave and Millimeter-Wave Technology.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

## **EAD 289M – Special Topics in Applied Science: Synchrotron Radiation Science (1-5 units)**

*Course Description:* Special topic in Synchrotron Radiation Science.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

## **EAD 289N – Special Topics in Applied Science: Space Physics (1-5 units)**

*Course Description:* Special topic in Space Physics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s) per segment when topic differs.

*Grade Mode:* Letter.

## **EAD 290 – Seminar (1-2 units)**

*Course Description:* Seminar.

*Learning Activities:* Seminar 1-2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EAD 290C – Graduate Research Group Conference (1 unit)**

*Course Description:* Graduate research group conference.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EAD 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Lecture 3-15 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EAD 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Arabic (ARB)**

### **College of Letters & Science**

## **ARB 001 – Elementary Arabic 1 (5 units)**

*Course Description:* Introduction to basic Arabic. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including the alphabet and basic syntax. Focus on standard Arabic with basic skills in spoken Egyptian and/or one other colloquial dialect.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **ARB 001A – Accelerated Intensive Elementary Arabic (15 units)**

*Course Description:* Special 12-week accelerated, intensive summer session course that combines the work of courses ARB 001, 002, and 003. Introduction to Modern Standard Arabic through development of all language skills in a cultural context with emphasis on communicative proficiency.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ARB 001, ARB 002, or ARB 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **ARB 002 – Elementary Arabic 2 (5 units)**

*Course Description:* Continuation of basic Arabic from ARB 001.

Interactive and integrated presentation of listening, speaking, reading, and writing skills, including syntax. Focus on standard Arabic and limited use of spoken Egyptian and/or one other colloquial dialect.

*Prerequisite(s):* ARB 001; or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **ARB 003 – Elementary Arabic 3 (5 units)**

*Course Description:* Continuation of introduction to basic Arabic from ARB 001 and ARB 002. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including syntax. Focus on standard Arabic with limited use of spoken Egyptian and/or one other colloquial dialect.

*Prerequisite(s):* ARB 002; or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **ARB 021 – Intermediate Arabic 21 (4 units)**

*Course Description:* Builds on courses ARB 001, ARB 002, and ARB 003. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect.

*Prerequisite(s):* ARB 003; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ARB 021A – Accelerated Intensive Intermediate Arabic (15 units)**

*Course Description:* Special 12-week accelerated, intensive summer session course that combines the work of courses ARB 021, ARB 022, and ARB 023. Modern Standard Arabic through development of all language skills in a cultural context with emphasis on communicative proficiency.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ARB 021, ARB 022, or ARB 023.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **ARB 021C – Colloquial Egyptian Arabic (4 units)**

*Course Description:* Continuation of the Colloquial Egyptian Arabic covered in the first year of Arabic; ARB 001, ARB 002, and ARB 003.

*Prerequisite(s):* ARB 003; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Lecture/Lab 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when instruction material changes.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ARB 021L – Colloquial Levantine Arabic (4 units)**

*Course Description:* Continuation of colloquial Levantine Arabic presented in ARB 001, ARB 002 and ARB 003. Integrated presentation of speaking and listening skills in colloquial Levantine Arabic, with reading and writing in Modern Standard Arabic that is related to Levantine cultural production and social life.

*Prerequisite(s):* ARB 003; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ARB 022 – Intermediate Arabic 22 (4 units)**

*Course Description:* Continuation of ARB 021. Interactive and integrated presentation of listening, speaking, reading, and writing, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect.

*Prerequisite(s):* ARB 021; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ARB 022C – Colloquial Egyptian Arabic (4 units)**

*Course Description:* Continuation of the Colloquial Egyptian Arabic covered in first year of Arabic; courses ARB 001, ARB 002, and ARB 003 and the first quarter of Colloquial Arabic ARB 021C.

*Prerequisite(s):* ARB 021C; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Lecture/Lab 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when instruction material changes.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ARB 022L – Colloquial Levantine Arabic (4 units)**

*Course Description:* Continuation of colloquial Levantine Arabic presented in ARB 021L. Integrated presentation of speaking and listening skills in colloquial Levantine Arabic; reading and writing in Modern Standard Arabic related to Levantine social life.

*Prerequisite(s):* ARB 021L; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ARB 023 – Intermediate Arabic 23 (4 units)**

*Course Description:* Continuation of ARB 021 and ARB 022. Interactive and integrated presentation of Arabic listening, speaking, reading, and writing skills, including idiomatic expression.

*Prerequisite(s):* ARB 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ARB 023C – Colloquial Egyptian Arabic (4 units)**

*Course Description:* Continuation of Colloquial Egyptian Arabic covered in ARB 022C.

*Prerequisite(s):* ARB 022C; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Lecture/Lab 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when instruction material changes.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**ARB 023L – Colloquial Levantine Arabic (4 units)**

*Course Description:* Continuation of colloquial Levantine Arabic presented in ARB 022L. Integrated presentation of speaking and listening skills in colloquial Levantine Arabic; reading and writing in Modern Standard Arabic related to Levantine social life.

*Prerequisite(s):* ARB 022L; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**ARB 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ARB 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ARB 101A – Readings in Arabic: 600-1850 (4 units)**

*Course Description:* Readings in Arabic. Poetry, prose literature, and selections from texts on religion, history, politics, science, philosophy and mysticism.

*Prerequisite(s):* ARB 123; or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when instructor decides there is benefit from additional practice working on the different selections from the same texts or if 50% or more of the texts are different.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ARB 121 – Advanced Arabic (4 units)**

*Course Description:* Review, refinement, and development of skills learned in intermediate Arabic through work with texts, video, and audio on cultural and social issues. Integrated approach to reading, writing, listening, speaking primarily standard Arabic, with limited use of one colloquial dialect.

*Prerequisite(s):* ARB 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when based on different readings.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ARB 122 – Advanced Arabic (4 units)**

*Course Description:* Continuation of ARB 121. Further development of advanced skills in reading, listening, writing, and speaking standard Arabic through work with texts, video, and audio on cultural and social issues. Limited use of one colloquial dialect.

*Prerequisite(s):* ARB 121; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ARB 123 – Advanced Arabic (4 units)**

*Course Description:* Continuation of ARB 122. Further development of advanced skills in reading, listening, writing, and speaking standard Arabic through work with texts, video, and audio on cultural and social issues. Limited use of one colloquial dialect.

*Prerequisite(s):* ARB 122; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ARB 140 – A Story for a Life: The Arabian Nights (4 units)**

*Course Description:* In-depth exploration of The Arabian Nights, the best-known work of pre-modern Arabic literature and a major work of world literature. Analysis of the work in its historical context and in comparison to other frame tales in world literature.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* COM 172, MSA 121C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ARB 141 – Readings in Modern Arabic Literature (4 units)**

*Course Description:* Readings of modern Arabic poetry and fiction in original format, assisted by instructor-prepared glossaries and other supplementary material. Readings to be followed by class discussion and short writing assignments in Arabic. Open to students at advanced proficiency in Arabic.

*Prerequisite(s):* ARB 123; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) if reading material changes.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ARB 198 – Directed Group Study (1-5 units)**

*Course Description:* Development of reading, writing, speaking, and listening skills in advanced Arabic. Materials may include al-Kitaab Part Two or Three, news articles and broadcasts, short stories, poetry, novels, essays, scripture, prophetic traditions, audio recordings, and television and film.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated 4 time(s) when content differs.

*Grade Mode:* Letter.

**ARB 297 – Directed Independent Study (4 units)**

*Course Description:* Directed Independent Study on a topic culminating in a term paper. Independent Study may only be arranged with consent of the instructor when graduate seminars are unavailable. Topic varies by instructor.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Independent Study.

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 5 time(s) when no graduate seminars are available and topic differs.

*Grade Mode:* Letter.

**ARB 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ARB 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 18 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Art History (AHI)

College of Letters & Science

**AHI 001A – Ancient Mediterranean Art (4 units)**

*Course Description:* Introduction to the art and architecture of the ancient Mediterranean world, including Mesopotamia, Egypt, Greece, and Rome.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 001B – Medieval & Renaissance Art (4 units)**

*Course Description:* Christian, Barbarian, Moslem, and Classical traditions in European Art from the 4th through the 16th centuries.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 001C – Baroque to Modern Art (4 units)**

*Course Description:* Introduction to visual analysis through study of western art 1600-present, examining major artists and movements from Europe to North America. Study of the relationship of art and artists to political, religious, social change, and to changes in ideology, patronage, audience.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 001D – Arts of Asia (4 units)**

*Course Description:* Introduction to major forms and trends in the arts, architecture, and material culture of Asia from the Neolithic to the contemporary emphasizing the visual manifestation of secular and religious ideas and ideals.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AHI 001DV.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 001DY – Arts of Asia (5 units)**

*Course Description:* Introduction to major forms and trends in the arts and material culture of Asia from the Neolithic to the contemporary, emphasizing the visual manifestation of secular and religious ideas and ideals.

*Learning Activities:* Web Virtual Lecture 2.50 hour(s), Discussion 1 hour(s), Lecture/Discussion 1.50 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AHI 001D.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 001E – Islamic Art & Architecture (4 units)**

*Course Description:* Introduction to the art and architecture of the Islamic world including the Middle East, Africa, Europe, and South Asia, from the 7th century CE to the 20th century.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 005 – Understanding Visual Culture (4 units)**

*Course Description:* Development of visual literacy for an increasingly visual world; critical analyses focusing on the widest variety of visual imagery: the fine arts across media and eras of world culture, television, film, and advertising. Intended for a diverse spectrum of audiences.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 025 – Understanding Architecture (4 units)**

*Course Description:* Development of architecture and urban design; how form, space, order are conceived and used across eras and cultures. Examines the function and organization of space, technological problems of construction, visual qualities of architecture, and social issues connected to architecture.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

**AHI 098 – Directed Group Study (1-5 units)**

This version has ended; see updated course, below.

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1-5 hour(s).

*Enrollment Restriction(s):* Restricted to lower division students.

*Grade Mode:* Pass/No Pass only.

**AHI 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

This course version is effective from, and including: Winter Quarter 2024.

**AHI 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**AHI 100 – Methods of Art History (4 units)**

*Course Description:* Methods of art historical research and analysis, and general issues in critical thought. Writing skills appropriate to a range of art-historical exposition.

*Prerequisite(s):* Prior completion of two upper-division Art History (AHI) courses recommended.

*Learning Activities:* Extensive Writing/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**AHI 101 – Understanding Museum Practices (4 units)**

*Course Description:* Museum theory and practice. Mission of the museum to collect, preserve and educate. Museum administrative structure and the role of the curator. Visitor engagement, ethics of display, interpretation and content production.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**AHI 102 – Exhibition Practicum (4 units)**

*Course Description:* Curate an exhibition. Development of exhibition proposal, object selection and installation, design, lighting, creation of exhibition text and promotional material. Production of a public display for a campus museum or elsewhere.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One restricted to Art History and Art Studio majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**AHI 110 – Cultural History of Museums (4 units)**

*Course Description:* Evolution of museums in the western world from the "cabinet of curiosities" of 16th-century Europe to the modern "art center." The changing motives behind collecting, exhibiting, and interpretation of objects. Attention to museums' historical legacies and continuing philosophical dilemmas.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 120A – Art, Architecture, & Human Rights (4 units)**

*Course Description:* Study of human rights as they relate to art, architecture, and cultural heritage. Examines museums, art collections, and cultural-heritage management, their relation to the cultural prerogatives of communities and indigenous groups, and protection of cultural heritage during war and conflict.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* HMR 120A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 121 – Politics of Public Art (4 units)**

*Course Description:* Politics of public art. Role of contemporary artists, public monuments, urban spaces, the movie industry, photography, propaganda art, and comics in construction of political ideologies and collective identities.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**AHI 122 – Sex & Space (4 units)**

*Course Description:* Relationship between space and sexuality. Sexual metaphors in art and architecture, gender identity formation via images and space. Diverse intersections of sexuality and art history.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

**AHI 123 – The Museum in the Age of Spectacle (4 units)**

*Course Description:* The institution of the museum in the context of modernity, nationalism, (post) colonialism, and the society of spectacle. Designed to bring art objects of the Manetti Shrem collection, global art history, and foundational critical theory together in a meaningful and experimental way.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**AHI 130 – Landscape, Nature, & Art (4 units)**

*Course Description:* Interpretation of the natural world in the western world 1600-1900, with perspectives on the present; landscape painting, ideology of picturesque and sublime, landscape art and travel, reshaping the land as art; dialogues between art and science; nature as national identity.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 148 – Theory & Criticism: Painting & Sculpture (4 units)**

*Course Description:* Study of forms and symbols in historic and contemporary masterpieces.

*Prerequisite(s):* ART 005 or 007 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* ART 148.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**AHI 150 – Arts of Subsaharan Africa (4 units)**

*Course Description:* Traditional arts and crafts of subsaharan Africa from prehistoric times to the present; the relationships among art, nature, cycles of life, and religion; art as expression of power; sculpture and culture in West and Central Africa; Colonialism and collecting.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 151 – Arts of the Ancient New World (4 units)**

*Course Description:* Artistic developments of the ancient New World. Interpretations of art and architecture in relation to religious ideologies, social structures, and political paradigms in Peru, Central America, the Caribbean, and Mesoamerica.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 152 – Arts of Oceania & Prehistoric Europe (4 units)**

*Course Description:* Traditional arts of aboriginal Australia, Melanesia, Polynesia, and Micronesia, as seen in their cultural contexts. Prehistoric art of Europe and the Near East.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 153 – Hindu Gods & Hindu Symbols (4 units)**

*Course Description:* A historical survey of the development of the language of symbolism and iconography in Hinduism.

*Prerequisite(s):* RST 068 Hinduism or RST 069 Hindu Mythology recommended, but not required.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* RST 181.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 154 – The Hindu Temple (4 units)**

*Course Description:* Comparative history of architecture and symbolism of the Hindu Temple in India, Southeast Asia and the United States. Attention to the temple as expression of religious knowledge, political authority, and cultural heritage through the lens of colonialism and postcolonialism.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* RST 154.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 155 – The Islamic City (4 units)**

*Course Description:* Introduction to the urban history of the Islamic world. Critical study of the historiography of the Islamic city, development of urban form, institutions and rituals, and analysis of selected themes.

*Prerequisite(s):* AHI 001E recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC).

**AHI 156 – Arts of the Islamic Book (4 units)**

*Course Description:* Critical study of the arts of the luxury book in the pre-modern Islamic world. Representation in Islam, the relationship of word and image, the discipline of calligraphy, aesthetics and representation in Persianate painting.

*Prerequisite(s):* Prior completion of AHI 001E recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 157 – Buddhist Art (4 units)**

*Course Description:* A historical survey of Buddhist art in relation to the development of Buddhist doctrine and philosophy.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* RST 171.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 158 – Popular Religious Art in India (4 units)**

*Course Description:* Survey of Indian popular religious art in prints, trade labels, comics and photographs.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* RST 180.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 163A – Early Chinese Art (4 units)**

*Course Description:* Thematic and chronological examination of 3000 years of Chinese art and culture from Neolithic through Tang Dynasty (10th c. CE). Study of ceremonial and secular objects manifesting folk beliefs and belief systems of ancestor worship, Buddhism, Daoism, and Confucianism.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 163B – Chinese Painting (4 units)**

*Course Description:* Thematic and chronological examination of Chinese painting and culture from the Tang Dynasty (7th century CE) through the early 20th century. Issues considered include political art (made to support or protest regimes), art and the market, art and individual expression.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 163C – Early Modern Chinese Painting (4 units)**

*Course Description:* Topics in Chinese Art History, 13th-19th century. Study of issues pertaining to self and society; gender and gendering; religion and philosophy; political engagement and protest; economy and the market; the effects created by periods of transition on visual expression.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 163D – Art from China 1900 to the Present (4 units)**

*Course Description:* Forms of modern and avant-garde expression from China's industrialization to the 21st century. Interactions of art and politics, individual and state, art for the free market versus art for the state, expressions of modernity; China on the world stage.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 164 – The Arts of Japan (4 units)**

*Course Description:* Japan's painting, architecture, decorative arts, and print heritage, ancient times to the 20th century in literary, political, intellectual, and spiritual contexts; impact of Japanese art on the West and the West's transformative impact upon Japan's opening in the 19th century.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**AHI 168 – Great Cities (4 units)**

*Course Description:* Transformation in architecture and urban form in Paris, London, and Vienna in the context of varying social, political, and economic systems as well as very different cultural traditions, concentrating on the years 1830-1914.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**AHI 172A – Early Greek Art & Architecture (4 units)**

*Course Description:* Examination of the origin and development of the major monuments of Greek art and architecture from the 8th century to the mid-5th century B.C.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* CLA 172A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**AHI 172B – Later Greek Art & Architecture (4 units)**

*Course Description:* Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-5th century to the 1st century B.C.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* CLA 172B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**AHI 173 – Roman Art & Architecture (4 units)**

*Course Description:* Art and architecture of Rome and the Roman Empire, from the founding of Rome through the 4th century C.E.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* CLA 173.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**AHI 175 – Architecture & Urbanism in Mediterranean Antiquity (4 units)**

*Course Description:* Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Cross Listing:* CLA 175.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 176A – Art of the Middle Ages: Early Christian & Byzantine Art (4 units)**

*Course Description:* Term paper or gallery studies and review. Painting, sculpture and architecture of the early Christian era and Byzantine Empire: through the later Roman Empire in the West and to the final capture of Constantinople in the East.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 176B – Art of the Middle Ages: Early Medieval & Romanesque Art (4 units)**

*Course Description:* Term paper or gallery studies and review. Painting, sculpture and architecture of western Europe in the early medieval era: from the rise of the barbarian kingdoms through the 12th century.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 176C – Art of the Middle Ages: Gothic (4 units)**

*Course Description:* Term paper or gallery studies and review. Painting, sculpture and architecture in northern Europe from the 12th through the 15th centuries.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**AHI 177 – Northern Renaissance Art (4 units)**

*Course Description:* Artistic culture of Western and Central Europe c. 1350-1600. Topics include the development of "realism" in portraiture and landscape, prints and print culture, urbanism, science and the exotic, anti-religious artworks, religious attacks on art, contacts with Renaissance Italy.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **AHI 178B – Early Italian Renaissance Art & Architecture (4 units)**

*Course Description:* Artists of the 15th century, with a focus on Florence; Donatello and Masaccio through Botticelli, in their artistic, architectural, and cultural setting; the impact of Humanism and the rebirth of classical learning.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **AHI 178C – High & Late Italian Renaissance Art & Architecture (4 units)**

*Course Description:* High Renaissance and Mannerism in 16th-century Italy: Leonardo, Michelangelo, Raphael, and Titian in their artistic and cultural settings, Florence, Rome, and Venice; the architecture of Bramante, Michelangelo, and Palladio.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **AHI 179B – Baroque Art (4 units)**

*Course Description:* Painting, sculpture and graphic arts in the 17th century, including such artists as Caravaggio, Rubens, Rembrandt, and Velázquez in their political and social context.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **AHI 180 – Arts of the Rococo (4 units)**

*Course Description:* European design culture between 1710 and 1780, including painting, sculpture, architecture, interior design, furniture, metalwork, and ceramics. Concentration on the arts in France and Germany, but in dialogue with art from China, India, the Middle East, and the Americas. Ornamentation and decoration as critical concepts in art history.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## **AHI 181 – Latin American Art & Architecture (4 units)**

*Course Description:* Art and architecture of Latin America since Spanish arrival in the New World to the present. Visual, spatial, and material practices (painting, sculpture, urban form, cartography, and film, among others) from North and South America. How art and architecture shape and define colonial encounters and negotiations, religious and cultural exchange, conceptions of race and gender, and notions of nationalism and globalism.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## **AHI 182 – British Art & Culture (1750-1900) (4 units)**

*Course Description:* British painting in relation to the position of women in society and the rise of the middle-class art market. Topics covered Hogarth and popular culture, Queen Victoria and the female gaze, and Pre-Raphaelite artists and collectors.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **AHI 183A – Art in the Age of Revolution, 1750-1850 (4 units)**

*Course Description:* Emergence of modernism in Europe from the late 18th century to the middle of the 19th century. Major artistic events viewed against a revolutionary backdrop of changing attitudes toward identity, race, and gender.

*Prerequisite(s):* Prior completion of AHI 001C recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **AHI 183B – Impressionism & Post-Impressionism: Manet to 1900 (4 units)**

*Course Description:* Innovations of Impressionists, Post-Impressionists, and Symbolists in relation to social changes. Assessment of role of dealers and critics, myth of the artist-genius, and gender relations in French art and culture of the late 1800s.

*Prerequisite(s):* Prior completion of AHI 001C recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **AHI 183C – Modernism in France, 1880-1940 (4 units)**

*Course Description:* Development of modern art in France, its social context, and its transnational aspects. Post-Impressionism, Fauvism, Cubism, Expressionism, and Surrealism are considered in relation to secessionist movements, the formation of other artistic groups, new forms of patronage, and new audiences.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **AHI 184 – 20th-Century Architecture (4 units)**

*Course Description:* Major movements in architecture of the 20th century in Europe and America. Formal innovations are examined within the social, political, and economic circumstances in which they emerged.

*Prerequisite(s):* Prior completion of AHI 025 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## AHI 185 – Avant-Gardism & its Aftermath, 1917-1960 (4 units)

**Course Description:** Social, cultural, aesthetic, and theoretical development for artists and their audiences in the context of larger issues like the Mexican, Russian and German revolutions, WWI, the Depression, WWII, etc., and a critical-theoretical inquiry into questions of modernism, modernity, and avant-gardism.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## AHI 186 – Contemporary Art 1960-Present (4 units)

**Course Description:** Development of new media and aesthetics in the context of such cultural and political phenomena as the New Left, feminism, and globalization; investigation of the critical-theoretical questions of neo avant-gardism, postmodernism, and postmodernity.

**Learning Activities:** Lecture/Discussion 4 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

## AHI 187 – Contemporary Architecture (4 units)

**Course Description:** Introduction to world architecture and urban design since circa 1966. Relation of influential styles, buildings, and architects to postmodern debates and to cultural, economic, technological and environmental change.

**Learning Activities:** Lecture 3 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## AHI 188A – The American Home (4 units)

**Course Description:** American domestic architecture and its responsiveness to changes in daily life from Colonial times to the 1960s. Vernacular developments, effects of different socioeconomic conditions, and women's role in shaping the home receive special attention.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL).

## AHI 188B – Architecture of the United States (4 units)

**Course Description:** Major movements from colonial times to the present. The role of buildings in a changing American society, the interplay of styles with technologies of construction, relationship between American and European developments and evolution of the architectural and planning professions.

**Learning Activities:** Lecture/Discussion 3 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

## AHI 188C – American Art to 1910 (4 units)

**Course Description:** Major movements in American art from the 17th-century English-speaking colonies to the onset of World War I.

**Learning Activities:** Lecture/Discussion 4 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

## AHI 189 – Photography in History (4 units)

**Course Description:** Social, cultural, aesthetic and technical developments in the history of photography including patronage and reception, commercial, scientific, political and artistic applications, and a critical-theoretical inquiry into photography's impact on the social category "art" and the history of subjectivity.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Visual Literacy (VL).

## AHI 190A – Undergraduate Seminar in Art History: Mediterranean Antiquity (4 units)

**Course Description:** Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

**Prerequisite(s):** Upper division standing; significant training in Art History recommended; or consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s), Term Paper.

**Enrollment Restriction(s):** Limited to 25 students; for majors, minors, other advanced students.

**Repeat Credit:** May be repeated 2 time(s) when topic differs.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190B – Undergraduate Seminar in Art History: Medieval (4 units)

**Course Description:** Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

**Prerequisite(s):** Upper division standing; significant training in Art History recommended; or consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s), Term Paper.

**Enrollment Restriction(s):** Limited to 25 students; for majors, minors, other advanced students.

**Repeat Credit:** May be repeated 2 time(s) when topic differs.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190C – Undergraduate Seminar in Art History: Renaissance (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190D – Undergraduate Seminar in Art History: American (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190E – Undergraduate Seminar in Art History: Gendering of Culture (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190F – Undergraduate Seminar in Art History: Chinese (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190G – Undergraduate Seminar in Art History: Japanese (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190H – Undergraduate Seminar in Art History: Modern-Contemporary (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190I – Undergraduate Seminar in Art History: 17th-18th Century (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190J – Undergraduate Seminar in Art History: Islamic (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Upper division standing; significant training in Art History recommended, or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190K – Undergraduate Seminar in Art History: 19th Century (4 units)

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Art History major, minor, or other significant training in Art History recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190L – Undergraduate Seminar in Art History: Architecture & Heritage (4 units)

This version has ended; see updated course, below.

*Course Description:* Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing.

*Prerequisite(s):* Art History major, minor, or other significant training in Art History recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 25 students; for majors, minors, other advanced students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## AHI 190L – Undergraduate Seminar in Art History: Cultures of Collecting (4 units)

*Course Description:* Study of a broad problem or theoretical issue in the history of collecting, including individual and institutional collecting practices.

*Prerequisite(s):* Art History major, minor, or other significant training in Art History recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## AHI 192 – Internship (1-6 units)

*Course Description:* Supervised program of internships at professional art institutions such as museums, galleries, and art archives including collections of slides and photographs.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## AHI 194HA – Honors Thesis Research (4 units)

*Course Description:* Research and initial drafting of a senior thesis paper in a scholarly area of Art History, under supervision of Art History faculty advisor.

*Prerequisite(s):* Consent of instructor; a minimum GPA of 3.7 and completion of one undergraduate seminar in Art History (AHI 190A-L).

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Only open to Art History majors with a minimum 135 units toward graduation.

*Grade Mode:* Letter.

## AHI 194HB – Honors Thesis Writing (4 units)

*Course Description:* Final writing of a senior thesis paper in a scholarly area of Art History, under supervision of Art History faculty advisor.

*Prerequisite(s):* AHI 194HA A- or better; consent of instructor.

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Only open to majors in the Art History Honors Program with upper division standing.

*Grade Mode:* Letter.

## AHI 198 – Directed Group Study (1-5 units)

*Course Description:* Directed group Study. May be taught abroad.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## AHI 199 – Special Study for Advanced Undergraduates (1-5 units)

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## AHI 200A – Visual Theory & Interpretive Methods (4 units)

*Course Description:* Close study of selected recent developments in interpretive methodology used by art historians and other analysts of visual culture and the place of those developments within art history's history and in the larger field of social, cultural and historical analysis.

*Learning Activities:* Discussion 3 hour(s), Extensive Writing 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

## AHI 200B – Research & Writing Methods in Art History (4 units)

*Course Description:* Development of the research, writing, and editing skills necessary for producing publishable work. Focus on reference tools used by art historians and the mechanics of scholarship, from question framing and organization of ideas to writing clear, effective prose.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students in Art History.

*Grade Mode:* Letter.

**AHI 200C – Thesis Writing Colloquium (1 unit)**

*Course Description:* Meeting concurrently with AHI 200B, the colloquium provides a structured, supportive environment for second-year Art History graduate students drafting masters' theses. Offers a forum for technical discussions, discussion of writing/editing procedures, and peer review of writing in progress.

*Prerequisite(s):* AHI 200B; taken by all Art History M.A. students in their first year.

*Learning Activities:* Discussion 1.50 hour(s), Auto Tutorial.

*Enrollment Restriction(s):* Restricted to graduate students in Art History.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AHI 210 – Museums, Art Exhibitions & Culture (4 units)**

*Course Description:* Issues accompanying the evolution and function of museums from cabinets of curiosities in 16th-century Europe to modern art centers. Examination of divergent motives behind collecting, exhibiting, and interpretation of objects. Investigation of museums' historical legacies and continuing philosophical dilemmas.

*Prerequisite(s):* Graduate status in art history or an allied field.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing/Discussion, Term Paper.

*Enrollment Restriction(s):* Limited to 20 students.

*Grade Mode:* Letter.

**AHI 250 – Problems in Art Historical Research (4 units)**

*Course Description:* Major topics in art historical research, emphasizing special methods of investigation, and of historical and critical analysis.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**AHI 254 – Seminar in Classical Art (4 units)**

*Course Description:* Selected areas of special study in classical art of the Greek and Roman tradition.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**AHI 263 – Seminar in Chinese Art (4 units)**

*Course Description:* Selected areas of special study in Chinese Art.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**AHI 276 – Seminar in Medieval Art (4 units)**

*Course Description:* Selected areas of special study in medieval art from Early Christian to late Gothic.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**AHI 278 – Seminar in Italian Renaissance Art (4 units)**

*Course Description:* Selected areas of special study in Italian art from the 14th to the 16th century.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**AHI 283 – Seminar in Visual Culture & Gender (4 units)**

*Course Description:* Selected areas of special study in the relationship between visual culture and gender in Europe and America from 1750 to present.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**AHI 288 – Seminar in European & American Architecture (4 units)**

*Course Description:* Exploration of selected topics in European and American architectural history with concentration on the Modern Period.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**AHI 290 – Special topics in Art History (4 units)**

*Course Description:* Special research seminar in the theory or methods of Art History, or in a period of Art History. Topic varies depending on the interests of the instructor or students.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and with consent of instructor.

*Grade Mode:* Letter.

**AHI 292 – Internship (1-4 units)**

*Course Description:* Supervised internship at professional art or cultural institution including museum, galleries, archives, government offices, visual resources libraries, etc.

*Prerequisite(s):* Consent of instructor; graduate student.

*Learning Activities:* Internship 3-12 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Art History only.

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AHI 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Seminar.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AHI 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AHI 390 – Introduction to Teaching Art History for Teaching Assistants (1 unit)**

*Course Description:* Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of undergraduate art history.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## AHI 396 – Teaching Assistant Training Practicum (1-4 units)

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar, Practice.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## AHI 402 – Museum Training: Exhibition Methods (4 units)

*Course Description:* Approved for graduate degree credit. History of exhibition methods in private and public collections. Comparisons of different types of museums and their exhibition problems. Lighting and techniques of display with emphasis on actual design. Experimentation with unusual presentation forms.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

# Art Studio (ART)

College of Letters & Science

## ART 001 – Introduction to Studio Art Practice (4 units)

*Course Description:* Introduction to studio art practice. Overview and practice of artists' creative process including hands-on visual exercises, reading, writing, presentation, and critique.

*Learning Activities:* Lecture 3 hour(s), Studio 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 002 – Beginning Drawing (5 units)

*Course Description:* Introduction to drawing using various black and white media to articulate forms and organize space, with reference to historical and contemporary works.

*Learning Activities:* Studio 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 005 – Beginning Sculpture (5 units)

*Course Description:* Basic sculpture techniques using a variety of media. Form in space using cardboard, plaster, and/or cement, wood and/or metal and other media.

*Learning Activities:* Studio 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 007 – Beginning Painting (5 units)

*Course Description:* Introduction to techniques and concepts in the practice of painting.

*Learning Activities:* Studio 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 008 – Beginning Ceramic Sculpture (5 units)

*Course Description:* Introduction to ceramic sculpture construction and processes. Large scale hand-building, glazing, kilns and kiln firing technology.

*Learning Activities:* Studio 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 009 – Beginning Photography (5 units)

*Course Description:* Introduction to visual language of photographic art and technique. Manual camera operation and printing techniques. Concept and practice of photography as an art form and creating photographic projects.

*Learning Activities:* Studio 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 010D – Contemporary Art Appreciation (4 units)

*Course Description:* Survey of contemporary art since 1960; includes discussion. Explores contemporary thought within the visual arts using forms and strategies of painting, sculpture, installation, performance, photo and video in collaborative, ephemeral and multimedia approaches. For Art and non-Art majors.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ART 010F.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 010F – Contemporary Art Appreciation (4 units)

*Course Description:* Survey of contemporary art since 1960; includes fieldwork. Explores contemporary thought within the visual arts using forms and strategies of painting, sculpture, installation, performance, photo and video in collaborative, ephemeral and multimedia approaches. For Art and non-Art majors.

*Learning Activities:* Lecture 3 hour(s), Fieldwork.

*Credit Limitation(s):* Not open for credit to students who have taken ART 010D.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 011 – Beginning Printmaking (5 units)

*Course Description:* Introduction to printmaking such as monoprint, intaglio, lithography, relief and digital techniques. Practical methods taught within a workshop environment using art historical and contemporary examples.

*Learning Activities:* Studio 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 012 – Beginning Video (5 units)

*Course Description:* Production techniques of video shooting, editing, lighting, sound and effects. A conceptual framework for video-art techniques.

*Learning Activities:* Lecture/Discussion 2 hour(s), Studio 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## ART 024 – Introduction to Experimental Video & Film (4 units)

*Course Description:* Evolution of moving image technologies. Shifts within avant-garde artistic practices. Conceptual and historical differences between film and video. Relationship of film and video to fine arts.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **ART 030 – Introduction to Contemporary Visual Culture (4 units)**

*Course Description:* Establishing visual literacy across the media of fine art, photography, advertising, television and film; media culture; focus on critical decoding of contemporary visual culture.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to lower division students.

*Grade Mode:* Pass/No Pass only.

## **ART 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* .

*Grade Mode:* Pass/No Pass only.

## **ART 101A – Intermediate Painting (5 units)**

*Course Description:* Individualized projects exploring color and space in a variety of subject matter and approaches. Builds on basic skills and concepts from beginning drawing and painting courses. Study of historical and contemporary art in relation to studio practice.

*Prerequisite(s):* ART 007.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 101B – Intermediate Painting: Figure (5 units)**

*Course Description:* Study of the human figure through the medium of painting with emphasis on development of skill and conceptual awareness.

*Prerequisite(s):* ART 007.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 101C – Intermediate Painting: Watercolor (5 units)**

*Course Description:* Watercolor as a means of visual expression.

Techniques and medium used in water media.

*Prerequisite(s):* ART 007.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 101D – Intermediate Painting: Installation (5 units)**

*Course Description:* Expanded fields of painting and installation art in the context of contemporary art practice. Painting's possibilities in relation to space and pushing the boundaries of two-dimensional art.

*Prerequisite(s):* ART 007.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 101E – Intermediate Painting: Reinterpreting Landscape (5 units)**

*Course Description:* Interpretation of landscape through painting, drawing, and related media. Integration of historical, cultural, natural, and artistic contexts.

*Prerequisite(s):* ART 007.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 102A – Advanced Painting: Studio Projects (5 units)**

*Course Description:* Sustained development of painting for advanced students. Approaches will vary according to the instructor.

*Prerequisite(s):* Three courses from ART 101, ART 101A, ART 101B, ART 101C, ART 101D, or ART 101E or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 102C – Advanced Painting: Special Topics (4 units)**

*Course Description:* Special topics in painting for upper division students. Emphasis on development of a personal practice of painting informed by awareness of contemporary issues in painting and their historical background. Topics will vary with instructor.

*Prerequisite(s):* (ART 002, ART 007, ART 101); (ART 102A or ART 102B).

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 103AN – Intermediate Drawing (5 units)**

*Course Description:* Study of drawing composition using charcoal and ink.

*Prerequisite(s):* ART 002.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors; students who have completed ART 103A or 103B can take ART 103AN once for credit.

*Repeat Credit:* May be repeated 1 time(s) when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 103BN – Intermediate Drawing: Figure (5 units)**

*Course Description:* Study of the human figure through the medium of drawing.

*Prerequisite(s):* ART 002.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors; students who have completed ART 105B can take ART 103BN once for credit.

*Repeat Credit:* May be repeated 1 time(s) when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 103C – Intermediate Drawing: 3 Dimensions (5 units)**

*Course Description:* Study of drawing composition using three dimensional media.

*Prerequisite(s):* ART 002.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio Major.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 105A – Advanced Drawing: Studio Projects (5 units)**

*Course Description:* Exploration of composition and process in drawing. Emphasis on the role of drawing in contemporary art and on drawing as an interdisciplinary practice.

*Prerequisite(s):* ART 002; (ART 103A or ART 103B or ART 103C).

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 110A – Intermediate Photography: Black & White Analog (5 units)**

*Course Description:* Introduction to analog black-and-white film photography. Technical instruction in 35mm film camera operation, developing film, making prints in the dark-room. Critical exploration of great works of photography and peer critique. Development of photographic project.

*Prerequisite(s):* ART 009.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 110B – Intermediate Photography: Digital Imaging (5 units)**

*Course Description:* Introduction to digital photography on screen and paper. Technical demonstrations, workshops, and critique. Development of photographic project.

*Prerequisite(s):* ART 009.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated for credit 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 110C – Intermediate Photography: Photographic Lighting (5 units)**

*Course Description:* Effects of lighting on photographic image. Ability to read, utilize, modify natural lighting conditions. Studio lighting equipment, and use of photographic studio. Photographic production management.

*Prerequisite(s):* ART 009; or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 110DA – The Photobook (5 units)**

*Course Description:* History and practice of photographic book. Sequencing, use of text & image, page layout and bookbinding techniques. Development of major photographic project. Includes technical lessons on image correction, digital page layout, and bookbinding techniques.

*Prerequisite(s):* ART 009; or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 110DB – The Photobook (5 units)**

This version has ended; see updated course, below.

*Course Description:* Continuation of 110DA. Advanced practice of photographic book. Sequencing, use of text & image, page layout and bookbinding techniques. Development of major photographic project. Topics include cover design and use of non-photographic techniques such as screen printing.

*Prerequisite(s):* ART 009; ART 110DA; or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 110DB – The Photobook (5 units)**

*Course Description:* Continuation of 110DA. Advanced practice of photographic book. Sequencing, use of text & image, page layout and bookbinding techniques. Development of major photographic project. Topics include cover design and use of non-photographic techniques such as screen printing.

*Prerequisite(s):* ART 009; or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

This course version is effective from, and including: Winter Quarter 2024.

**ART 111A – Advanced Photography: Special Topics (5 units)**

*Course Description:* Special topics related to photography and contemporary art practice. Multiple projects in a variety of approaches.

*Prerequisite(s):* ART 009; (ART 110A or ART 110B).

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One open to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s); consent of instructor required for taking the course a second time.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 111B – Advanced Photography: Digital Imaging (5 units)**

*Course Description:* In-depth exploration of digital photography, including refined digital imaging techniques. Theoretical issues involved in digital media.

*Prerequisite(s):* ART 009; ART 110B.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 112 – Sound for Vision (5 units)**

*Course Description:* Sound composition and development of an audio databank. Study of repetition and phase shifts. Creation of descriptive acoustic space recordings in combination with other artistic media. Audio as stand alone or accompaniment.

*Prerequisite(s):* ART 012 or CDM 020 or CTS 020.

*Learning Activities:* Lecture/Discussion 2 hour(s), Studio 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 113 – Interdisciplinary Art (4 units)**

*Course Description:* Experimental interdisciplinary strategies. Use of various media in creation of collaborative or independent works. Production of participatory audio-visual works, installations, or two dimensional explorations.

*Prerequisite(s):* Upper division standing in Art Studio, Theater and Dance, Design, Technocultural Studies, or Music.

*Learning Activities:* Studio 6 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 114A – Intermediate Video: Animation (5 units)**

*Course Description:* Exploration of animation as an artistic approach and conceptual platform. Relationship between drawing, digital stills, and moving images through use of drawing techniques.

*Prerequisite(s):* ART 012 or CTS 020 or CDM 020.

*Learning Activities:* Lecture/Discussion 2 hour(s), Studio 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 114B – Intermediate Video: Experimental Documentary (5 units)**

*Course Description:* Experimental documentary practice. Use of interviews, voice-overs, and still and moving images. Production of alternative conceptual and visual projects.

*Prerequisite(s):* ART 012 or CTS 020 or CDM 020.

*Learning Activities:* Studio 3 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 114C – Intermediate Video: Performance Strategies (5 units)**

*Course Description:* Use of video to expand performance art production. Exploration of improvisation, direction, projection, and image processing in real time.

*Prerequisite(s):* ART 012 or CTS 020 or CDM 020.

*Learning Activities:* Lecture/Discussion 2 hour(s), Studio 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 117 – Advanced Video & Electronic Arts (5 units)**

*Course Description:* Independently driven video, digital, and/or performance projects. Further development in the electronic arts ranging from video installation to performance.

*Prerequisite(s):* ART 012 or CDM 020; (ART 112 or ART 114A or ART 114B or ART 114C or CDM 100 or CDM 104 or CDM 105 or TCS 100 or CDM 101 or TCS 104); upper division standing Art Studio majors.

*Learning Activities:* Studio 3 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors; upper division standing.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 125A – Intermediate Printmaking: Relief (5 units)**

*Course Description:* Relief printmaking, experimental printing of found surfaces, single-color block printing and reduction woodcut techniques. Development of conceptual and technical progress.

*Prerequisite(s):* ART 011.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 125B – Intermediate Printmaking: Intaglio (5 units)**

*Course Description:* Intaglio printmaking techniques including copper-plate drypoint, engraving, etching, aquatint. Development of on soft-ground, spit bite and chine-collé. Development of conceptual and technical progress.

*Prerequisite(s):* ART 011.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 125C – Intermediate Printmaking: Lithography (5 units)**

*Course Description:* Polyester-plate printing. Drawing materials and chemistry for stone or ball-grained plates. Digital processes in photoplatemaking. Development of conceptual and technical progress.

*Prerequisite(s):* ART 011.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 125D – Intermediate Printmaking: Screenprinting (5 units)**

*Course Description:* Screen printing including the introduction of photo-emulsion, hand stencil making and digital stencil making techniques for screen printing on paper or alternative surfaces. Development of conceptual and technical progress.

*Prerequisite(s):* ART 011.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 125E – Intermediate Printmaking: Post-Digital Print Media (5 units)**

*Course Description:* Post-digital print media integrating digital forms of image making and print-on-demand technology with established printing processes; screen printing, lithography or intaglio. Development of conceptual and technical progress.

*Prerequisite(s):* ART 011 D or better.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 129 – Advanced Printmaking (5 units)**

*Course Description:* Advanced printmaking. Further development of intaglio, relief, lithography screen printing and post-digital print media. Study of a body of work that broadens knowledge of one or more methods. Processes integrated in a self-directed project, researched within historic and contemporary printmaking discourse.

*Prerequisite(s):* ART 011; (ART 125A or ART 125B or ART 125C or ART 125D or ART 125E).

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 138 – The Artist's Book (4 units)**

*Course Description:* Creation of an artist's book in an edition of three. Use of a variety of media.

*Prerequisite(s):* Completion of three upper division Art Studio (ART) courses.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 142A – Intermediate Ceramic Sculpture: Industrial Production Methods (5 units)**

*Course Description:* Ceramic sculpture creation using two forms of industrial processes: plaster mold design, fabrication and casting; and extrusion with dies, including die fabrication.

*Prerequisite(s):* ART 008.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 142B – Intermediate Ceramic Sculpture: Material Study (5 units)**

*Course Description:* Study of ceramic materials and processes.

Areas studied include clay and clay bodies; glaze materials through temperature, color and texture; history and technology of kilns and kiln firing. Examination of material properties and characteristics through experimentation.

*Prerequisite(s):* ART 008.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 142C – Intermediate Ceramic Sculpture: Ceramics & the Painted Surface (5 units)**

*Course Description:* Exploration of the ceramic surface for creative expression. Use of glazing techniques including china paint, decals, luster, and silkscreen with underglaze and overglaze as well as the use of common materials such as epoxy, paint, oil and wax.

*Prerequisite(s):* ART 008.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 142D – Intermediate Ceramic Sculpture: Special Topics (5 units)**

*Course Description:* Studio work and professional practice practicum. Visit artist's studios, museums and galleries, and attend artist lectures. Both drawings and written journals are kept throughout the term.

*Prerequisite(s):* ART 008.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 143 – Advanced Ceramic Sculpture: Studio Projects (5 units)**

*Course Description:* Experimentation with all techniques learned in prerequisite ceramics classes. Includes class projects in consultation with faculty.

*Prerequisite(s):* ART 008; (ART 142A or ART 142B or ART 142C).

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 2 time(s) with consent of instructor required for taking the course a third time.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 147 – Theory & Criticism of Photography (4 units)**

*Course Description:* Development of camera vision, ideas, and aesthetics and their relationship to the fine arts from 1839 to the present.

*Prerequisite(s):* ART 009.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 148 – Theory & Criticism: Painting & Sculpture (4 units)**

*Course Description:* Study of forms and symbols in historic and contemporary masterpieces.

*Prerequisite(s):* ART 005 or ART 007 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* AHI 148.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **ART 149 – Introduction to Critical Theory (4 units)**

*Course Description:* Overview of 20th-century critical theories of culture and their relation to visual art and mass media culture.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 150 – Theory & Criticism of Electronic Media (4 units)**

*Course Description:* Study of electronic media, focusing on critique, application, and relationship to art practice. Analysis of the conceptual basis of electronic media as an artistic mode of expression.

*Prerequisite(s):* ART 024 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **ART 151 – Intermediate Sculpture (5 units)**

*Course Description:* Individualized explorations through multiple projects in a variety of sculpture media and techniques. Builds upon technical skills and concepts covered in ART 005.

*Prerequisite(s):* ART 005.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 152A – Advanced Sculpture: Studio Projects (5 units)**

*Course Description:* Sculpture for advanced students. Emphasis on concept, idea development and honing technical skills. Approaches and projects will vary according to the instructor.

*Prerequisite(s):* ART 005; ART 151.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 152B – Advanced Sculpture: Material Explorations (5 units)**

*Course Description:* Primary application and exploration of a single sculpture material chosen by the student. Examination of its properties, qualities, and characteristics for three-dimensional expression.

*Prerequisite(s):* ART 005; ART 151.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 152C – Advanced Sculpture: Concepts (5 units)**

*Course Description:* Investigation of a specific idea chosen by the class. Relationship of idea to form and content. Individual development of conceptual awareness.

*Prerequisite(s):* ART 005; ART 151.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 152D – Advanced Sculpture: Metals (5 units)**

*Course Description:* Technical aspects of the use of metals in contemporary art practice. Projects assigned to demonstrate the evolution of concepts and processes.

*Prerequisite(s):* ART 005; ART 151.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **ART 152E – Advanced Sculpture: Site Specific Public Sculpture (5 units)**

*Course Description:* Place and site specificity in contemporary sculpture. Individual and group work to conceive and fabricate sculpture in a public space.

*Prerequisite(s):* ART 005; ART 151.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 152F – Advanced Sculpture: Figure (5 units)**

*Course Description:* Exploration of historical and contemporary approaches to the body in three-dimensions. Projects based on observational and conceptual strategies. Variety of media and techniques, including clay, wax, plaster, plastics, found objects, and others.

*Prerequisite(s):* ART 005; ART 151.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 152G – Advanced Sculpture: The Miniature & Gigantic (5 units)**

*Course Description:* Exploration of scale, from the very small to the very large in a series of projects in a variety of media. Tools and techniques of enlargement and miniaturization.

*Prerequisite(s):* ART 005; ART 151.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 171 – Mexican & Chicano Mural Workshop (4 units)**

*Course Description:* The Mural: a collective art process that empowers students and people through design and execution of mural paintings in the tradition of the Mexican Mural Movement; introduces materials and techniques.

*Prerequisite(s):* CHI 070; and consent of instructor.

*Learning Activities:* Studio 8 hour(s), Independent Study 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Cross Listing:* CHI 171.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 190 – Seminar in Art Practice (4 units)**

*Course Description:* Introduction to professional practices. Development of an artist's packet including a resume, cover letter, artist statement, and statement of purpose. Ongoing independent studio work with group critiques. Research on galleries and museums, and readings in contemporary theory and criticism.

*Prerequisite(s):* Upper division standing Art Studio major and completion of two upper division ART classes.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Art Studio majors.

*Repeat Credit:* May be repeated 1 time(s) when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ART 192 – Internship (2-12 units)**

*Course Description:* Supervised program of internships in artists' studios and at professional art institutions such as museums, galleries, and art archives including collections of slides and photographs.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**ART 195 – Expanded Field: Artist Lecture Series (1 unit)**

*Course Description:* Exploration of the expanded field of practice, theory and criticism in the visual arts. Presentations and discussions with professional practitioners in the field.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated 12 unit(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

**ART 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to lower division students.

*Grade Mode:* Pass/No Pass only.

**ART 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ART 220 – Research Methods for Artists (4 units)**

*Course Description:* Research methods for artists through critical reading and writing, studio practice, presentations, site-visits, and professional engagement related to the field of visual art.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

**ART 221A – Critical Exploration & Collaboration (4 units)**

*Course Description:* During the first year of study, MFA graduate students take the Critical Exploration & Collaboration seminar. Explore and analyze a range of subjects in contemporary art and begin to define their relationship to these ideas through speaking, writing, research and presentation in ways that are relevant to their own art practice.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

**ART 221B – Advanced Critical Exploration & Collaboration (4 units)**

*Course Description:* Advanced course for second-year graduate students. Explore and analyze a range of subjects in contemporary art and begin to define their relationship to these ideas through speaking, writing, research and presentation in ways that are relevant to their own art practice.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 223 – Concepts & Critique (4 units)

*Course Description:* Focuses on research methods for artists through critical reading and writing, studio practice, presentations, site-visits, and professional engagement related to the field of visual art. Faculty-moderated group critique course to develop a sense of the theoretical foundations and implications of the work of each of the participants through class analysis and extended discussion.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 224 – Theory & Concepts on Critical Issues in Contemporary Art (4 units)

*Course Description:* Critical and conceptual foundations for graduate students. Political, social and cultural questions as they relate to the production and reception of art. Contemporary theories to develop verbal and analytical skills.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 225 – Professional Practice in Contemporary Art (4 units)

*Course Description:* Fluctuating critical and cultural environment of the professional art world. New strategies to support the social and philosophical networks and frameworks that inform contemporary cultural production. Emphasis on new esthetics concepts, practices and technologies.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 226 – Exhibition Strategy & Thesis Seminar (4 units)

*Course Description:* Completion of a body of work and development of a thesis show. Curation, design, installation, documentation, contributing to catalog content and design, and promoting work in a public forum.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 227 – Collaboration & Interdisciplinarity (4 units)

*Course Description:* Explores methodologies in practice with emphasis on collaboration and interdisciplinarity. Artistic production and directed research supporting the development of site. Work across artistic mediums, academic disciplines, and social concerns.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 290 – Seminar (4 units)

*Course Description:* Original works produced for group discussion and criticism; associated topics of a contemporary and historical nature.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## ART 290A – Critical Discourse in Contemporary Art (4 units)

*Course Description:* Critical discourse in contemporary art and application to practice. Exploration of concerns in broader artistic and contemporary context. How artists look to shift prevalent expectations through critical analysis.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 290B – Critical Discourse in Studio Practice (4 units)

*Course Description:* Advanced course for second-year graduate students. Critical discussion and contemporary readings pertinent to studio practice and artwork, including video, installation, photography, interactive arts, performance, sculpture, painting, printmaking, ceramics, sound, and all other mediums.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 290C – Critical Discourse in Materiality (4 units)

*Course Description:* Mid-year study focusing on individual work in the studio. Explores mediums, techniques, skill building, resourcing and problem solving. Defining the artists relationship to topics in contemporary art through speaking, writing, research and presentation.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only, or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## ART 290D – Critical Discourse in Context (4 units)

*Course Description:* Advanced course for second-year Graduate students. Discussion of social, political, cultural, and economic issues in a constantly changing world. How contemporary art practice are affected by global issues.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only; or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

**ART 290E – Critical Discourse on Media (4 units)**

*Course Description:* Critical discussion and contemporary readings pertinent to artwork that uses digital media including video, installation, photography, interactive arts, performance, sculpture, painting, printmaking, ceramics, sound, and all other mediums.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only; or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

**ART 290F – Critical Discourse in Presentation (4 units)**

*Course Description:* For second-year graduate students. Study focuses on individual performance work. Exploration extends into other mediums, techniques for props or sites, tapping the resources of peers, problem solving with the intention to deepen understanding and engagement with an audience. Exploration and analysis of subjects in cont. art and begin to define their relationship to these ideas through speaking, writing, research and presentation in ways that are relevant to their performance art practice.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Art Studio graduate students only; or with prior written consent of faculty member.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

**ART 291 – Seminar: Critical Evaluation (1 unit)**

*Course Description:* Seminar in critical evaluation.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ART 292 – Seminar: Comprehensive Qualifying (1 unit)**

*Course Description:* Further critical evaluation of the student's work to determine his eligibility to begin the Comprehensive Project.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ART 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ART 299D – Comprehensive Project (1-12 units)**

*Course Description:* An original body of work accompanied by a catalog summarizing the student's aesthetic position.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ART 401 – Museum Training: Curatorial Principles (4 units)**

*Course Description:* Approved for graduate degree credit. Study of private and public collections. Museum personalities. Appraisal of works of art; ethics of appraisal. Auction and sales: methods and catalogues. Registration. Technical problems of the museum. Connoisseurship. Collateral reading. Visits to museums.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**ART 402 – Museum Training: Exhibition Methods (4 units)**

*Course Description:* Approved for graduate degree credit. History of exhibition methods in private and public collections. Comparisons of different types of museums and their exhibition problems. Lighting and techniques of display with emphasis on actual design. Experimentation with unusual presentation forms.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**Asian American Studies (ASA)**

College of Letters & Science

**ASA 001 – Historical Experience of Asian Americans (4 units)**

*Course Description:* Introduction to Asian American Studies through an overview of the history of Asians in America from the 1840s to the present within the context of the development of the United States.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ASA 002 – Contemporary Issues of Asian Americans (4 units)**

*Course Description:* Introduction to Asian American Studies through the critical analysis of the impact of race, racism, ethnicity, imperialism, militarism, and immigration since post-World War II on Asian Americans. Topics may include sexuality, criminality, class, hate crimes, and inter-ethnic relations.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ASA 003 – Methods in Asian American Studies (4 units)**

*Course Description:* Diverse research methods used in the multidisciplinary field of Asian American studies and research by department faculty. Application of methods to case studies of Asian American communities and issues. Methods include: historical/ archival research, literary analysis, feminist methods, media analysis, visual critique, ethnography, interviews, community-engaged research, and quantitative methods. Faculty guest lectures on relevant scholarship and their own research.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH), Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**ASA 004 – Asian American Cultural Studies (4 units)**

*Course Description:* Interdisciplinary course examines the multiple ways in which race, class, sexuality and gender, as well as the recent turn to transnationalism and postcolonial theory, have changed the ways we read Asian American literature and see art, theater and film.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ASA 092 – Internship (1-3 units)**

*Course Description:* Supervised internship in community and institutional settings related to Asian American concerns.

*Prerequisite(s):* Consent of instructor; enrollment dependent on availability of intern positions.

*Learning Activities:* Internship 3-9 hour(s).

*Grade Mode:* Pass/No Pass only.

**ASA 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily intended for lower division students.

*Learning Activities:* Lecture 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**ASA 098F – Student Facilitated Course (1-4 units)**

*Course Description:* Student-facilitated (taught) course intended for lower division students.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ASA 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**ASA 100 – Asian American Communities (4 units)**

*Course Description:* Survey and analysis of Asian American communities within both historical and contemporary contexts. Presentation of the analytical skills, theories, and concepts needed to describe, explain, and understand the diversity of Asian American communities within the larger, dominant society.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**ASA 102 – Theoretical Perspective in Asian American Studies (4 units)**

*Course Description:* Critically examines major theoretical perspectives and approaches central to the intellectual and political concerns of Asian American studies as a distinct field of intellectual inquiry and sustained site of critique.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**ASA 112 – Asian American Women (4 units)**

*Course Description:* Experiences of Asian American women from major ethnic subgroups comparatively examined in their social, economic and historical contexts using theoretical perspectives from social sciences, humanities/arts: identity, racialization, immigration, gender, sexuality, labor, socialization, cultural expression, social movements and feminist theorizing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ASA 113 – Asian American Sexuality (4 units)**

*Course Description:* Restrictive U.S. immigration laws, labor exploitation, race-based exclusionary laws, removal and internment, anti-miscegenation laws, and other examples of social control are surveyed to assess their role in shaping the sexuality of the different Asian American groups.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**ASA 114 – Asian Diasporas (4 units)**

*Course Description:* Asian diasporic communities and the experiences of its members in the United States and internationally. Community building, cyberspace, gender issues, labor, transnational practices, effects of globalization, political organizing, homeland politics, humanitarian projects, citizenship and nationalism.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

**ASA 115 – Multiracial Asian Pacific American Issues (4 units)**

*Course Description:* Introduction to the experiences of biracial and multiracial Asian Pacific people in the U.S., concentrating on theories of race, racial identity formation, culture, media, and anti-racist struggles. Critical approaches to the analysis of popular media and academic representations.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ASA 116 – Asian American Youth (4 units)**

*Course Description:* Social experiences of diverse groups of Asian American youth. Ways in which youth themselves actively create cultural expressions and political interventions.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ASA 121 – Asian American Performance (4 units)**

*Course Description:* Performance work by, for, and/or about Asian Pacific Americans including dramatic literature, performance art, dance, and film. Ethnicity, gender and sexuality, class and age as they intersect with Asian Pacific American identities in and through dramatic performance.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ASA 130 – Asian American Literature (4 units)**

*Course Description:* Works of Asian American literature by writers from the major ethnic subgroups, examined in their social, economic and historical contexts. Intertextual analysis of their thematic and formal elements to form an understanding of Asian American literary traditions.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ASA 131 – Ethnicity, Culture, & the Self (4 units)**

*Course Description:* Cultural and social psychological influences on Asian Americans focusing on the individual.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**ASA 132 – Health Issues Confronting Asian Americans & Pacific Islanders (4 units)**

*Course Description:* Health issues confronting Asian Americans & Pacific Islanders.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* SPH 132.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ASA 141 – Asian Americans & the Political Culture of Fashion in the U.S. & Asia (4 units)**

*Course Description:* Historical, cultural and sociopolitical development of fashion in Asia and the U.S. as it relates to the Asian Diasporas. Specific aspects of material culture: textiles, clothing and fashion.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ASA 150 – Filipino American Experience (4 units)**

*Course Description:* Examination of the relationship between the Filipino-American community, the Philippine home community and the larger American society through a critical evaluation of the historical and contemporary conditions, problems and prospects of Filipinos in the U.S.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

**ASA 150B – Japanese American Experience (4 units)**

*Course Description:* Different analytical approaches to understand Japanese American history, culture and society.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ASA 150C – Chinese American Experience (4 units)**

*Course Description:* Survey of the historical and contemporary experiences of Chinese in the United States, starting with the gold rush era and concluding with the present-day phenomenon of Chinese transnational movement to the United States and its diasporic significance.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

**ASA 150D – Korean American Experience (4 units)**

*Course Description:* Interdisciplinary survey of the historical and contemporary experiences of Koreans in the United States from the late-19th century to the present.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

**ASA 150E – Southeast Asian American Experience (4 units)**

*Course Description:* Historical survey of Southeast Asian experiences with special focus on United States involvement and post 1975 migrations.

Defines international and transnational conditions that led up to the large exodus and resettlement of Southeast Asians.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ASA 150F – South Asian American History, Culture, & Politics (4 units)**

*Course Description:* South Asian American experiences, focusing on the histories, cultures, and politics of Indian, Pakistani, Bangladeshi, and Sri Lankan communities in the U.S. Interdisciplinary approaches to migration, labor, gender, racialization, ethnicity, youth, community mobilization.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ASA 155 – Asian American Legal History (4 units)**

*Course Description:* Legal history of Asian Americans, from the mid-19th century to present. Laws and administrative policies affecting Asian American communities, including those governing immigration, social and economic participation, WWII internment, and affirmative action.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**ASA 189A – Topics in Asian American Studies: History (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies; history.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

**ASA 189B – Topics in Asian American Studies: Culture (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies; culture.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**ASA 189C – Topics in Asian American Studies: Physical & Mental Health (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies; physical and mental health.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ASA 189D – Topics in Asian American Studies: Policy & Community (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies; policy and community.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**ASA 189E – Topics in Asian American Studies: Comparative Racial Studies (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies; comparative racial studies.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ASA 189F – Topics in Asian American Studies: Asian Studies & Asian American Studies (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies: asian studies and asian american studies.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ASA 189G – Topics in Asian American Studies: Race, Class, Gender, & Sexuality (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies: race, class, gender, and sexuality.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ASA 189H – Topics in Asian American Studies: Society & Institutions (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies: society and institutions.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**ASA 189I – Topics in Asian American Studies: Politics & Social Movements (4 units)**

*Course Description:* Intensive treatment of a topic in Asian American Studies: politics and social movements.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ASA 192 – Internships (1-5 units)**

*Course Description:* Supervised internship in community and institutional settings related to Asian American concerns.

*Prerequisite(s):* Consent of instructor; enrollment dependent on availability of intern position with priority to Asian American Studies minors; consent of instructor.

*Learning Activities:* Internship 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**ASA 194 – Asian American Studies Capstone Course (4 units)**

*Course Description:* Synthesis of the approaches and methods learned by students in Asian American Studies and development of specialization in their areas of interest. Development of a research proposal for thesis project.

*Learning Activities:* Lecture/Discussion 4 hour(s), Project, Extensive Writing.

*Enrollment Restriction(s):* Open to junior or senior level standing in Asian American Studies or consent of instructor.

*Grade Mode:* Letter.

## **ASA 195 – Asian American Studies Senior Thesis Seminar (4 units)**

*Course Description:* Synthesis of the approaches and methods learned in Asian American Studies. Production of an original research paper on a topic of student's interest, building on the research proposal submitted in the capstone seminar.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing, Project.

*Enrollment Restriction(s):* Restricted to junior and senior level standing in Asian American Studies. Completion of ASA 194 required.

*Grade Mode:* Letter.

## **ASA 197T – Tutoring in Asian American Studies (1-5 units)**

*Course Description:* Tutoring in lower division Asian American Studies courses in small group discussion. Weekly meetings with instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated 1 time(s) for a given course and also for a different course.

*Grade Mode:* Pass/No Pass only.

## **ASA 198 – Directed Group Study (1-5 units)**

*Course Description:* Primarily intended for upper division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ASA 198F – Student Facilitated Course (1-4 units)**

*Course Description:* Student-facilitated (taught) course intended for upper division students.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ASA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ASA 199FA – Student Facilitated Course Development (1-4 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 098F/198F.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ASA 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* Student facilitated. Under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* ASA 199FA.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

# **Astronomy (AST)**

College of Letters & Science

## **AST 010C – Introduction to Cosmology (3 units)**

*Course Description:* Introduction to the fundamentals of modern cosmology, humanity's changing view of the Universe, and our current understanding of its origin and evolution.

*Prerequisite(s):* High school algebra.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed any quarter of the PHY 009 series or the PHY 009H series, or any upper-division physics course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

## **AST 010G – Introduction to Stars, Galaxies, & the Universe (3 units)**

*Course Description:* Non-mathematical introduction to astrophysics of the Universe beyond our solar system using concepts of modern physics.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken AST 002, the former AST 010, any quarter of PHY 009 or PHY 009H, or any upper division physics course (other than PHY 137 or PHY 160).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

## **AST 010L – Observational Astronomy Lab (1 unit)**

*Course Description:* Introduction to observations of the night sky using small telescopes in nighttime laboratory.

*Learning Activities:* Laboratory 2.50 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken AST 002 or AST 010.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **AST 010S – Astronomy of the Solar System (3 units)**

*Course Description:* Introduction to naked eye and telescopic observations of events in the night sky: positions of sun, moon, planets throughout the year. Historical perspective on how our understanding of the solar system evolved to current non-mathematical astrophysical interpretation of planetary systems.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken AST 002, any quarter of PHY 009 or PHY 009H, or any upper division PHY course (other than PHY 137 or PHY 160).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

## **AST 025 – Introduction to Modern Astronomy & Astrophysics (4 units)**

*Course Description:* Description and interpretation of astronomical phenomena using the laws of modern physics and observations by modern astronomical instruments. Gravity, relativity, electromagnetic radiation, atomic and nuclear processes in relation to the structure and evolution of stars, galaxies and the universe.

*Prerequisite(s):* Good facility in high school physics and mathematics (algebra and trigonometry).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2.50 hour(s).

*Credit Limitation(s):* Not open to students who have received credit for AST 002, AST 010G, or AST 010L.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

## **Atmospheric Science (ATM)**

College of Agricultural & Environmental Sciences

### **ATM 005 – Global Climate Change (3 units)**

*Course Description:* Scientific concepts needed to understand climate and climate change. Principles of regional variations in climate. Understanding observed seasonal, decadal and millennial changes. Analysis of the Antarctic ozone hole, El Nino and human-induced global warming.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

### **ATM 006 – Fundamentals of Atmospheric Pollution (3 units)**

*Course Description:* Effects of human emissions on the atmosphere: smog, ozone pollution, and ozone depletion; indoor air pollution; global warming; acid rain. Impacts of these problems on the earth, ecosystems, and humans. Strategies to reduce atmospheric pollution.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

### **ATM 010 – Severe & Unusual Weather (3 units)**

*Course Description:* Introduction to physical principles of severe and unusual weather: flood, blizzards, thunderstorms, lightning, tornadoes, and hurricanes. Emphasis on scientific perspective and human context. Not open to students who have received credit for ATM 100. (Former ATM 100.)

*Prerequisite(s):* High school physics.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

### **ATM 060 – Introduction to Atmospheric Science (4 units)**

*Course Description:* Fundamental principles of the physics, chemistry, and fluid dynamics underlying weather and climate. Solar radiation, the greenhouse effect, and the thermal budget of the Earth. Clouds and their formation, convection, precipitation, mid-latitude storm systems.

*Prerequisite(s):* (MAT 016A or MAT 021A); (PHY 007A or PHY 009A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

### **ATM 092 – Atmospheric Science Internship (1-12 units)**

*Course Description:* Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

### **ATM 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **ATM 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **ATM 110 – Weather Observation & Analysis (4 units)**

*Course Description:* Acquisition, distribution and analysis of meteorological data. Vertical sounding analysis, stability indices, probability of local severe weather, weather map analysis. Use of National Weather Service analyses and forecast products. Laboratory makes use of computer-generated analyses.

*Prerequisite(s):* ATM 060.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Visual Literacy (VL).

### **ATM 111 – Weather Analysis & Prediction (3 units)**

*Course Description:* Tools for analyzing observed properties of mid-latitude weather systems. The analysis-forecast system, including various weather forecast models. General structure and properties of mid-latitude weather systems.

*Prerequisite(s):* ATM 110; ATM 121B; (ATM 111L (can be concurrent) or ATM 111LY (can be concurrent)); knowledge of a programming language.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ATM 111LY – Weather Analysis & Prediction Laboratory (2 units)**

*Course Description:* Subjective and objective analysis of weather data. Web-based learning of the analysis-forecast system and various weather forecasting situations. Weather map interpretation and forecast discussions.

*Prerequisite(s):* ATM 111 (can be concurrent).

*Learning Activities:* Laboratory 2 hour(s), Web Virtual Lecture 4 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Visual Literacy (VL).

## **ATM 112 – Weather Forecasting Practice (2 units)**

*Course Description:* Formal practice in preparing local weather forecasts. Analysis of current weather conditions and recent model performance. Verification and discussion of prior forecast. Interpretation of current forecast model guidance. Posting of forecast.

*Prerequisite(s):* ATM 110.

*Learning Activities:* Discussion 2 hour(s), Laboratory 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

## **ATM 115 – Hydroclimatology (3 units)**

*Course Description:* Examination of climate as the forcing function for the hydrologic system. Emphasis on seasonal variations in the relationship between precipitation and evapotranspiration for meso-scale areas.

Watershed modeling of floods and drought for evaluating the effects of climatic fluctuations.

*Prerequisite(s):* ATM 060.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **ATM 116 – Modern Climate Change (3 units)**

*Course Description:* Factors that determine the Earth's climate, including natural and human-caused changes. Impacts of climate change. Possible future climates and policies to reduce human emissions of greenhouse gases.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ATM 120 – Atmospheric Thermodynamics & Cloud Physics (4 units)**

*Course Description:* Atmospheric composition and structure, thermodynamics of atmospheric gases, thermal properties of dry and moist air, atmospheric stability; cloud nucleation, cloud growth by condensation and collision, cloud models.

*Prerequisite(s):* MAT 021C; PHY 009B; ATM 060 (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ATM 121A – Atmospheric Dynamics (4 units)**

*Course Description:* Fundamental forces of atmospheric flow; noninertial reference frames; development of the equations of motion for rotating stratified atmospheres; isobaric and natural coordinate systems; geostrophic flow; thermal wind; circulation and vorticity.

*Prerequisite(s):* ATM 120; MAT 021D; PHY 009B.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ATM 121B – Atmospheric Dynamics (4 units)**

*Course Description:* Dynamics of fluid motion in geophysical systems; quasi-geostrophic theory; fundamentals of wave propagation in fluids; Rossby waves; gravity waves; fundamentals of hydrodynamic instability; two-level model; baroclinic instability and cyclogenesis.

*Prerequisite(s):* ATM 121A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ATM 124 – Meteorological Instruments & Observations (3 units)**

*Course Description:* Modern meteorological instruments and their use in meteorological observations and measurements. Both standard and micrometeorological instruments are included.

*Prerequisite(s):* ATM 060.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ATM 128 – Radiation & Satellite Meteorology (4 units)**

*Course Description:* Concepts of atmospheric radiation and the use of satellites in remote sensing. Emphasis on the modification of solar and infrared radiation by the atmosphere. Estimation from satellite data of atmospheric variables such as temperatures and cloudiness.

*Prerequisite(s):* ATM 060; PHY 009B; MAT 022B; MAT 021D.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Extensive Problem Solving 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ATM 133 – Biometeorology (4 units)**

*Course Description:* Atmospheric and biological interactions. Physical and biological basis for water vapor, carbon dioxide and energy exchanges with the atmosphere associated with plants and animals, including humans. Microclimate of plant canopies and microclimatic modification such as frost protection and windbreaks.

*Prerequisite(s):* MAT 016B; one course in a biological discipline or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**ATM 149 – Air Pollution (4 units)**

*Course Description:* Physical and technical aspects of air pollution. Factors that determine local, regional, and global air quality; climate change; and physical and chemical properties of pollutants.

*Prerequisite(s):* MAT 021D; (MAT 022B or MAT 027B); CHE 002B C- or better; (ATM 121A or ENG 103 C- or better or ECI 100 C- or better).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ECI 149.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**ATM 150 – Introduction to Computer Methods in Physical Sciences (4 units)**

*Course Description:* Computational techniques used in physical sciences. Integral and differential equation numerical solution: mainly finite differencing and spectral (Fourier transform) methods. Time series applications (time-permitting). Specific applications drawn from meteorology. Accelerated introduction to FORTRAN including programming assignments.

*Prerequisite(s):* MAT 022B; PHY 009B; computer programming course such as ECS 030; additional courses in fluid dynamics (ATM 121A or ENG 103) and in Fourier transforms (MAT 118C or PHY 104A) helpful but not required.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Enrollment limited to 12, preference to Atmospheric Science majors.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ATM 158 – Boundary-Layer Meteorology (4 units)**

*Course Description:* Dynamics of the atmosphere nearest the Earth's surface. Friction and heat transfer. Properties of turbulent flows; statistical and spectral techniques; use and interpretation of differential equations. Emphasis on the importance to weather, air pollution, and the world's oceans.

*Prerequisite(s):* ATM 121A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**ATM 160 – Introduction to Atmospheric Chemistry (4 units)**

*Course Description:* Quantitative examination of current local, regional and global problems in atmospheric chemistry (including photochemical smog, acid deposition, climate change, and stratospheric ozone depletion) using fundamental concepts from chemistry. Basic chemical modeling of atmospheric reaction systems.

*Prerequisite(s):* CHE 002B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**ATM 192 – Atmospheric Science Internship (1-12 units)**

*Course Description:* Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor. Completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**ATM 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; three upper division units in Atmospheric Science.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ATM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; three upper division units in Atmospheric Science and at least an overall B average.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ATM 215 – Advanced Hydroclimatology (3 units)**

*Course Description:* Theoretical and applied aspects of energy and mass fluxes linking the earth's surface, atmosphere, and hydrologic system. Emphasis on regional scale analysis and modeling, spatial data representation, and climate change influences on precipitation and its hydroclimatic expression.

*Prerequisite(s):* ATM 115.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ATM 221 – Advanced Atmospheric Dynamics (3 units)**

*Course Description:* Conditions for instability in stratified atmospheres; baroclinic instability; forced topographic Rossby Waves; wave-mean flow interaction theory; tropical dynamics; stratospheric dynamics.

*Prerequisite(s):* ATM 121B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ATM 223 – Advanced Boundary-Layer Meteorology (3 units)**

*Course Description:* Characteristics of the atmospheric boundary layer under convective and nocturnal conditions. Heat budget at the surface and boundary layer forcing. Similarity theory and scaling of the boundary layer. Measurement and simulation techniques.

*Prerequisite(s):* ATM 230.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ATM 230 – Atmospheric Turbulence (3 units)**

*Course Description:* Dynamics and energetics of turbulence in the atmosphere including vorticity dynamics. Statistical description of turbulence; Eulerian and Lagrangian scales, spectral analysis, conditional sampling techniques. Turbulent diffusion; the closure problem, gradient-diffusion and second-order methods.

*Prerequisite(s):* ATM 121B or ATM 158.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ATM 231 – Advanced Air Pollution Meteorology (3 units)**

*Course Description:* Processes determining transport and diffusion of primary and secondary pollutants. Models of chemical transformation, of the atmospheric boundary layer and of mesoscale wind fields, as applicable to pollutant dispersion problems.

*Prerequisite(s):* ATM 160; ATM 149A; course in fluid dynamics.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ATM 233 – Advanced Biometeorology (3 units)**

*Course Description:* Current topics in biometeorology. Physical and biological basis for water vapor, other gases, and energy exchange with the atmosphere. Topics include modeling and measuring turbulent transport from plant canopies, surface temperatures and energy budgets, bio-aerosol physics and aerobiology.

*Prerequisite(s):* ATM 133; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **ATM 240 – General Circulation of the Atmosphere (4 units)**

*Course Description:* Large-scale, observed atmospheric properties. Radiation, momentum, and energy balances derived and compared with observations. Lectures and homework synthesize observations and theories, then apply them to understand the large-scale circulations.

*Prerequisite(s):* ATM 121B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **ATM 241 – Climate Dynamics (3 units)**

*Course Description:* Dynamics of large-scale climatic variations over time periods from weeks to centuries. Description of the appropriate methods of analysis of atmospheric and oceanic observations. Conservation of mass, energy and momentum. Introduction to the range of climate simulations.

*Prerequisite(s):* ATM 121B.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **ATM 244 – Cloud & Precipitation Physics (3 units)**

*Course Description:* Observations and modeling of clouds and precipitation. Physics and parameterization of cloud microphysical processes including nucleation, condensation/evaporation, deposition/sublimation, collision-coalescence and sedimentation.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to Atmospheric Science graduate group students or consent of instructor.

*Grade Mode:* Letter.

## **ATM 245 – Climate Change, Water & Society (4 units)**

*Course Description:* Integration of climate science and hydrology with policy to understand hydroclimatology and its impact upon natural and human systems. Assignments: readings, take-home examination on climate and hydrologic science, paper that integrates course concepts into a research prospectus or review article.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Cross Listing:* HYD 245, ECL 245.

*Grade Mode:* Letter.

## **ATM 250 – Meso-Scale Meteorology (3 units)**

*Course Description:* The study of weather phenomena with horizontal spatial dimensions between 2.5 and 2500 kilometers. Methods of observational study and numerical modeling of the structure and temporal behavior of these weather systems.

*Prerequisite(s):* ATM 150; graduate standing; course in partial differential equations or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ATM 255 – Numerical Modeling of the Atmosphere (4 units)**

*Course Description:* Principles of numerical modeling of the dynamic, thermodynamic and physical processes of the atmosphere. Hands-on experiments on model development using the shallow water equations and the primitive equations. Operational forecast models.

*Prerequisite(s):* ATM 121B; ENG 005; ATM 150 recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

## **ATM 260 – Atmospheric Chemistry (3 units)**

*Course Description:* Chemistry and photochemistry in tropospheric condensed phases (fog, cloud, and rain drops and aerosol particles). Gas-drop and gas-particle partitioning of compounds and effects of reactions in condensed phases on the fates and transformations of tropospheric chemical species.

*Prerequisite(s):* ATM 160.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ATM 265 – The Art of Climate Modeling (4 units)**

*Course Description:* Over the past fifty years, global models have given us incredible insight into the Earth system. Provides an introduction to these models, with a focus on their design and the science questions they have been built to address.

*Prerequisite(s):* ATM 121A.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **ATM 270A – Topics in Atmospheric Science: Meteorological Statistics (1-3 units)**

*Course Description:* Applications and concepts in meteorological statistics.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Letter.

## **ATM 270B – Topics in Atmospheric Science: Computer Modeling of the Atmosphere (1-3 units)**

*Course Description:* Applications and concepts in computer modeling of the atmosphere.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Letter.

## **ATM 270C – Topics in Atmospheric Science: Design of Experiments & Field Studies in Meteorology (1-3 units)**

*Course Description:* Applications and concepts in design of experiments and field studies in meteorology.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Letter.

**ATM 270D – Topics in Atmospheric Science: Solar & Infrared Radiation in the Atmosphere (1-3 units)**

*Course Description:* Applications and concepts in solar and infrared radiation in the atmosphere.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Letter.

**ATM 270E – Topics in Atmospheric Science: Aerosol & Cloud Physics (1-3 units)**

*Course Description:* Applications and concepts in aerosol and cloud physics.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Letter.

**ATM 270F – Topics in Atmospheric Science: Atmospheric Chemistry (1-3 units)**

*Course Description:* Applications and concepts in atmospheric chemistry.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Letter.

**ATM 270G – Topics in Atmospheric Science: General Meteorology (1-3 units)**

*Course Description:* Applications and concepts in general meteorology.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Letter.

**ATM 280A – Air Quality Policy in the Real World (4 units)**

*Course Description:* In-depth investigation of an air quality problem with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing.

*Prerequisite(s):* (ATM 149 or ECI 149); ECI 242; consent of instructor, or equivalent of ECI 242.

*Learning Activities:* Project.

*Grade Mode:* Letter.

**ATM 280B – Air Quality Policy in the Real World (4 units)**

*Course Description:* In-depth investigation of an air quality problem with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing.

*Prerequisite(s):* ATM 280A; and consent of instructor.

*Learning Activities:* Project.

*Grade Mode:* Letter.

**ATM 290 – Seminar (1 unit)**

*Course Description:* Current developments in selected areas of atmospheric research. Topics will vary according to student and faculty interests.

*Prerequisite(s):* Graduate standing in Atmospheric Science or related field.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 291A – Research Conference in Atmospheric Science: Air Quality Meteorology (1-3 units)**

*Course Description:* Review and discussion of current literature and research in Air Quality Meteorology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 291B – Research Conference in Atmospheric Science: Biometeorology (1-3 units)**

*Course Description:* Review and discussion of current literature and research in Biometeorology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 291C – Research Conference in Atmospheric Science: Boundary Layer Meteorology (1-3 units)**

*Course Description:* Review and discussion of current literature and research in Boundary Layer Meteorology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 291D – Research Conference in Atmospheric Science: Climate Change (1-3 units)**

*Course Description:* Review and discussion of current literature and research in Climate Change.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 291E – Research Conference in Atmospheric Science: General Meteorology (1-3 units)**

*Course Description:* Review and discussion of current literature and research in General Meteorology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 291F – Research Conference in Atmospheric Science: Atmospheric Chemistry (1-3 units)**

*Course Description:* Review and discussion of current literature and research in Atmospheric Chemistry.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ATM 393 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ATM 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## Avian Sciences (AVS)

### College of Agricultural & Environmental Sciences

**AVS 011 – Introduction to Poultry Science (3 units)**

*Course Description:* The mosaic of events that have tied poultry science to other scientific disciplines and poultry to humans. Poultry science techniques and production methods from the time of domestication to the present. One field trip required.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 013 – Birds, Humans & the Environment (3 units)**

*Course Description:* Interrelationships of the worlds of birds and humans. Lectures, discussions, field trips and projects focus on ecology, avian evolution, physiology, reproduction, flight, behavior, folklore, identification, ecotoxicology and conservation. Current environmental issues are emphasized. Half-day field trip.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to students with lower division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 014L – Management of Captive Birds (2 units)**

*Course Description:* One weekly discussion and field trip to study practical captive management (housing, feeding, equipment, marketing, diseases). Visit facilities rearing birds such as commercial parrots, hobbyist exotics, ostrich, raptors, waterfowl, game birds, poultry and pigeons.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Fieldwork 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 015L – Captive Raptor Management (2 units)**

*Course Description:* Hands-on experience handling birds of prey. Students are taught all of the skills required to handle and care for raptors, including husbandry, biology, habitat requirements, cage design, veterinary care, rehabilitation methods, research potential and long-term care requirements. One Saturday fieldtrip.

*Learning Activities:* Laboratory 3 hour(s), Independent Study 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 016LA – Raptor Migration & Population Fluctuations (2 units)**

*Course Description:* Identify raptors: study of effects of weather, crops, agricultural practices on fluctuations in raptor species and numbers. Familiarize with literature; design a project; survey study sites; collect, computerize, analyze data, compare with previous years. Species, observations, emphasis different each quarter. One Saturday field trip.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Fieldwork 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 016LB – Raptor Migration & Population Fluctuations (2 units)**

*Course Description:* Identify raptors: study of effects of weather, crops, agricultural practices on fluctuations in raptor species and numbers. Familiarize with literature; design a project; survey study sites; collect, computerize, analyze data, compare with previous years. Species, observations, emphasis different each quarter. One Saturday field trip.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Fieldwork 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 016LC – Raptor Migration & Population Fluctuations (2 units)**

*Course Description:* Identify raptors: study of effects of weather, crops, agricultural practices on fluctuations in raptor species and numbers. Familiarize with literature; design a project; survey study sites; collect, computerize, analyze data, compare with previous years. Species, observations, emphasis different each quarter. One Saturday field trip.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Fieldwork 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 092 – Internship in the Avian Sciences (1-12 units)**

*Course Description:* Internship on and off campus in poultry, game birds or exotic bird production, management and research; or in a business, industry, or agency concerned with these entities. Compliance with Internship Approval form essential.

*Prerequisite(s):* Consent of instructor. Sophomore standing preferred.

*Learning Activities:* Variable 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**AVS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**AVS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**AVS 100 – Avian Biology (3 units)**

*Course Description:* Biology of domesticated poultry, specifically chickens and turkeys. Avian genetics, immunology, reproduction, growth and development, broiler and layer management.

*Prerequisite(s):* BIS 002A; BIS 002B; ANS 002 preferred.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 103 – Avian Development & Genomics (3 units)**

*Course Description:* Unique features of avian development and genomics: Incubation; Staging; Egg Structure/Function; Fertilization; Pre-oviposital; Oviposition, Cold Torpor; Post-oviposital Development; Organogenesis, Growth; Sexual Differentiation; Extraembryonic Membranes; Mortality/Hatching; Genome Organization; Comparative Avian Genomics; Telomere Biology; Sex Chromosomes/Sex Determination; Advanced Technologies; Genome Manipulation; Mutations.

*Prerequisite(s):* BIS 002A; BIS 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 115 – Raptor Biology (3 units)**

*Course Description:* Study of birds of prey: classification, distribution, habits, migration, unique anatomical and physiological adaptations, natural and captive breeding, health and diseases, environmental concerns, conservation, legal considerations, rehabilitation, and falconry. Includes two Saturday field trips.

*Prerequisite(s):* BIS 002A; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 121 – Avian Reproduction (2 units)**

*Course Description:* Breeding cycles and reproductive strategies, egg and sperm formation, incubation, sexual development, imprinting, hormonal control of reproductive behavior and song. Species coverage includes wild and companion birds. Course has a physiological orientation.

*Prerequisite(s):* BIS 002A; BIS 002B.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**AVS 123 – Management of Birds (3 units)**

*Course Description:* Captive propagation of birds, including reproduction, genetic management, health, feeding, artificial incubation, artificial insemination, and related legal aspects, including trade and smuggling. Emphasis on exotic species and the role of captive propagation in conservation.

*Prerequisite(s):* BIS 002A; BIS 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**AVS 149 – Egg Production Management (2 units)**

*Course Description:* Management of commercial table egg flocks as related to environment, nutrition, disease control, economics, housing, equipment, egg processing and raising replacement pullets. Offered in alternate years. One Saturday field trip required.

*Prerequisite(s):* AVS 011; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 150 – Nutrition of Birds (1 unit)**

*Course Description:* Principles of nutrition specific to avian species, including feedstuffs, feed additives, nutrient metabolism, energy systems, and nutritional support of egg production and growth. Use of computers for feed formulation to support production.

*Prerequisite(s):* ABI 103 (can be concurrent) or BIS 103 (can be concurrent).

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**AVS 160 – Designing & Performing Experiments in Avian Sciences (2 units)**

*Course Description:* Experiments in current problems in avian biology. Introduction to experimental design. Students choose a project, design a protocol, perform an experiment and report their findings.

*Prerequisite(s):* AVS 100 or WFC 111; or consent of instructor.

*Learning Activities:* Laboratory 6 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 170 – Advanced Avian Biology (4 units)**

*Course Description:* Ecology, behavior, functional morphology and lifehistory evolution of birds. Emphasis on the importance of body size as a principle determinant of most aspects of avian performance from lifespan to reproduction and species abundance. Analytical synthesis and critical thought emphasized.

*Prerequisite(s):* AVS 100 or WFC 111.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**AVS 190 – Seminar in Avian Sciences (1 unit)**

*Course Description:* Seminar in Avian Sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

**AVS 192 – Internship in Avian Sciences (1-12 units)**

*Course Description:* Internship on and off campus in poultry, game birds or exotic bird production, management and research; or in a business, industry, or agency concerned with these entities. Compliance with Internship Approval form essential.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**AVS 195 – Topics in Current Research (1-3 units)**

*Course Description:* Discussion of topics of current interest in avian sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-3 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

**AVS 197T – Tutoring in Avian Sciences (1-3 units)**

*Course Description:* Tutoring of students in lower division avian sciences courses; weekly conference with instructors in charge of courses; written critiques of teaching procedures.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 1-3 hour(s).

*Grade Mode:* Pass/No Pass only.

**AVS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Enrollment Restriction(s):* Restricted to upper division students.

*Grade Mode:* Pass/No Pass only.

**AVS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**AVS 203 – Advanced Avian Development & Genomics (1 unit)**

*Course Description:* In consultation with the instructor, students develop a lecture and associated instructional materials, i.e., lesson plan, including justification, reading and presentation and evaluation aids. Topic must complement a topic covered in AVS 103.

*Prerequisite(s):* AVS 103 (can be concurrent); graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Letter.

**AVS 290 – Seminar (1 unit)**

*Course Description:* Reports and discussions of recent advances and selected topics of current interest in avian genetics, physiology, nutrition, and poultry technology.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Letter.

**AVS 290C – Research Conference (1 unit)**

*Course Description:* Major professors lead research discussions with their graduate students. Research papers are reviewed and project proposals presented and evaluated. Format will combine seminar and discussion.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AVS 297T – Supervised Teaching in Avian Sciences (1-4 units)**

*Course Description:* Tutoring of students in lower, upper division, and graduate courses in Avian Sciences; weekly conference with instructor in charge of course; written critiques of teaching methods in lectures and laboratories.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Tutorial 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**AVS 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Letter.

**AVS 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-12 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Biochemistry, Molecular, Cellular, & Developmental Biology (BCB)****Graduate Studies****BCB 210 – Molecular Genetics & Genomics (3 units)**

*Course Description:* Emphasizes molecular genetic and genomic approaches to address fundamental biological questions. Introduces and emphasizes the strengths of prokaryotic and eukaryotic model systems and serves as building block for the BMCDB core courses, which use model systems to develop their themes.

*Prerequisite(s):* BIS 101; MCB 121; or equivalent courses.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students.

*Grade Mode:* Letter.

**BCB 211 – Macromolecular Structure & Interactions (3 units)**

*Course Description:* Conceptual and quantitative basis for macromolecular structure-function relationships. Investigation of the paradigm form follows function. Review of key elements of protein, nucleic acid, and membrane structure. Exploration of specific macromolecular associations by analyzing chemical structure and physical-chemical behavior.

*Prerequisite(s):* BIS 102; or the equivalent, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students.

*Grade Mode:* Letter.

**BCB 212 – Cell Biology (3 units)**

*Course Description:* Analysis of basic processes governing cell organization, division, and transport. Study of the integration and regulation of cell behavior in response to changes in cellular environment.

*Prerequisite(s):* BIS 104; or the equivalent, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students.

*Grade Mode:* Letter.

**BCB 213 – Developmental Biology (3 units)**

*Course Description:* Fundamental principles in embryonic development that guide application of modern cellular and genetic approaches to understand developmental mechanisms. Emphasis on experimental approaches used to critically address scientific questions.

*Prerequisite(s):* Undergraduate biology course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students.

*Grade Mode:* Letter.

**BCB 214 – Molecular Biology (3 units)**

*Course Description:* Investigation of the basic cellular processes in prokaryotes and eukaryotes that govern the central dogma of molecular biology (DNA-RNA-protein).

*Prerequisite(s):* BCB 211; or the equivalent, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students.

*Grade Mode:* Letter.

**BCB 215 – Graduate Reading Course (2 units)**

*Course Description:* Development of critical reading skills through study of major paradigm advances in specialized fields of biochemistry, molecular, cell, and developmental biology. Emphasis on active learning and student participation. Guided analysis of literature and major advances in field of study.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Discussion 10 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

**BCB 220L – Advanced Biochemistry Laboratory Rotations (5 units)**

*Course Description:* Two five-week assignments in BMCDB research laboratories. Individual research problems with emphasis on methodological/procedural experience, experimental design, proposal writing and oral communication of results.

*Prerequisite(s):* BCB 210; BCB 211 (can be concurrent); BCB 120L or the equivalent.

*Learning Activities:* Laboratory 15 hour(s).

*Enrollment Restriction(s):* Open to graduate students.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**BCB 251 – Molecular Mechanisms in Early Development (3 units)**

*Course Description:* Analysis of the early events of development including: germ cells and other stem cells, gametogenesis, meiosis, imprinting, fertilization, genetically-engineered organisms, egg activation and establishment of embryonic polarity with focus on cellular events including gene regulation and cell signaling.

*Prerequisite(s):* Graduate standing or consent of instructor; introductory background in developmental biology and/or cell biology recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BCB 255 – Molecular Mechanisms in Pattern Formation & Development (3 units)**

*Course Description:* Genetic and molecular analysis of mechanisms that control animal development after fertilization. Establishment of embryonic axes, cell fate and embryonic pattern; induction, apoptosis, tissue patterning. Critical reading of current literature in C.elegans, Drosophila, and mouse genetic model systems.

*Prerequisite(s):* Graduate standing or consent of instructor; introductory background in developmental biology and/or genetics recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BCB 256 – Cell & Molecular Biology of Cancer (3 units)**

*Course Description:* Analysis of the pathologic alterations of cancer cells and therapeutic opportunities; with emphasis on animal models, tumor immunotherapy, stress response, metabolism, epigenetics, microRNAs and non-coding RNAs, and microbiota and inflammation.

*Prerequisite(s):* BCB 210; BCB 212; BCB 213; BCB 214.

*Learning Activities:* Lecture 1.50 hour(s), Seminar 1.50 hour(s).

*Grade Mode:* Letter.

**BCB 257 – Cell Proliferation & Cancer Genes (3 units)**

*Course Description:* Genetic and molecular alterations underlying the conversion of normal cells to cancers, emphasizing regulatory mechanisms and pathways. Critical reading of the current literature and development of experimental approaches.

*Prerequisite(s):* BCB 221C BCB 221D or equivalent courses.

*Learning Activities:* Lecture 1.50 hour(s), Seminar 1.50 hour(s).

*Grade Mode:* Letter.

**BCB 290 – Seminar (1 unit)**

*Course Description:* Presentation and discussion of faculty and graduate-student research.

*Prerequisite(s):* Consent of instructor and/or graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BCB 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BCB 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BCB 396 – Methods of Teaching (1 unit)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Biological Chemistry (BCM)**

School of Medicine

## **BCM 092 – Internship in Biological Chemistry (1-12 units)**

*Course Description:* Supervised work experience in biological chemistry and related fields.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **BCM 192 – Internship in Biological Chemistry (1-12 units)**

*Course Description:* Supervised work experience in Biological Chemistry and related fields.

*Prerequisite(s):* Upper division standing; approval of project prior to internship by preceptor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **BCM 198 – Group Study (1-5 units)**

*Course Description:* For undergraduate students desiring to explore particular topics in depth. Lecture and conferences may be involved.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **BCM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **BCM 209 – Prostaglandins/Leukotrienes & Related Lipids (2 units)**

*Course Description:* Oxidative desaturation/elongation of polyunsaturated fatty acids. Biosynthesis of prostaglandins/leukotrienes from polyunsaturated fatty acids. Chemistry, biochemistry, and metabolism. Nutritional regulation. Physiological/pathophysiological implications; pharmacological and clinical relevance.

*Prerequisite(s):* (BCP 101A and BCP 101B) or (PHC 101A and PHC 101B) or (PGG 100A and PGG 100B).

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **BCM 217 – Molecular Genetics of Fungi (3 units)**

*Course Description:* Advanced treatment of molecular biology and genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; secretion; control of reproduction; molecular evolution; transformation; and gene manipulation.

*Prerequisite(s):* PLP 130; PLP 215X; BCP 101B; BOT 119; GGG 100; GGG 102A; graduate standing in a biological science; MIC 215 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PLP 217.

*Grade Mode:* Letter.

## **BCM 222 – Mechanisms of Translational Control (2 units)**

*Course Description:* Molecular mechanisms of protein synthesis and translational control in eukaryotic cells, with emphasis on mammalian cells and their viruses. An advanced graduate-level treatment of topics of current interest, with readings and discussion of primary papers from the literature.

*Prerequisite(s):* BCP 201C or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **BCM 230 – Practical NMR Spectroscopy & Imaging (1 unit)**

*Course Description:* Basic theory, experimental methods, and instrumentation of NMR. Enables understanding of NMR spectroscopy and imaging experiments.

*Prerequisite(s):* CHE 107A; CHE 107B; (PHY 009A, PHY 009B, PHY 009C; or PHY 005A, PHY 005B, PHY 005C) or consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **BCM 231 – Biological Nuclear Magnetic Resonance (3 units)**

*Course Description:* Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/imaging, metabolic regulation, and cellular bioenergetics.

*Prerequisite(s):* MCB 221A; or equivalent or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* BPH 231.

*Grade Mode:* Letter.

## **BCM 250 – Functional Genomics: From Bench to Bedside (3 units)**

*Course Description:* Functional genomics (how genetic variation and epigenomics affect gene expression), with an emphasis on clinical relevance and applications. Topics include genetic variation and human disease, cancer therapeutics, and biomarker discovery.

*Prerequisite(s):* GGG 201C; MCB 214; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* No credit to students who have previously completed PHA 250.

*Cross Listing:* GGG 250.

*Grade Mode:* Letter.

## **BCM 291 – Seminar in Genetic Approaches to Pathogenesis of Human Disease (1 unit)**

*Course Description:* Current genetic approaches to understanding the pathogenesis of disease and mammalian development presented and critically discussed by faculty, fellows and students. Topics include Mendelian and non-Mendelian diseases, imprinting, homologous recombination, statistical methods, genetic epidemiology and cell cycle dependent expression.

*Prerequisite(s):* Student in Genetics Graduate Group or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Cross Listing:* BCM 491.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BCM 298 – Group Study (1-5 units)**

*Course Description:* For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**BCM 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BCM 410A – Molecular Medicine (4 units)**

*Course Description:* Biochemistry of proteins and nucleic acids. Includes an introduction to cancer biology and a full discussion of carbohydrate metabolism. Molecular aspects of human disease are highlighted throughout.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to Medical Students only.

*Grade Mode:* Pass/Fail only.

**BCM 491 – Seminar in Genetic Approaches to Pathogenesis of Human Disease (1 unit)**

*Course Description:* Current genetic approaches to understanding the pathogenesis of disease and mammalian development presented and critically discussed by faculty, fellows and students. Topics include Mendelian and non-Mendelian diseases, imprinting, homologous recombination, statistical methods, genetic epidemiology and cell cycle dependent expression.

*Prerequisite(s):* Student in Genetics Graduate Group or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Cross Listing:* BCM 291.

*Grade Mode:* Honors/Pass/Fail.

**BCM 493 – Medical Genomics (6 units)**

*Course Description:* Four-week module will focus on the clinical methods and applications of medical genomics. Topics will include an introduction to the human genome and human genomics, genetic and epigenetic variation and the ethics of medical genomics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 4 hour(s), Lecture 4 hour(s), Laboratory 12 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**BCM 497T – Tutoring in Biological Chemistry (1-5 units)**

*Course Description:* Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine.

*Prerequisite(s):* Advanced standing or consent of instructor.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**BCM 498 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

**BCM 499 – Research (1-12 units)**

*Course Description:* Research with Department of Biological Chemistry.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**Biological Sciences (BIS)**

**College of Biological Sciences**

**BIS 002A – Introduction to Biology: Essentials of Life on Earth (5 units)**

*Course Description:* Essentials of life including sources and use of energy, information storage, responsiveness to natural selection and cellularity. Origin of life and influence of living things on the chemistry of the Earth. May be taught abroad.

*Prerequisite(s):* CHE 002A or CHE 004A or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIS 001A with a grade of C- or better.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIS 002B – Introduction to Biology: Principles of Ecology & Evolution (5 units)**

*Course Description:* Introduction to basic principles of ecology and evolutionary biology, focusing on the fundamental mechanisms that generate and maintain biological diversity across scales ranging from molecules and genes to global processes and patterns. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIS 001B with a grade of C- or better.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**BIS 002C – Introduction to Biology: Biodiversity & the Tree of Life (5 units)**

*Course Description:* Introduction to organismal diversity, using the phylogenetic tree of life as an organizing theme. Lectures and laboratories cover methods of phylogenetic reconstruction, current knowledge of the tree of life, and the evolution of life's most important and interesting innovations. May be taught abroad.

*Prerequisite(s):* BIS 001B C- or better or BIS 002B C- or better.

*Learning Activities:* Lecture 4 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIS 001C with a grade of C- or better.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **BIS 002D – Introduction to Biology: Principles of Cell Biology & Physiology (3 units)**

*Course Description:* Introduction to the essential principles underlying cellular organization and function, how the properties of cells give rise to complex cellular behaviors that contribute to tissue organization/function and the physiological paradigms that govern complex life.

*Prerequisite(s):* BIS 002A C- or better.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken BIS 104 and NPB 110A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **BIS 005 – Exploring Biological Sciences (1 unit)**

*Course Description:* Introduction to biology at UC Davis through discussions with faculty and speakers from industry and medicine.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Enrollment limited to first year College of Biological Sciences students.

*Grade Mode:* Pass/No Pass only.

## **BIS 006 – BioLaunch: Career Pathways Seminar (1.5 units)**

*Course Description:* Exploration of diverse career options, building professional networks, transferable skills, and developing materials and strategies for landing relevant experiential learning opportunities in the biological sciences fields.

*Prerequisite(s):* BIS 005; or consent of instructor.

*Learning Activities:* Discussion 1.5 hour(s).

*Grade Mode:* P/NP only.

## **BIS 010 – Everyday Biology (4 units)**

*Course Description:* Everyday biological concepts using contemporary readings for non-scientists. Key topics include: personal genomics; food & health; climate & evolution; brain biology & the law. Innovative projects apply biological concepts to current events. For students not specializing in biology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIS 002A or NEM 010V or equivalent.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **BIS 011 – Issues in the Life Sciences (2 units)**

*Course Description:* The range of subjects and approaches in the field of biology, including both basic and applied research topics.

*Prerequisite(s):* Consent of instructor. Enrollment limited to BUSP students.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **BIS 011L – Basic Life Sciences Laboratory (1 unit)**

*Course Description:* Basic laboratory skills in life sciences research, including microbiology, molecular biology, and genetics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3 hour(s).

*Enrollment Restriction(s):* Limited to Biology Undergraduate Scholars Program (BUSP) students.

*Grade Mode:* Letter.

## **BIS 015L – Introduction to Data Science for Biologists (2 units)**

*Course Description:* Introduction to data science with a focus on developing practical computational skills for biologists. Data management, transformation, visualization, and analysis using R. Fundamentals of the UNIX shell including navigation and automation. Computational resources for biologists with emphasis on the management of genomic data.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **BIS 020Q – Modeling in Biology (2 units)**

*Course Description:* Introduction to the application of quantitative methods to biological problems. Use a mathematical software package to tackle problems drawn from all aspects of biology.

*Prerequisite(s):* MAT 016B C- or better (can be concurrent) or MAT 017B C- or better (can be concurrent) or MAT 021B C- or better (can be concurrent) or MAT 021BH C- or better (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **BIS 023A – Genome Hunters (3 units)**

*Course Description:* Hands-on, project-based introduction to genome-centric biology with specific focus on quantitative elements of associated experimental approaches. Measurement error and error estimation, experimental design, data analysis, model generation and fitting, and model-guided hypothesis generation and testing. Content covered through quarter-long interactive experiment to isolate an organism, quantitatively characterize its behavior, and sequence its genome.

*Prerequisite(s):* MAT 017A (can be concurrent) or MAT 021A (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **BIS 023B – Genome Hunters (3 units)**

*Course Description:* Hands-on, project-based introduction to modern computational and bioinformatics analyses using genome sequence data generated in BIS 023A. Genome sequence assembly and alignment, genome annotation, and genetic correlates of behavior. Additional topics may include scientific and societal implications of the availability and usage of genome information and genome manipulation, and real-life applications of genome analysis.

*Prerequisite(s):* BIS 023A; MAT 017B (can be concurrent) or MAT 021B (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## BIS 027A – Linear Algebra with Applications to Biology (4 units)

**Course Description:** Introduction to linear algebra with biological, medical, and bioengineering applications. Matrix algebra, vector spaces, orthogonality, determinants, eigenvalues, eigenvectors, principal component analysis, singular value decomposition, and linear transformations. Computer labs cover mathematical and computational techniques for modeling biological systems.

**Prerequisite(s):** MAT 017C C- or better or MAT 021C C- or better or MAT 021CH C- or better.

**Learning Activities:** Lecture 3 hour(s), Laboratory 2 hour(s).

**Credit Limitation(s):** Only 1 unit of credit for students who have completed MAT 022A.

**Cross Listing:** MAT 027A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIS 027B – Differential Equations with Applications to Biology (4 units)

**Course Description:** Solutions of differential equations with biological, medical, and bioengineering applications. First and second order linear equations, phase plane analysis, nonlinear dynamics, Laplace transforms, and the diffusion equation. Computer labs cover mathematical and numerical techniques for modeling biological systems.

**Prerequisite(s):** (BIS 027A C- or better or MAT 027A C- or better) or (MAT 022A C- or better, (MAT 022AL C- or better or ENG 006 C- or better or ECS 032A C- or better or ECS 036A C- or better or ECH 060 C- or better or EME 005 C- or better)).

**Learning Activities:** Lecture 3 hour(s), Laboratory 2 hour(s).

**Credit Limitation(s):** Only 1 unit of credit for students who have completed MAT 022B.

**Cross Listing:** MAT 027B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIS 060 – BioLaunch: Career Laboratory (2 units)

**Course Description:** Interactive, simulated activities that demonstrate day-to-day work in a variety of careers facilitated by professionals in industries related to Biological Sciences.

**Prerequisite(s):** BIS 005 P or better; BIS 006 P or better; or consent of instructor.

**Learning Activities:** Discussion/Laboratory 2 hour(s).

**Enrollment Restriction(s):** Open to College of Biological Sciences students only.

**Grade Mode:** P/NP only.

## BIS 092 – Internship in Biological Sciences (1-12 units)

**Course Description:** Internship in Biological Sciences.

**Prerequisite(s):** Consent of instructor; lower division standing.

**Learning Activities:** Internship 3-36 hour(s).

**Enrollment Restriction(s):** Restricted to lower division standing.

**Grade Mode:** Pass/No Pass only.

## BIS 098 – Directed Group Study (1-5 units)

**Course Description:** Primarily for lower division students.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Variable.

**Grade Mode:** Pass/No Pass only.

## BIS 099 – Special Study for Undergraduates (1-5 units)

**Course Description:** Special study for undergraduates.

**Prerequisite(s):** Consent of instructor; lower division standing.

**Learning Activities:** Independent Study 3-15 hour(s).

**Enrollment Restriction(s):** Restricted to lower division standing.

**Grade Mode:** Pass/No Pass only.

## BIS 101 – Genes & Gene Expression (4 units)

**Course Description:** Nucleic acid structure and function; gene expression and its regulation; replication; transcription and translation; transmission genetics; molecular evolution. May be taught abroad.

**Prerequisite(s):** (BIS 002A C- or better, BIS 002B C- or better); (CHE 008A or CHE 118A or CHE 128A); ((STA 013 or STA 013Y) or STA 100 or STA 102 or STA 130A)); STA 100 preferred.

**Learning Activities:** Lecture 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## BIS 101D – Genes & Gene Expression Discussion (1 unit)

**Course Description:** Discussion and problem solving related to fundamental principles of classical and molecular genetics as presented in BIS 101.

**Prerequisite(s):** BIS 101 (can be concurrent); and consent of instructor.

**Learning Activities:** Discussion 1 hour(s).

**Grade Mode:** Pass/No Pass only.

## BIS 102 – Structure & Function of Biomolecules (3 units)

**Course Description:** Structure and function of macromolecules with emphasis on proteins, catalysis, enzyme kinetics, lipids, membranes, and proteins as machines. May be taught abroad.

**Prerequisite(s):** (BIS 001A or BIS 002A); (CHE 008B or CHE 118B or CHE 128B).

**Learning Activities:** Lecture 3 hour(s).

**Credit Limitation(s):** Only 1 unit of credit for students who have completed ABI 102; only 1.5 units of credit for students who have completed BIS 105.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## BIS 103 – Bioenergetics & Metabolism (3 units)

**Course Description:** Fundamentals of the carbon, nitrogen, and sulfur cycles in nature, including key reactions of biomolecules such as carbohydrates, amino acids, lipids, and nucleotides, and of energy production and use in different types of organisms. Principles of metabolic regulation.

**Prerequisite(s):** BIS 102.

**Learning Activities:** Lecture 3 hour(s).

**Credit Limitation(s):** 1.5 units of credit for students who have completed BIS 105; 1 unit of credit if students who have completed ABI 103.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**BIS 104 – Cell Biology (3 units)**

This version has ended; see updated course, below.

*Course Description:* Membrane receptors and signal transduction; cell trafficking; cell cycle; cell growth and division; extracellular matrix and cell-cell junctions; cell development; immune system.

*Prerequisite(s):* BIS 101; (BIS 102 or BIS 105).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIS 104 – Cell Biology (3 units)**

*Course Description:* Membrane receptors and signal transduction; cell trafficking; cell cycle; cell growth and division; extracellular matrix and cell-cell junctions; cell development; immune system.

*Prerequisite(s):* BIS 101; (BIS 102 or BIS 105 or ABI 102 C- or better).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

This course version is effective from, and including: Summer Session 2 2025.

**BIS 105 – Biomolecules & Metabolism (3 units)**

*Course Description:* Fundamentals of biochemical processes, with emphasis on protein structure and activity; energy metabolism; catabolism of sugars, amino acids, and lipids; and gluconeogenesis.

*Prerequisite(s):* BIS 002A; (CHE 008B or CHE 118B or CHE 128B).

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* 1.5 units of credit for students who have completed BIS 102 or BIS 103; no credit for students who have completed both BIS 102 and BIS 103; 1 unit of credit for students who have completed ABI 102 or ABI 103; no credit for students who have completed both ABI 102 and ABI 103.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**BIS 106 – BioLaunch: Experiential Learning Seminar (1 unit)**

*Course Description:* Applied learning experience for self evaluation of a current or recent internship or research position. Analysis of workplace culture, identification of opportunities for professional growth, and useful lessons from peer experiences.

*Prerequisite(s):* BIS 005; BIS 006; BIS 060; or consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to College of Biological Sciences students only.

*Grade Mode:* P/NP only.

**BIS 107 – Probability & Stochastic Processes with Applications to Biology (4 units)**

*Course Description:* Introduction to probability theory and stochastic processes with biological, medical, and bioengineering applications. Combinatorics, discrete and continuous random variables, Bayes' formula, conditional probability, Markov chains, Poisson processes, and Brownian motion. Computer labs cover mathematical and computational modeling techniques.

*Prerequisite(s):* (BIS 027A C- or better or MAT 027A C- or better) or (MAT 022A C- or better, (MAT 022AL C- or better or ENG 006 C- or better or ECS 032A C- or better or ECS 036A C- or better or ECH 060 C- or better or EME 005 C- or better)).

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have completed MAT 135A or STA 131A.

*Cross Listing:* MAT 107.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIS 122 – Population Biology & Ecology (3 units)**

*Course Description:* Biological and physical processes affecting plant and animal populations in the rich array of habitats at the Bodega Marine Laboratory ecological preserve. Emphasis on field experience, with complementing lectures to address population and community processes. See Bodega Marine Laboratory Program.

*Prerequisite(s):* (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C); residence at Bodega Marine Laboratory required.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**BIS 122P – Population Biology & Ecology/Advanced Laboratory Topics (5 units)**

*Course Description:* Training in scientific research, from hypothesis testing to publication, including methods of library research. Research will be related to a topic covered in BIS 122. Final presentation both oral and written. See Bodega Marine Laboratory Program.

*Prerequisite(s):* BIS 122 (can be concurrent).

*Learning Activities:* Laboratory 12 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Residence at Bodega Marine Laboratory required.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

**BIS 123 – Undergraduate Colloquium in Marine Science (1 unit)**

*Course Description:* Series of weekly seminars by recognized authorities in various disciplines of marine science from within and outside the UC system. Includes informal discussion with speaker. Held at Bodega Marine Laboratory; see Bodega Marine Laboratory Program.

*Prerequisite(s):* Enrolled student at the Bodega Marine Laboratory.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**BIS 124 – Coastal Marine Research (6 units)**

*Course Description:* Independent research on topics related to an accompanying core Bodega Marine Laboratory summer course. Receive training in generating hypotheses, designing experiments, collecting and analyzing data, and scientific communication.

*Prerequisite(s):* (EVE 114 (can be concurrent) or EVE 106 (can be concurrent) or ESP 152 (can be concurrent) or ESP 124 (can be concurrent)); concurrent enrollment in one of the above listed courses required; upper division standing or consent of instructor.

*Learning Activities:* Laboratory 12 hour(s), Fieldwork 12 hour(s), Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Student must complete the application at <http://www.bml.ucdavis.edu>.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**BIS 133 – Collaborative Studies in Mathematical Biology (3 units)**

*Course Description:* Interdisciplinary research and training that uses mathematics and computation to solve current problems in biology.

*Prerequisite(s):* MAT 016A; MAT 016B; MAT 016C; (BIS 001A or BIS 001B or BIS 001C or BIS 002A or BIS 002B or BIS 002C or BIS 010); and consent of instructor, or equivalents.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**BIS 134 – Systems Biology: From Biological Circuits to Biological Systems (2 units)**

*Course Description:* Applying systems theory to understand the properties of biological networks in a variety of model organisms. Emphasis on both local biological circuits, and genome-scale biological networks. Topics include network motifs, robustness, modeling, emergent properties and integration of networks.

*Prerequisite(s):* BIS 101; (MCB 121 or PLB 113); (MAT 016A, MAT 016B, MAT 016C) or (MAT 017A, MAT 017B, MAT 017C) or (MAT 021A, MAT 021B, MAT 021C) or (MAT 021AH, MAT 021BH, MAT 021CH); or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Visual Literacy (VL).

**BIS 160 – BioLaunch: Career Next Step Seminar (1 unit)**

*Course Description:* Preparation for the next step after undergraduate work at UC Davis with support from staff, faculty, and industry partners. Applications for careers, graduate and professional schools.

*Prerequisite(s):* BIS 005; BIS 006; BIS 060; BIS 106; or consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to College of Biological Sciences students only.

*Grade Mode:* Pass/No Pass only.

**BIS 180L – Genomics Laboratory (5 units)**

*Course Description:* Computational approaches to model and analyze biological information about genomes, transcriptomes, and proteomes. Topics include genome assembly and annotation, mRNA and small RNA profiling, proteomics, protein-DNA and protein-protein interactions, network analysis, and comparative genomics. Computer programming experience is not required.

*Prerequisite(s):* BIS 181 or BIS 183 or MCB 182; BIS 015L or equivalent recommended or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Students who have received credit for taking BIT 150 will receive 3 units for completing BIS 180L.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIS 181 – Comparative Genomics (3 units)**

*Course Description:* Comparison of genomes at the population and species level. Genomic techniques for mapping disease (and other) genes, reconstruction of evolutionary history and migration patterns, determination of gene function, prediction of organismal traits, and metagenomics: determination of community composition and function.

*Prerequisite(s):* BIS 101 C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**BIS 183 – Functional Genomics (3 units)**

*Course Description:* Overview of genomic methodologies and key biological findings obtained using genome-wide analyses. RNA profiling, small RNAs, epigenomics, chromatin immunoprecipitation, protein-DNA interactions, proteomics and network analysis.

*Prerequisite(s):* BIS 101; (BIS 102 or BIS 105 recommended.)

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**BIS 185L – Systems & Synthetic Biology Lab (5 units)**

*Course Description:* Principles & applications of systems and synthetic biology. Bistable & monostable switches, single cell sequencing, genetic circuits, design of biological parts and pathway modeling. Computational & experimental labs use single cell sequence data to determine switch types in cell identity, design and characterize promoter libraries and use genomics-enabled approaches to discover and characterize enzymes & metabolites.

*Prerequisite(s):* BIS 015L C- or better; BIS 134 C- or better (can be concurrent); BIM 143 C- or better (can be concurrent); or consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Laboratory 6 hour(s), Lecture 2 hour(s).

*Grade Mode:* Letter.

**BIS 192 – Internship in Biological Sciences (1-12 units)**

*Course Description:* Internship in Biological Sciences.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**BIS 194H – Research Honors (2 units)**

*Course Description:* Students majoring in Biological Sciences who have completed two quarters (3-5 units per quarter) of 199 and who qualify for the honors program as defined by the current catalog. Opportunity for Biological Sciences majors to pursue intensive research culminating in the writing of a senior thesis with the guidance of faculty advisors.

*Prerequisite(s):* Senior standing.

*Learning Activities:* Independent Study 6 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**BIS 195A – Science Teaching Internship Program (4 units)**

*Course Description:* Basic teaching techniques including lesson planning, classroom management, and presentation skills. Interns spend time in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students, and teaching lessons.

*Prerequisite(s):* Upper division standing in a science major or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Internship 6 hour(s).

*Enrollment Restriction(s):* Major in science; junior or senior status (based on units); application and interview; limited to 24 students.

*Grade Mode:* Pass/No Pass only.

**BIS 195B – Science Teaching Internship (1-5 units)**

*Course Description:* Reinforcement of teaching techniques learned in 195A with additional classroom experience in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students and teaching lessons.

*Prerequisite(s):* BIS 195A.

*Learning Activities:* Internship 1-5 hour(s).

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**BIS 197T – Tutoring in Biological Sciences (1-5 units)**

*Course Description:* Assisting the instructor by tutoring students in one of the Biological Sciences' regular courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Discussion 2-6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**BIS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**BIS 199 – Special Study in Biological Sciences (1-5 units)**

*Course Description:* Special study in Biological Sciences.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**BIS 298 – Group Study (1-5 units)**

*Course Description:* College of Biological Sciences staff members offer group study courses under this number.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**Biological Systems Engineering (EBS)**

College of Engineering

**EBS 001 – Foundations of Biological Systems Engineering (4 units)**

*Course Description:* Introduction to engineering and the engineering design process with examples drawn from the field of biological systems engineering. Introduction to computer-aided design and mechanical fabrication of designs. Quarter-long group design project.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s), Project.

*Enrollment Restriction(s):* Open only to students in Biological Systems Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**EBS 075 – Properties of Materials in Biological Systems (4 units)**

*Course Description:* Properties of typical biological materials; composition and structure with emphasis on the effects of physical and biochemical properties on design of engineered systems; interactions of biological materials with typical engineering materials.

*Prerequisite(s):* BIS 002A; PHY 009B (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**EBS 090C – Research Group Conference in Biological Systems Engineering (1 unit)**

*Course Description:* Research group conference.

*Prerequisite(s):* Consent of instructor. Lower division standing in Biological Systems Engineering or Food Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**EBS 092 – Internship in Biological Systems Engineering (1-5 units)**

*Course Description:* Supervised work experience in biological systems engineering.

*Prerequisite(s):* Consent of instructor. Lower division standing; project approval prior to period of internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**EBS 098 – Directed Group Study (1-5 units)**

*Course Description:* Group study of selected topics; restricted to lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**EBS 099 – Special Study for Lower Division Students (1-5 units)**

*Course Description:* Special study for lower division students.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**EBS 103 – Fluid Mechanics Fundamentals (4 units)**

*Course Description:* Fluid mechanics axioms, fluid statics, kinematics, velocity fields for one-dimensional incompressible flow and boundary layers, turbulent flow time averaging, potential flow, dimensional analysis, and macroscopic balances to solve a range of practical problems.

*Prerequisite(s):* PHY 009B.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* HYD 103N.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**EBS 114 – Principles of Field Machinery Design (3 units)**

*Course Description:* Traction and stability of vehicles with wheels or tracks. Operating principles of field machines and basic mechanisms used in their design.

*Prerequisite(s):* ENG 102; ENG 104.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**EBS 115 – Forest Engineering (3 units)**

*Course Description:* Applications of engineering principles to problems in forestry including those in forest regeneration, harvesting, residue utilization, and transportation.

*Prerequisite(s):* ENG 104.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**EBS 120 – Power Systems Design (4 units)**

*Course Description:* Design and performance of power devices and systems including combustion engines, electric generators and motors, fluid power systems, fuels, and emerging technologies. Selection of units for power matching and optimum performance.

*Prerequisite(s):* ENG 017; ENG 102; ENG 103; ENG 105.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**EBS 125 – Heat Transfer in Biological Systems (4 units)**

*Course Description:* Fundamentals of heat transfer with application to biological systems. Steady and transient heat transfer. Analysis and simulation of heat conduction, convection and radiation. Heat transfer operations.

*Prerequisite(s):* BIS 002A; EBS 075; ENG 103; ENG 105.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**EBS 127 – Mass Transfer & Kinetics in Biological Systems (4 units)**

*Course Description:* Fundamentals of mass transfer and kinetics in biological systems. Molecular diffusion and convection.

Thermodynamics and bioenergetics. Biological and chemical rate equations. Heterogeneous kinetics. Batch and continuous reaction processes. Mass transfer operations.

*Prerequisite(s):* EBS 125.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**EBS 128 – Biomechanics & Ergonomics (4 units)**

*Course Description:* Anatomical, physiological, and biomechanical bases of physical ergonomics. Human motor capabilities, body mechanics, kinematics and anthropometry. Use of bioinstrumentation, industrial surveillance techniques and the NIOSH lifting guide. Cumulative trauma disorders. Static and dynamic biomechanical modeling. Emphasis on low back, shoulder and hand/wrist biomechanics.

*Prerequisite(s):* STA 100; ENG 102.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**EBS 130 – Modeling of Dynamic Processes in Biological Systems (4 units)**

*Course Description:* Techniques for modeling processes through mass & energy balance, rate equations, and equations of state. Computer problem solution of models. Example models include package design, evaporation, respiration heating, thermal processing of foods, and plant growth.

*Prerequisite(s):* (ENG 006 or ECS 032A); (MAT 022B C- or better or MAT 027B C- or better); EBS 075.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **EBS 135 – Bioenvironmental Engineering (4 units)**

*Course Description:* Biological responses to environmental conditions. Principles and engineering design of environmental control systems. Overview of environmental pollution problems and legal restrictions for biological systems, introduction of environmental quality assessment techniques, and environmental pollution control technologies.

*Prerequisite(s):* EBS 125; EBS 130.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 144 – Groundwater Hydrology (4 units)**

*Course Description:* Global role of groundwater resources in society; groundwater in the hydrologic cycle; geology of groundwater; global, US, and California geography of groundwater; physical measures of groundwater occurrence and flow; water balance; modeling groundwater flow; principles of well construction; aquifer tests; groundwater quality; contaminant transport and monitoring; groundwater law, water quality regulations, and sustainable management.

*Prerequisite(s):* MAT 012 (can be concurrent) or MAT 016B (can be concurrent) or MAT 021A (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* HYD 144.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 145 – Irrigation & Drainage Systems (4 units)**

*Course Description:* Engineering and scientific principles applied to the design of surface, sprinkle and micro irrigation systems and drainage systems within economic, biological, and environmental constraints. Interaction between irrigation and drainage.

*Prerequisite(s):* EBS 103 or HYD 103N.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 147 – Runoff, Erosion & Water Quality Management (3 units)**

*Course Description:* Practical hydrology and runoff water quality management from disturbed watersheds. Development of hillslope and soils restoration concepts and practice, modeling and application.

*Prerequisite(s):* (PHY 007B or PHY 009B); (MAT 016C or MAT 017C or MAT 021C); (ECI 142 or HYD 141 or ESM 100); or equivalent.

*Learning Activities:* Lecture/Lab 3 hour(s), Fieldwork.

*Cross Listing:* HYD 147.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 148 – Evapotranspiration Principles, Measurement & Modeling (4 units)**

*Course Description:* Estimation of evapotranspiration (ET) for irrigation management and water resources planning; including the basic principles and key factors controlling evaporation and ET rates, methods of measuring these factors in the field and remotely, and determination of likely water requirements for crops and various landscape conditions as needed for water resources planning.

*Prerequisite(s):* HYD 124 C or better; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ESM 118; HYD 118.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 161 – Kinetics & Bioreactor Design (4 units)**

*Course Description:* Provide the basic principles of reactor design for bioprocess applications. Emphasizes the following topics: 1) kinetics and reactor engineering principles; 2) bio-reaction kinetics; and 3) bioreactor design.

*Prerequisite(s):* EBS 127.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **EBS 165 – Bioinstrumentation & Control (4 units)**

*Course Description:* Instrumentation and control for biological production systems. Measurement system concepts, instrumentation and transducers for sensing physical and biological parameters, data acquisition and control.

*Prerequisite(s):* ENG 100.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 170A – Engineering Design & Professional Responsibilities (3 units)**

*Course Description:* Engineering design including professional responsibilities. Emphasis on project selection, data sources, specifications, human factors, biological materials, safety systems, and professionalism. Detailed design proposals developed for EBS 170B and EBS 170BL.

*Prerequisite(s):* EBS 001; ENG 102; ENG 104.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 170B – Engineering Projects: Design (2 units)**

*Course Description:* Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems. Project for study is jointly selected by student and instructor.

*Prerequisite(s):* EBS 170A; EBS 170BL (can be concurrent); EBS 170BL required concurrently.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 170BL – Engineering Projects: Design Laboratory (1 unit)**

*Course Description:* Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems.

*Prerequisite(s):* EBS 170B (can be concurrent); EBS 170B required concurrently.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 170C – Engineering Projects: Design Evaluation (1 unit)**

*Course Description:* Individual or group projects involving the fabrication, assembly and testing of components, devices, structures, or systems designed to solve specific engineering problems in biological systems. Project for study previously selected by student and instructor in EBS 170B.

*Prerequisite(s):* EBS 170B; EBS 170CL (can be concurrent); EBS 170CL required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 170CL – Engineering Projects: Design Evaluation (2 units)**

*Course Description:* Individual or group projects involving the fabrication, assembly and testing of components, devices, structures, or systems designed to solve specific engineering problems in biological systems.

*Prerequisite(s):* EBS 170C (can be concurrent); EBS 170C required concurrently.

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EBS 175 – Rheology of Biological Materials (3 units)**

*Course Description:* Fluid and solid rheology, viscoelastic behavior of foods and other biological materials, and application of rheological properties to food and biological systems (i.e., pipeline design, extrusion, mixing, coating).

*Prerequisite(s):* EBS 103 or ENG 103.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **EBS 189A – Special Topics in Biological Systems Engineering: Agricultural Engineering (1-5 units)**

*Course Description:* Special topics in Agricultural Engineering.

*Prerequisite(s):* Consent of instructor; upper division standing in Engineering.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 189B – Special Topics in Biological Systems Engineering: Aquacultural Engineering (1-5 units)**

*Course Description:* Special topics in Aquacultural Engineering.

*Prerequisite(s):* Consent of instructor; upper division standing in Engineering.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 189C – Special Topics in Biological Systems Engineering: Biomedical Engineering (1-5 units)**

*Course Description:* Special topics in Biomedical Engineering.

*Prerequisite(s):* Consent of instructor; upper division standing in Engineering.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 189D – Special Topics in Biological Systems Engineering: Biotechnical Engineering (1-5 units)**

*Course Description:* Special topics in Biotechnical Engineering.

*Prerequisite(s):* Consent of instructor; upper division standing in Engineering.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 189E – Special Topics in Biological Systems Engineering: Ecological Systems Engineering (1-5 units)**

*Course Description:* Special topics in Ecological Systems Engineering.

*Prerequisite(s):* Consent of instructor; upper division standing in Engineering.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 189F – Special Topics in Biological Systems Engineering: Food Engineering (1-5 units)**

*Course Description:* Special topics in Food Engineering.

*Prerequisite(s):* Consent of instructor; upper division standing in Engineering.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 189G – Special Topics in Biological Systems Engineering: Forest Engineering (1-5 units)**

*Course Description:* Special topics in Forest Engineering.

*Prerequisite(s):* Consent of instructor; upper division standing in Engineering.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EBS 190C – Research Group Conference in Biological Systems Engineering (1 unit)**

*Course Description:* Research group conference.

*Prerequisite(s):* Consent of instructor; upper division standing in Biological Systems Engineering of Food Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EBS 192 – Internship in Biological Systems Engineering (1-5 units)**

*Course Description:* Supervised work experience in biological systems engineering.

*Prerequisite(s):* Consent of instructor; upper division standing; approval of project prior to period of internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EBS 197T – Tutoring in Biological Systems Engineering (1-5 units)**

*Course Description:* Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department's regular courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EBS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EBS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EBS 200 – Research Methods in Biological Systems Engineering (2 units)**

*Course Description:* Planning, execution and reporting of research projects. Literature review techniques and proposal preparation. Record keeping and patents. Uncertainty analysis in experiments and computations. Graphic analysis. Oral and written presentation of research results, manuscript preparation, submission and review.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **EBS 216 – Energy Systems (4 units)**

*Course Description:* Theory and application of energy systems. Systems analysis, energy conversion technologies, environmental considerations, economics and system optimization.

*Prerequisite(s):* ENG 105; or equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EBS 228 – Occupational Musculoskeletal Disorders (3 units)**

*Course Description:* Epidemiology and etiology of occupational musculoskeletal disorders (MSDs) with focus on low back and upper extremities disorders; anatomical and biomechanical functions of lower back and upper extremities; MSDs risk factors assessment and control; research opportunities related to MSDs.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EBS 240 – Infiltration & Drainage (3 units)**

*Course Description:* Aspects of multi-phase flow in soils and their application to infiltration and immiscible displacement problems. Gas phase transport and entrapment during infiltration, and oil-water-gas displacement will be considered.

*Prerequisite(s):* SSC 107; ENG 103.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EBS 241 – Precision Irrigation Systems & Management (3 units)**

*Course Description:* Advanced irrigation science and engineering for agricultural, horticultural, engineering, and hydrology graduate students. Precision irrigation techniques for application of water to meet specific requirements of individual plants or management units and maximum economic benefits of crop production.

*Prerequisite(s):* EBS 145; SSC 100; ABT 110; HYD 110.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* HYD 241.

*Grade Mode:* Letter.

## **EBS 242 – Hydrology & Sustainability of Irrigated Lands (3 units)**

*Course Description:* Impact of irrigated agricultural on groundwater depletion, surface water and groundwater quality, soil salinization, downstream ecosystems, and seawater intrusion. Exploration of efficient resource use, and policies adopted in California to enhance sustainability of irrigated crop production.

*Prerequisite(s):* ABT 110 or ESM 110 or HYD 110 or EBS 145.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* HYD 242.

*Grade Mode:* Letter.

## **EBS 243 – Water Resource Planning & Management (3 units)**

*Course Description:* Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design, and management. Water allocation, capacity expansion, and reservoir operation. Conjunctive use of surface water and groundwater. Water quality management. Irrigation planning and operation models.

*Prerequisite(s):* HYD 141; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* HYD 243.

*Grade Mode:* Letter.

## **EBS 245 – Waste Management for Biological Production Systems (3 units)**

*Course Description:* Characterization of solid and liquid wastes from animal, crop, and food production systems. Study of methods and system design for handling, treatment, and disposal/utilization of these materials.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EBS 265 – Design & Analysis of Engineering Experiments (5 units)**

*Course Description:* Simple linear, multiple, and polynomial regression, correlation, residuals, model selection, one-way ANOVA, fixed and random effect models, sample size, multiple comparisons, randomized block, repeated measures, and Latin square designs, factorial experiments, nested design and subsampling, split-plot design, statistical software packages.

*Prerequisite(s):* STA 100; ASE 120; or an introductory course in statistics.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **EBS 268 – Polysaccharides Surface Interactions (3 units)**

*Course Description:* Study of fundamental surface science theories as applied to physical and chemical interactions of carbohydrates and polysaccharides.

*Prerequisite(s):* Graduate students in science or engineering.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ECH 268.

*Grade Mode:* Letter.

## **EBS 270 – Modeling & Analysis of Physical and Biological Processes & Systems (4 units)**

*Course Description:* Mathematical modeling of biological systems: model development; analytical and numerical solutions. Case studies from various specializations within Biological & Agricultural Engineering.

*Prerequisite(s):* MAT 022B or EBS 130; Familiarity with a programming language.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EBS 275 – Physical Properties of Biological Materials (3 units)**

*Course Description:* Selected topics on physical properties, such as mechanical, optical, rheological, and aerodynamic properties, as related to the design of harvesting, handling, sorting, and processing equipment. Techniques for measuring and recording physical properties of biological materials.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EBS 289A – Selected Topics in Biological Systems Engineering: Animal Systems Engineering (1-5 units)**

*Course Description:* Special topics in Animal Systems Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EBS 289B – Selected Topics in Biological Systems Engineering: Aquacultural Engineering (1-5 units)**

*Course Description:* Special topics in Aquacultural Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EBS 289C – Selected Topics in Biological Systems Engineering: Biological Engineering (1-5 units)**

*Course Description:* Special topics in Biological Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EBS 289D – Selected Topics in Biological Systems Engineering: Energy Systems (1-5 units)**

*Course Description:* Special topics in Energy Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EBS 289E – Selected Topics in Biological Systems Engineering: Environmental Quality (1-5 units)**

*Course Description:* Special topic in Environmental Quality.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EBS 289F – Selected Topics in Biological Systems Engineering: Food Engineering (1-5 units)**

*Course Description:* Special topics in Food Engineering.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable 1-5 hour(s).  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

## **EBS 289G – Selected Topics in Biological Systems Engineering: Forest Engineering (1-5 units)**

*Course Description:* Special topics in Forest Engineering.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable 1-5 hour(s).  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

## **EBS 289H – Selected Topics in Biological Systems Engineering: Irrigation & Drainage (1-5 units)**

*Course Description:* Special topics in Irrigation & Drainage.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable 1-5 hour(s).  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

## **EBS 289I – Selected Topics in Biological Systems Engineering: Plant Production & Harvest (1-5 units)**

*Course Description:* Special topics in Plant Production & Harvest.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable 1-5 hour(s).  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

## **EBS 289J – Selected Topics in Biological Systems Engineering: Postharvest Engineering (1-5 units)**

*Course Description:* Special topics in Postharvest Engineering.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable 1-5 hour(s).  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

## **EBS 289K – Selected Topics in Biological Systems Engineering: Sensors & Actuators (1-5 units)**

*Course Description:* Special topics in Sensors & Actuators.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable 1-5 hour(s).  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

## **EBS 290 – Seminar (1 unit)**

*Course Description:* Weekly seminars on recent advances and selected topics in biological systems engineering. Theme changes from quarter to quarter.  
*Prerequisite(s):* Graduate standing.  
*Learning Activities:* Seminar 1 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EBS 290C – Graduate Research Conference (1 unit)**

*Course Description:* Research problems, progress and techniques in biological systems engineering.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Discussion 1 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EBS 298 – Group Study (1-5 units)**

*Course Description:* Group study.  
*Learning Activities:* Variable.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EBS 299 – Research (1-12 units)**

*Course Description:* Research.  
*Learning Activities:* Variable.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EBS 390 – Supervised Teaching in Biological & Agricultural Engineering (1-3 units)**

*Course Description:* Tutoring and teaching students in undergraduate courses offered in the Department of Biological and Agricultural Engineering. Weekly conferences with instructor; evaluation of teaching. Preparing for and conducting demonstrations, laboratories and discussions. Preparing and grading exams.  
*Prerequisite(s):* Consent of instructor. Graduate standing.  
*Learning Activities:* Laboratory 3 hour(s), Tutorial 3-9 hour(s).  
*Repeat Credit:* May be repeated 6 unit(s).  
*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Biomedical Engineering (BIM)**

College of Engineering

## **BIM 001 – Introduction to Biomedical Engineering (2 units)**

*Course Description:* Introduction to the field of biomedical engineering with emphasis on design, careers, and specializations, including (1) medical devices (2) cellular & tissue engineering, (3) biomechanics, (4) systems & synthetic biology, and (5) biomedical imaging.  
*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).  
*Enrollment Restriction(s):* Pass One open to freshmen.  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **BIM 020 – Fundamentals of Bioengineering (4 units)**

*Course Description:* Basic principles of mass, energy and momentum conservation equations applied to solve problems in the biological and medical sciences.  
*Prerequisite(s):* (CHE 002B C- or better or CHE 002BH C- or better); MAT 021D C- or better; PHY 009B; ENG 006; BIM 020L (can be concurrent).  
*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).  
*Enrollment Restriction(s):* Pass One restricted to BME majors only.  
*Credit Limitation(s):* Only 2 units of credit to students who have previously taken ECH 051, ENG 105.  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**BIM 020L – Graphics Design for BME (2 units)**

*Course Description:* Computer-aided design and its application to problems in Biomedical Engineering.

*Prerequisite(s):* (CHE 002B or CHE 002BH C- or better); MAT 021D C- or better; PHY 009B; ENG 006; BIM 020 (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Open to BME majors only.

*Credit Limitation(s):* No credit for students who have previously taken ENG 004.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 088V – Introduction to Research (2 units)**

*Course Description:* Introduction to types of research, including the basics of joint research with a faculty mentor. Self-assessments to identify areas of interest, priorities, and fit. Literature search and library skills used in early stages of research. Research safety, integrity, and intellectual property.

*Learning Activities:* Web Virtual Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**BIM 089A – Topics in Biomedical Engineering (1-5 units)**

*Course Description:* Topics in Biomedical Engineering. (A) Cellular and Molecular Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Enrollment Restriction(s):* Restricted to lower division students.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 089B – Topics in Biomedical Engineering (1-5 units)**

*Course Description:* Topics in Biomedical Engineering. (B) Biomedical Imaging.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 089C – Topics in Biomedical Engineering (1-5 units)**

*Course Description:* Topics in Biomedical Engineering. (C) Biomedical Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**BIM 102 – Cellular Dynamics (4 units)**

*Course Description:* Fundamental cell biology for bioengineers. Emphasis on physical concepts underlying cellular processes including protein trafficking, cell motility, cell division and cell adhesion. Current topics including cell biology of cancer and stem cells will be discussed.

*Prerequisite(s):* BIS 002A; CHE 008B or CHE 118B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to College of Engineering students only.

*Credit Limitation(s):* Only 2 units of credit for students who have completed BIS 104.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 105 – Probability & Data Science for Biomedical Engineers (4 units)**

*Course Description:* Concepts of probability, random variables, stochastic processes, mathematical modeling, and data analysis, with applications to biomedical engineering. Includes combinatorics, discrete, continuous, and jointly distributed random variables, probability distributions and models, Markov Chains, and Poisson Processes. Computer labs using MATLAB cover mathematical and computational modeling techniques, hands-on data analysis, and computer simulations.

*Prerequisite(s):* (MAT 022A C- or better or MAT 027A C- or better or BIS 027A C- or better); ENG 006 { can be concurrent }; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* No credit for students who have taken MAT 107 or BIS 107; only 2 units of credit for students who have completed MAT 135A or STA 131A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 106 – Biotransport Phenomena (4 units)**

*Course Description:* Principles of momentum and mass transfer with applications to biomedical systems; emphasis on basic fluid transport related to blood flow, mass transfer across cell membranes, and the design and analysis of artificial human organs.

*Prerequisite(s):* BIM 020 C- or better; BIM 020L; (BIM 116 or NPB 101); PHY 009B; (MAT 022B or MAT 027B).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Biomedical Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**BIM 107 – Manufacturing Processes for BME (2 units)**

*Course Description:* Manufacturing processes and computer numerical control methods applied to the design and fabrication of biomedical devices.

*Prerequisite(s):* BIM 020 C- or better; BIM 020L C- or better.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to BME majors only.

*Credit Limitation(s):* No credit for students who have previously taken EME 050.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 108 – Biomedical Signals & Control (4 units)**

This version has ended; see updated course, below.

*Course Description:* Systems and control theory applied to biomedical engineering problems. Time-domain and frequency-domain analyses of signals and systems, convolution, Laplace and Fourier transforms, transfer function, dynamic behavior of first and second order processes, and design of control systems for biomedical applications.

*Prerequisite(s):* ENG 006; ENG 017; (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Biomedical Engineering majors only.

*Credit Limitation(s):* No credit for students who have taken EEC 150A; 2 units of credit for students who have taken EME 171.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**BIM 108 – Biomedical Signals & Control (4 units)**

*Course Description:* Systems and control theory applied to biomedical engineering problems. Time-domain and frequency-domain analyses of signals and systems, convolution, Laplace and Fourier transforms, transfer function, dynamic behavior of first and second order processes, and design of control systems for biomedical applications.

*Prerequisite(s):* ENG 006; ENG 017; (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Biomedical Engineering majors only.

*Credit Limitation(s):* No credit for students who have taken EEC 150; 2 units of credit for students who have taken EME 171.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

This course version is effective from, and including: Winter Quarter 2024.

**BIM 109 – Biomaterials (4 units)**

*Course Description:* Introduce important concepts for design, selection and application of biomaterials. Given the interdisciplinary nature of the subject, principles of polymer science, surface science, materials science and biology will be integrated into the course.

*Prerequisite(s):* BIS 002A; CHE 002C or CHE 002CH; BIM 106.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Biomedical Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL);

Visual Literacy (VL).

**BIM 110A – Biomedical Engineering Senior Design Experience (3 units)**

*Course Description:* Application of bioengineering theory and experimental analysis to a design project culminating in the design of a unique solution to a biomedical problem. Continues in BIM 110B.

*Prerequisite(s):* BIM 105; BIM 106; BIM 107; BIM 108; BIM 109; BIM 020L; (BIM 116 or NPB 101).

*Learning Activities:* Lecture/Discussion 2 hour(s), Project 6 hour(s).

*Enrollment Restriction(s):* Restricted to senior Biomedical Engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL).

**BIM 110B – Biomedical Engineering Senior Design Experience (3 units)**

*Course Description:* Application of bioengineering theory and experimental analysis to a design project culminating in the design of a unique solution to a biomedical problem. Continues in BIM 110C.

*Prerequisite(s):* BIM 110A.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project 6 hour(s).

*Enrollment Restriction(s):* Restricted to senior Biomedical Engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL).

**BIM 110C – Biomedical Engineering Senior Design Experience (3 units)**

*Course Description:* Application of bioengineering theory and experimental analysis to a design project culminating in the design of a unique solution to a biomedical problem.

*Prerequisite(s):* BIM 110B.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project 6 hour(s).

*Enrollment Restriction(s):* Restricted to senior Biomedical Engineering majors.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**BIM 111 – Biomedical Instrumentation Laboratory (6 units)**

*Course Description:* Basic biomedical signals and sensors. Topics include analog and digital records using electronic, hydrodynamic, and optical sensors, and measurements made at cellular, tissue and whole organism level.

*Prerequisite(s):* BIM 105; BIM 106; BIM 107; BIM 108; BIM 109; (ENG 100 or EEC 100); (BIM 116 or NPB 101).

*Learning Activities:* Lecture 4 hour(s), Discussion/Laboratory 4 hour(s).

*Enrollment Restriction(s):* Open to Biomedical Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## BIM 116 – Physiology for Biomedical Engineers (5 units)

This version has ended; see updated course, below.

**Course Description:** Basic human physiology for the nervous, musculoskeletal, cardiovascular, respiratory, gastrointestinal, renal, and endocrine systems. Emphasis on small group design projects and presentations in interdisciplinary topics relating biomedical engineering to medical diagnostic and therapeutic applications.

**Prerequisite(s):** BIS 002A C- or better; PHY 009C; MAT 022B recommended.

**Learning Activities:** Lecture 2 hour(s), Discussion 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIM 116 – Quantitative Physiology (5 units)

**Course Description:** Human physiology from a quantitative and engineering perspective; quantitative models to understand human physiology of the pulmonary and cardiovascular systems with an emphasis on organ transport (convection and diffusion) and biomechanics.

**Prerequisite(s):** BIS 002A C- or better; BIM 020 C- or better; MAT 022B; PHY 009C recommended.

**Learning Activities:** Lecture 3 hour(s), Discussion 2 hour(s).

**Enrollment Restriction(s):** Open to students in the Biomedical Engineering (EBIM) major only.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

This course version is effective from, and including: Winter Quarter 2024.

## BIM 117 – Modeling Strategies for Biomedical Engineering (4 units)

**Course Description:** Non-simulation strategies for modeling biomedical engineering systems, including natural and synthetic systems at the cell and molecular level. Formulating and testing hypotheses by translating real-world problems into appropriate mathematical models, translating mathematical results into real-world understanding, and gaining appreciation for how models contribute to the development cycle of biomedical engineering applications.

**Prerequisite(s):** BIS 002A C- or better; MAT 022A C- or better.

**Learning Activities:** Lecture 2 hour(s), Lecture/Discussion 2 hour(s).

**Enrollment Restriction(s):** Restricted to upper division standing.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIM 118 – Microelectromechanical Systems (4 units)

**Course Description:** Introduction to the theory and practice of micro-electromechanical systems (MEMS), including fundamentals of micro-nanofabrication, microscale sensing and actuation, self assembly, microfluidics and lab-on-a-chip. Weekly hands-on laboratory sections are emphasized on implementation and utilization of MEMS technologies.

**Prerequisite(s):** CHE 002A; ENG 017.

**Learning Activities:** Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Pass One restricted to upper division standing in Biomedical Engineering.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIM 120 – Introduction to Materials Science for Biomedical Engineers (4 units)

**Course Description:** Historical perspective on materials usage in the body. Fundamental properties of materials and key considerations needed for material selection in the context of biomedical applications. Case studies of commonly used biomaterials spanning a range of material types.

**Prerequisite(s):** (BIM 020 C- or better or ENG 105 C- or better); PHY 009C; MAT 022B or MAT 27B recommended.

**Learning Activities:** Lecture 4 hour(s).

**Enrollment Restriction(s):** Open to upper division Biomedical Engineering students only.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIM 125 – Introduction to Design & Analysis of Experiments for BME (4 units)

**Course Description:** Basic concepts and methods in design of experiments with biomedical engineering applications. Statistical concepts and methods to study strategies to design efficient industrial experiments that can improve data quality and simplify data analysis.

**Prerequisite(s):** BIM 105 or STA 100.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIM 126 – Tissue Mechanics (3 units)

**Course Description:** Structural and mechanical properties of biological tissues, including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle.

**Prerequisite(s):** EXB 103 or ENG 045 or ENG 045Y.

**Learning Activities:** Lecture 2 hour(s), Laboratory 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## BIM 140 – Protein Engineering (4 units)

**Course Description:** Introduction to protein structure and function. Modern methods for designing, producing, and characterizing novel proteins and peptides. Design strategies, computer modeling, heterologous expression, in vitro mutagenesis. Protein crystallography, spectroscopic and calorimetric methods for characterization, and other techniques.

**Prerequisite(s):** BIS 002A.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## BIM 140L – Protein Engineering Laboratory (2 units)

**Course Description:** Optional hands-on laboratory for BIM 140. Students use the engineering design process to design, build, and test a solution to a practical problem in the field of protein engineering. Problems change each offering.

**Prerequisite(s):** BIM 140 (can be concurrent); concurrent enrollment in BIM 140 required.

**Learning Activities:** Discussion 1 hour(s), Laboratory 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**BIM 141 – Cell & Tissue Mechanics (4 units)**

*Course Description:* Mechanical properties that govern blood flow in the microcirculation. Concepts in blood rheology and cell and tissue viscoelasticity, biophysical aspects of cell migration, adhesion, and motility.

*Prerequisite(s):* PHY 009B; ENG 006; ENG 035.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**BIM 142 – Principles & Practices of Biomedical Imaging (4 units)**

*Course Description:* Basic physics, engineering principles, and applications of biomedical imaging techniques including x-ray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear imaging.

*Prerequisite(s):* BIM 108 (can be concurrent); (MAT 022B or MAT 027B).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 143 – Biomolecular Systems Engineering: Synthetic Biology (4 units)**

*Course Description:* Includes analysis, design, construction and characterization of molecular systems. Process and biological parts standardization, computer aided design, gene synthesis, directed evolution, protein engineering, issues of human practice, biological safety, security, innovation, and ethics are covered.

*Prerequisite(s):* BIS 002A; (MAT 016C or MAT 017C or MAT 021C).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 143L – Synthetic Biology Laboratory (2 units)**

*Course Description:* Optional hands-on laboratory for BIM 143. Students solve a practical problem in the field of synthetic biology by designing, building, and testing an appropriate solution or product. Problems change each offering.

*Prerequisite(s):* BIM 143 (can be concurrent); concurrent enrollment in BIM 143 required.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 144 – Fundamentals of Biophotonics & Bioimaging (4 units)**

*Course Description:* Biophotonics and bioimaging, emphasizing quantitative description of light propagation & light tissue interactions. Key technologies and illustrative applications in basic research, clinical diagnostics and therapy.

*Prerequisite(s):* PHY 009B; (MAT 022B or MAT 027B); or consent of instructor. BIM 108 or equivalent helpful; Biology or Physiology course recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 145 – Immuno-Engineering (4 units)**

*Course Description:* Basic immunology and immunological tools. Survey of current immuno-therapeutic strategies. Ongoing research efforts to engineer the immune system for positive diagnostic and therapeutic outcomes.

*Prerequisite(s):* BIM 161A or BIS 102.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 151 – Mechanics of DNA (3 units)**

*Course Description:* Structural, mechanical and dynamic properties of DNA. Topics include DNA structures and their mechanical properties, in vivo topological constraints on DNA, mechanical and thermodynamic equilibria, DNA dynamics, and their roles in normal and pathological biological processes.

*Prerequisite(s):* BIS 002A; MAT 022B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL).

**BIM 152 – Molecular Control of Biosystems (4 units)**

*Course Description:* Fundamentals of molecular biomedicine covering state-of-the-art methods for quantitative understanding of gene regulation and signal transduction networks at different levels of organization in health and disease. Topics include classic genetic systems, synthetic circuits, networks disrupted in disease and cancer.

*Prerequisite(s):* BIS 002A; PHY 009B; (MAT 022B or MAT 027B).

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

**BIM 154 – Computational Genomics (4 units)**

*Course Description:* Fundamental computational and probabilistic modeling techniques underlying analytical approaches to recent problems in functional genomics and molecular biology; DNA sequencing technologies; sequencing-based genomic assays; genomics and molecular biology lab techniques; gene expression quantification; nucleic acid structure; statistical inference and parameter estimation; resampling methods; simulations of genomic big data sets.

*Prerequisite(s):* ENG 006 C- or better; MAT 021D C- or better; (MAT 022A C- or better or MAT 027A C- or better); BIM 105 C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 161A – Biomolecular Engineering (4 units)**

*Course Description:* Introduction to the basic concepts and techniques of biomolecular engineering such as recombinant DNA technology, protein engineering, and molecular diagnostics.

*Prerequisite(s):* BIS 002A; CHE 008B or CHE 118B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Credit Limitation(s):* Only 3 units of credit for students who have taken BIM 161S.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **BIM 161L – Biomolecular Engineering Laboratory (3 units)**

*Course Description:* Introduction to the basic techniques in biomolecular engineering. Lectures, laboratory, and discussion sessions will cover basic techniques in DNA cloning, bacterial cell culture, gene regulation, protein expression, and data analysis.

*Prerequisite(s):* BIM 161A or BIS 101.

*Learning Activities:* Laboratory 4.50 hour(s), Lecture/Discussion 1.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **BIM 162 – Introduction to the Biophysics of Molecules & Cells (4 units)**

*Course Description:* Introduction to fundamental physical mechanisms governing structure and function of bio-macromolecules. Emphasis on a quantitative understanding of the nano- to microscale biomechanics of interactions between and within individual molecules, as well as of their assemblies, in particular membranes.

*Prerequisite(s):* PHY 009C C- or better; (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **BIM 163 – Bioelectricity, Biomechanics, & Signaling Systems (4 units)**

*Course Description:* Fundamentals of bioelectricity in cells, the calcium signaling system, and mechanical force generation in muscle.

Combination of lecture and projects to promote learning of important concepts in hands-on projects using neurons and muscle as microcosms.

*Prerequisite(s):* (BIM 116 or NPB 101); (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **BIM 167 – Biomedical Fluid Mechanics (4 units)**

*Course Description:* Theories of fluid mechanics, including Navier Stokes Equation and Conservation Laws, will be presented to understand dynamics of human circulatory systems. Fluid dynamics will be analyzed using partial differential equations.

*Prerequisite(s):* BIM 106 C- or better; NPB 101 or BIM 116.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **BIM 170 – Aspects of Medical Device Design & Manufacturing (2 units)**

*Course Description:* Survey of medical device design & impact on manufacturing operations. Introduction to medical device design process & product lifecycle. Principles of Design for Manufacturability, Design for Lean Manufacturing, and quality management systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Open to upper division Biomedical Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **BIM 171 – Clinical Applications for Biomedical Device Design (4 units)**

*Course Description:* Clinical applications for biomedical devices with emphasis in the pathophysiology of common diseases as it relates to the biodesign process, biosensors principles, in vitro diagnostics, needs assessment, and regulatory considerations.

*Prerequisite(s):* BIM 116 C- or better or NPB 101 C- or better; NPB 101 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Biomedical Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **BIM 172 – Introduction to Neuroengineering Lab (2 units)**

*Course Description:* Basics of electroencephalography (EEG). Recording EEG signals from the brain. Machine learning tools for brain-computer interface (BCI) techniques. The power of neural signals to improve health outcomes.

*Prerequisite(s):* BIM 105; (ENG 100 or EEC 100).

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **BIM 173 – Cell & Tissue Engineering (4 units)**

*Course Description:* Engineering principles to direct cell and tissue behavior and formation. Cell sourcing, controlled delivery of macromolecules, transport within and around biomaterials, bioreactor design, tissue design criteria and outcomes assessment.

*Prerequisite(s):* BIM 106 C- or better; BIM 109 C- or better.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Writing Experience (WE).

## **BIM 174 – Microcontroller Applications Lab (2 units)**

*Course Description:* Hands-on design module to introduce microcontroller platforms, e.g., Arduino; programming microcontroller development board, use of external programs to support development of controlled systems, design of simple control systems.

*Prerequisite(s):* ENG 017 C- or better.

*Learning Activities:* Laboratory 3 hour(s), Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division BME students.

*Credit Limitation(s):* No credit for students who have previously taken EEC 010.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 176 – Microfluidic Lab (2 units)**

*Course Description:* Theory and practice of microfluidic and lab-on-a-chip (LOC) systems. Microfluidic theories, microfluidic functions and operations, microfluidic sensing, and organ-on-a-chip development. Laboratory sections emphasize implementation and utilization of modern microfluidic devices, interfacial phenomena, and digital and droplet microfluidics.

*Prerequisite(s):* CHE 002A; ENG 017.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Upper division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 177 – Introduction to Rapid Prototyping for BME (2 units)**

*Course Description:* Introduction to additive manufacturing techniques (3D printing), laser cutting, and other rapid prototyping technologies, their strengths and limitations. Emphasis on workflows and design considerations including features that enhance function, manufacturability, and common pitfalls. Application to problems in biology and medicine, including medical model development.

*Prerequisite(s):* BIM 110A; BIM 020L.

*Learning Activities:* Laboratory 2 hour(s); Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Biomedical Engineering seniors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 180 – Clinical Needs in Healthcare Settings (5 units)**

*Course Description:* Unique hands-on experience that brings students into clinical arenas where biomedical technologies are deployed, such as surgical suites and operating rooms. Direct interaction with surgeons, radiologists and other medical providers on how engineering concepts and techniques can be applied. Development of skills necessary to identify unmet clinical needs, including observations in workflow and communication skills.

*Prerequisite(s):* Consent of instructor; complete all BME lower division coursework; must apply and be selected to the BME Quarter at Aggie Square program.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Biomedical Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 189A – Topics in Biomedical Engineering: Cellular & Molecular Engineering (1-5 units)**

*Course Description:* Topics in Biomedical Engineering: Cellular & Molecular Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 189B – Topics in Biomedical Engineering: Biomedical Imaging (1-5 units)**

*Course Description:* Topics in Biomedical Engineering: Biomedical Imaging.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 189C – Topics in Biomedical Engineering: Biomedical Engineering (1-5 units)**

*Course Description:* Topics in Biomedical Engineering: Biomedical Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIM 190A – Upper Division Seminar in Biomedical Engineering (1 unit)**

*Course Description:* In depth examination of research topics in a small group setting. Question and answer session with faculty members.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**BIM 192 – Internship in Biomedical Engineering (1-12 units)**

*Course Description:* Supervised work experience in the Biomedical Engineering field.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Enrollment Restriction(s):* Restricted to upper division majors.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**BIM 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when content differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**BIM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **BIM 201 – Scientific Communication for Biomedical Engineers (1 unit)**

*Course Description:* Designed to improve the written and oral communication skills of first-year graduate students through writing fellowship proposals, analyzing data, and critically reviewing research papers.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **BIM 202 – Cell & Molecular Biology for Engineers (4 units)**

*Course Description:* Preparation for research and critical review in the field of cell and molecular biology for biomedical or applied science engineers. Emphasis on biophysical and engineering concepts intrinsic to specific topics including receptor-ligand dynamics in cell signaling and function, cell motility, DNA replication and RNA processing, cellular energetics and protein sorting. Modern topics in bioinformatics and proteomics.

*Prerequisite(s):* BIS 104 or MCB 121.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 204 – Physiology for Bioengineers (5 units)**

*Course Description:* Basic human physiology of the nervous, muscular, cardiovascular, respiratory, and renal systems and their interactions; Emphasis on the physical and engineering principles governing these systems, including control and transport processes, fluid dynamics, and electrochemistry.

*Prerequisite(s):* BIS 001A; or equivalent; graduate standing or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 208Y – Towards Well-Being (2 units)**

*Course Description:* Mental health issues, key elements in collaboration and team science, and select coping skills to deal with common graduate school stressors. Self-efficacy, resilience, problem-solving, conflict resolution, self-compassion, and role of psychosocial factors in well-being. Wellness topics in art therapy, interaction with nature, soothing sound/music, cooking, and walking. Mind-body activities. Extensive small group discussion.

*Learning Activities:* Web Electronic Discussion 1 hour(s); Lecture/Discussion 1 hour(s).

*Grade Mode:* S/U only.

## **BIM 209 – Scientific Integrity for Biomedical Engineers (2 units)**

*Course Description:* Scientific integrity and ethics for biomedical engineers, with emphasis and discussion on mentoring, authorship and peer review, use of humans and animals in biomedical research, conflict of interest, intellectual property, genetic technology and scientific record keeping.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Biomedical Engineering majors only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **BIM 210 – Introduction to Biomaterials (4 units)**

*Course Description:* Mechanical and atomic properties of metallic, ceramic, and polymeric implant materials of metallic, ceramic, and polymeric implant materials; corrosion, degradation, and failure of implants; inflammation, wound and fracture healing, blood coagulation; properties of bones, joints, and blood vessels; biocompatibility of orthopaedic and cardiovascular materials.

*Prerequisite(s):* ENG 045 or ENG 045Y; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 211 – Design of Polymeric Biomaterials & Biological Interfaces (4 units)**

*Course Description:* Design, selection and application of polymeric biomaterials. Integration of the principles of polymer science, surface science, materials science and biology.

*Prerequisite(s):* ENG 045 or ENG 045Y; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to upper division undergraduates or graduate students.

*Grade Mode:* Letter.

## **BIM 212 – Biomedical Heat & Mass Transport Processes (4 units)**

*Course Description:* Application of principles of heat and mass transfer to biomedical systems related to heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs.

*Prerequisite(s):* EME 165; EBS 125; ECH 153; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* MAE 212.

*Grade Mode:* Letter.

## **BIM 213 – Principles & Applications of Biological Sensors (4 units)**

*Course Description:* Biological sensors based on principles of electrochemical, optical and affinity detection. Methods for integration of sensing elements (e.g. enzymes) into biosensors and miniaturization of biosensors.

*Prerequisite(s):* CHE 002C.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 214 – Continuum Biomechanics (4 units)**

*Course Description:* Continuum mechanics relevant to bioengineering. Concepts in tensor calculus, kinematics, stress and strain, and constitutive theories of continua. Selected topics in bone, articular cartilage, blood/circulation, and cell biomechanics will illustrate the derivation of appropriate continuum mechanics theories.

*Prerequisite(s):* BIM 141; ENG 102; or equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 216 – Advanced topics in Cellular Engineering (4 units)**

*Course Description:* Advanced research strategies and technologies used in the study of immune function and inflammation. Static and dynamic measurements of stress, strain, and molecular scale forces in blood and vascular cells, as well as genetic approaches to the study of disease.

*Prerequisite(s):* BIM 214; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 217 – Mechanobiology in Health & Disease (4 units)**

*Course Description:* Principles by which biomechanical forces affect cell and tissue function to impact human health and disease. Emphasis on cardiovascular system: structure and function, biofluid mechanics and mechanotransduction, disease mechanisms and research methods. Cartilage, bone and other systems; current topics discussed.

*Prerequisite(s):* BIM 106; BIS 101; NPB 101; or equivalents.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 221 – Drug Delivery Systems (4 units)**

*Course Description:* Fundamental engineering and biotechnology principles critical for the formulation and delivery of therapeutic agents, including peptide/protein drugs and small molecules.

*Prerequisite(s):* BIM 204 recommended but not required.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 222 – Cytoskeletal Mechanics (4 units)**

*Course Description:* Current topics in cytoskeletal mechanics including physical properties of the cytoskeleton and motor proteins, molecular force sensor and generator, cytoskeletal regulation of cell motility and adhesion.

*Prerequisite(s):* BIM 202.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 223 – Multibody Dynamics (4 units)**

*Course Description:* Coupled rigid-body kinematics/dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomicity; generalized speeds; partial velocities; mass; inertia tensor/theorems; angular momentum; generalized forces; comparing Newton/Euler, Lagrange's, Kane's methods; computer-aided equation derivation; orientation; Euler; Rodrigues parameters.

*Prerequisite(s):* ENG 102.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* MAE 223.

*Grade Mode:* Letter.

## **BIM 225 – Spatial Kinematics & Robotics (4 units)**

*Course Description:* Spatial kinematics, screw theory, spatial mechanisms analysis and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, real-time architecture and software implementation.

*Prerequisite(s):* BIM 222; C Language.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* MAE 225.

*Grade Mode:* Letter.

## **BIM 228 – Skeletal Muscle Mechanics: Form, Function, Adaptability (4 units)**

*Course Description:* Basic structure and function of skeletal muscle examined at the microscopic and macroscopic level. Muscle adaptation in response to aging, disease, injury, exercise, and disuse. Analytic models of muscle function are discussed.

*Prerequisite(s):* ENG 035; (ENG 045 or ENG 045Y); MAT 021D; basic background in biology, physiology, and engineering; NPB 101 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 232 – Skeletal Tissue Mechanics (3 units)**

*Course Description:* Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disuse.

*Prerequisite(s):* Engineering 104B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Cross Listing:* MAE 232.

*Grade Mode:* Letter.

## **BIM 233 – Soft Tissue Mechanics (4 units)**

*Course Description:* Presentation of structure and function of musculoskeletal soft tissues: cartilage, tendon, ligament, meniscus, and intervertebral disc. Instruction in engineering principals governing the mechanical behavior of these tissues: viscoelasticity, quasilinear viscoelasticity, and biphasic theory.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 239 – Advanced Finite Elements & Optimization (4 units)**

*Course Description:* Introduction to advanced finite elements and design optimization methods, with application to modeling of complex mechanical, aerospace and biomedical systems. Application of states of the art in finite elements in optimum design of components under realistic loading conditions and constraints.

*Prerequisite(s):* ENG 180 or MAT 128C or EAD 115.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* MAE 239.

*Grade Mode:* Letter.

## **BIM 240 – Computational Methods in Nonlinear Mechanics (4 units)**

*Course Description:* Deformation of solids and the motion of fluids treated with state-of-the-art computational methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronautical, and biological systems.

*Prerequisite(s):* MAT 128B or ENG 180 or EAD 115.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* MAE 240.

*Grade Mode:* Letter.

## **BIM 241 – Introduction to Magnetic Resonance Imaging (4 units)**

*Course Description:* Basic hardware, acquisition, and reconstruction of MRI. Basic and advanced pulse sequences, MRI sequence design and sampling requirements, and image reconstruction strategies. Clinical applications of MRI.

*Prerequisite(s):* BIM 108; PHY 009D.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **BIM 242 – Introduction to Biomedical Imaging (4 units)**

*Course Description:* Basic physics and engineering principles of image science. Emphasis on ionizing and nonionizing radiation production and interactions with the body and detectors. Major imaging systems: radiography, computed tomography, magnetic resonance, ultrasound, and optical microscopy.

*Prerequisite(s):* PHY 009D; EEC 106 or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 243 – Radiation Detectors for Biomedical Applications (4 units)**

*Course Description:* Radiation detectors and sensors used for biomedical applications. Emphasis on radiation interactions, detection, measurement and use of radiation sensors for imaging. Operating principles of gas, semiconductor, and scintillation detectors.

*Prerequisite(s):* PHY 009D; MAT 021D; MAT 022B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 246 – Magnetic Resonance Technology (3 units)**

*Course Description:* Covers MRI technology at an advanced level with emphasis on mathematical descriptions and problem solving. Topics include spin dynamics, signal generation, image reconstruction, pulse sequences, biophysical basis of T1, T2, RF, gradient coil design, signal to noise, image artifacts.

*Prerequisite(s):* PHY 009D; MAT 022B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **BIM 248 – Multi-modal Neuroimaging Techniques (4 units)**

*Course Description:* Neuroimaging techniques including magnetic resonance imaging (MRI) and positron emission tomography (PET) and their multi-modal applications in neuroscience and neurological disorders. Imaging methods and brain biomarkers. Software and coding experience to analyze imaging datasets of brain structure, function, and pathology.

*Prerequisite(s):* BIM 108; BIM 142.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **BIM 251 – Medical Image Analysis (4 units)**

*Course Description:* Techniques for assessing the performance of medical imaging systems. Principles of digital image formation and processing. Measurements that summarize diagnostic image quality and the performance of human observers viewing those images. Definition of ideal observer and other mathematical observers that may be used to predict performance from system design features. Obtain hands-on experience in computer vision by completing individual Matlab assignments that they select from topics in the course.

*Prerequisite(s):* EEC 106.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 252 – Computational Methods in Biomedical Imaging (4 units)**

*Course Description:* Analytic tomographic reconstruction from projections in 2D and 3D; model-based image reconstruction methods; maximum likelihood and Bayesian methods; applications to CT, PET, and SPECT.

*Prerequisite(s):* (BIM 105 or STA 120); (BIM 108 or EEC 150A).

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* EEC 205.

*Grade Mode:* Letter.

## **BIM 254 – Statistical Methods in Genomics (4 units)**

*Course Description:* Statistical approaches to problems in computational molecular biology and genomics; formulation of questions via probabilistic modeling, statistical inference methods for parameter estimation, and interpretation of results to address biological questions; application to high-impact problems in functional genomics and molecular biology.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 255 – Nanoscale Imaging for Molecular Medicine (3 units)**

*Course Description:* Current and emerging technologies to visualize biological structures and processes at size scales = 100 nanometers – and their application towards the advancement of molecular medicine. Technologies include superresolution optical microscopy, electron microscopy and tomography. Emphasis on quantitative imaging.

*Prerequisite(s):* BIM 202 highly recommended; graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* BPH 255.

*Grade Mode:* Letter.

## **BIM 257 – Fundamentals of Tissue Optics & Biomedical Applications (5 units)**

*Course Description:* Fundamentals of optical properties of tissue. Range of optical technologies and their applications to tissue characterization and diagnostics.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **BIM 258 – Advanced Biophotonics & Bioimaging (4 units)**

*Course Description:* Quantitative basis for biophotonics and bioimaging, with an emphasis on the physical and mathematical description of optics, light propagation, and light-tissue interactions. Advantages and limitations of various optical imaging and sensing technologies. Illustrative applications in diagnostics, basic research, and therapy.

*Prerequisite(s):* BIM 108; PHY 108; or an equivalent undergraduate optics course to PHY 108.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 260 – Techniques in Molecular & Cellular Mechanics (4 units)**

*Course Description:* Physical techniques used to visualize and manipulate mechanical processes in cells. Biophysical techniques used to characterize cellular and molecular mechanics, with a particular emphasis on single molecule technologies.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 262 – Cell & Molecular Biophysics for Bioengineers (4 units)**

*Course Description:* Introduction to fundamental mechanisms governing the structure, function, and assembly of bio-macromolecules. Emphasis is on a quantitative understanding of the nano-to-microscale interactions between and within individual molecules, as well as of their assemblies, in particular membranes.

*Prerequisite(s):* BIM 284; or equivalent; graduate standing; undergraduate students by consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIM 162.

*Cross Listing:* ECH 269.

*Grade Mode:* Letter.

## **BIM 263 – Optical Microscopy Hands-On (4 units)**

*Course Description:* Informed use of an optical research microscope. Analysis of digitized images. Optical image formation and its limitations. Laboratories on modern microscope usage and videomicroscopy techniques including optimization of recorded images and quantification of microscopic distances and displacements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

## **BIM 264 – Synthetic & Systems Engineering of Cells (4 units)**

*Course Description:* Introduction to the design, engineering, and control of biological systems for biotechnological applications and biological studies.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 265 – NanoEngineering (4 units)**

*Course Description:* Inorganic and organic nanomaterials and their technological applications in medicine, imaging, energy harvesting, and computing. Fundamentals and applications of methods to fabricate, image, and analyze materials and devices that are structured at the nanometer scale. Intermolecular forces between atoms and molecules and how these forces give rise to exploitable phenomena at the nanoscale.

*Prerequisite(s):* BIM 109 or BIM 120.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 272 – Tissue Engineering (3 units)**

*Course Description:* Based on morphogenetic signals, responding stem cells and extracellular matrix scaffolding. Design and development of tissues for functional restoration of various organs damaged/lost due to cancer, disease and trauma. Fundamentals of morphogenetic signals, responding stem cells and extracellular matrix scaffolding.

*Prerequisite(s):* BIS 104 or MCB 121.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **BIM 273 – Integrative Tissue Engineering & Technologies (4 units)**

*Course Description:* Engineering principles to direct cell and tissue behavior and formation. Contents include controlled delivery of macromolecules, transport within and around biomaterials, examination of mechanical forces of engineered constructs, and current experimental techniques used in the field.

*Prerequisite(s):* BIM 202; BIM 204; or equivalent; strongly encourage completion of BIM 272 although not a prerequisite.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

## **BIM 280 – Neural Signals & Machine Learning Tools for Neural Data (4 units)**

*Course Description:* Select and use machine learning tools to analyze neural data. Knowledge of the definitions and fundamental principles of data analytics related to neural data including field potentials (EEG, iEEG, local field potentials, EMG) and single neuron or muscle action potentials. Neural decoding/encoding, how to apply classifiers, regression and dimension reduction techniques, factor analysis and dynamic modeling.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **BIM 281 – Acquisition & Analysis of Biomedical Signals (4 units)**

*Course Description:* Basic concepts of digital signal recording and analysis; sampling; empirical modeling; Fourier analysis, random processes, spectral analysis, and correlation applied to biomedical signals.

*Prerequisite(s):* ENG 100; STA 130A.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division engineering.

*Grade Mode:* Letter.

## **BIM 283 – Advanced Design of Experiments for Biomedical Engineers (4 units)**

*Course Description:* Provides biomedical engineering graduate students with the tools to properly design experiments, collect and analyze data, and extract, communicate and act on information generated.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Credit Limitation(s):* Not open for credit to students who have taken EBS 265.

*Grade Mode:* Letter.

## **BIM 284 – Mathematical Methods for Biomedical Engineers (4 units)**

*Course Description:* Theoretical applications of linear systems, ordinary and partial differential equations, and probability theory and random processes that describe biological systems and instruments that measure them. Students will be introduced to numerical solution techniques in MATLAB.

*Prerequisite(s):* MAT 022B; STA 130A; or consent of instructor; upper division biomedical engineering majors, and graduate students in sciences and engineering; priority given to Biomedical Engineering graduate students.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 286 – Nuclear Imaging in Medicine & Biology (4 units)**

*Course Description:* Radioactive decay, interaction of radiation with matter, radionuclide production, radiation detection, digital autoradiography, gamma camera imaging, single photon emission computed tomography, positron emission tomography and applications of these techniques in biology and medicine.

*Prerequisite(s):* BIM 243; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **BIM 287 – Concepts in Molecular Imaging (4 units)**

*Course Description:* Current techniques and tools for molecular imaging. Emphasis on learning to apply principles from the physical sciences to imaging problems in medicine and biology.

*Prerequisite(s):* CHE 002C; MAT 021C; PHY 009D; and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 2 hour(s), Term Paper.

*Grade Mode:* Letter.

## **BIM 288 – Living Matter: Physical Biology of the Cell (3 units)**

*Course Description:* Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to any student possessing general background in any disciplines of physical or biological sciences and engineering.

*Cross Listing:* EMS 288, BPH 288.

*Grade Mode:* Letter.

## **BIM 289A – Selected Topics in Biomedical Engineering: Cellular & Molecular Systems Engineering (1-5 units)**

*Course Description:* Selected topics in Cellular and Molecular Systems Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **BIM 289B – Selected Topics in Biomedical Engineering: Biomedical Imaging (1-5 units)**

*Course Description:* Selected topics in Biomedical Imaging.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **BIM 289C – Selected Topics in Biomedical Engineering: Computational Bioengineering (1-5 units)**

*Course Description:* Selected topics in Computational Bioengineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **BIM 289D – Selected Topics in Biomedical Engineering: Cell & Tissue Biomechanics (1-5 units)**

*Course Description:* Selected topics in Cell and Tissue Biomechanics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **BIM 289E – Selected Topics in Biomedical Engineering: Analysis of Human Movement (1-5 units)**

*Course Description:* Selected topics in Analysis of Human Movement.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **BIM 290 – Seminar (1 unit)**

*Course Description:* Seminar in biomedical engineering.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **BIM 290C – Graduate Research Conference (1 unit)**

*Course Description:* Individual and/or group conference on problems, progress, and techniques in biomedical engineering research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BIM 295 – Literature in Neuroengineering (2 units)**

*Course Description:* Critical presentation and discussion of current literature in neuroengineering.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Repeat Credit:* May be repeated.

*Cross Listing:* NSC 295.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BIM 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study in Biomedical Engineering.

*Learning Activities:* Variable 1-5 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the Biomedical Engineering Graduate Group, or consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BIM 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BIM 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Biophotonics (BPT)**

College of Engineering

**BPT 201 – Current Topics in Biophotonics & Bioimaging Research (1 unit)**

*Course Description:* Designed to help graduate students develop and maintain familiarity with the current and past literature in the field of Biophotonics and Bioimaging research and related areas.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 4 time(s) when subject differs.

*Grade Mode:* Letter.

**BPT 290 – Biophotonics Seminar (1 unit)**

*Course Description:* Presentation of current research in the area of biophotonics by experts in the field, followed by group discussions.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* S/U only.

**Biophysics (BPH)**

College of Agricultural & Environmental Sciences

**BPH 200A – Current Techniques in Biophysics (3 units)**

*Course Description:* Current Techniques in Biophysics. Topics include mathematical methods, modeling, mass spectrometry, stochastic process, scanning probe microscopy, electron microscopy, fluorescence, membrane diffusion/mechanics, and single particle tracking.

*Prerequisite(s):* BIS 102; CHE 110A; or equivalents.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BPH 200B – Current Techniques in Biophysics (3 units)**

*Course Description:* Current Techniques in Biophysics. Topics include protein folding, membrane structure and dynamics, Raman spectroscopy, fluorescence resonance energy transfer, time resolved fluorescence, quantum dot, fluorescence imaging, esr, high resolution nmr, and in vivo nmr.

*Prerequisite(s):* CHE 110A; BIS 102; or equivalent of BIS 102.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BPH 200LA – Biophysics Laboratory (3 units)**

*Course Description:* One five-week laboratory assignment in the research laboratory of a Biophysics Graduate Group faculty member. Individual research problems with emphasis on methodological/procedural experience and experimental design.

*Prerequisite(s):* BPH 200 (can be concurrent).

*Learning Activities:* Laboratory 18 hour(s).

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Letter.

**BPH 200LB – Biophysics Laboratory (6 units)**

*Course Description:* Two five-week laboratory assignments in the research laboratories of Biophysics Graduate Group faculty members. Individual research problems with emphasis on methodological/procedural experience and experimental design.

*Prerequisite(s):* BPH 200 (can be concurrent).

*Learning Activities:* Laboratory.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**BPH 231 – Biological Nuclear Magnetic Resonance (3 units)**

*Course Description:* Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/imaging, metabolic regulation, and cellular bioenergetics.

*Prerequisite(s):* MCB 221A; or consent of instructor, or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* BCM 231.

*Grade Mode:* Letter.

**BPH 241 – Membrane Biology (3 units)**

*Course Description:* Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomembranes to their roles in cell biology and physiology.

*Prerequisite(s):* BIS 102; BIS 103; BIS 104; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## BPH 255 – Nanoscale Imaging for Molecular Medicine (3 units)

**Course Description:** Current and emerging technologies to visualize biological structures and processes at size scales = 100 nanometers – and their application towards the advancement of molecular medicine. Technologies include superresolution optical microscopy electron microscopy and tomography. Emphasis on quantitative imaging.

**Prerequisite(s):** BIM 202 highly recommended; graduate standing.

**Learning Activities:** Lecture/Discussion 3 hour(s).

**Cross Listing:** BIM 255.

**Grade Mode:** Letter.

## BPH 271 – Optical Methods in Biophysics (4 units)

**Course Description:** Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nucleic acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques.

**Prerequisite(s):** BIS 102; EAD 108B; CHE 110A; or equivalents.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

**Grade Mode:** Letter.

## BPH 288 – Living Matter: Physical Biology of the Cell (3 units)

**Course Description:** Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability.

**Learning Activities:** Lecture 3 hour(s).

**Enrollment Restriction(s):** Open to any student possessing general background in any disciplines of physical or biological sciences and engineering.

**Cross Listing:** BIM 288, EMS 288.

**Grade Mode:** Letter.

## BPH 290 – Biophysics Seminar (1 unit)

**Course Description:** Presentation of current research by experts in biophysics.

**Prerequisite(s):** Graduate standing or consent of instructor.

**Learning Activities:** Seminar 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## BPH 290C – Research Conference in Biophysics (1 unit)

**Course Description:** Presentation and discussion of faculty and graduate-student research in biophysics.

**Prerequisite(s):** BPH 299 (can be concurrent); graduate standing in Biophysics and/or consent of instructor.

**Learning Activities:** Discussion 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## BPH 293 – Introduction to Research Topics (1 unit)

**Course Description:** Presentation of current research activities of the Biophysics Graduate Group faculty. Facilitation of students in developing their research interest, and promoting collegial interactions.

**Learning Activities:** Seminar 1 hour(s).

**Repeat Credit:** May be repeated 1 time(s) when topics differ.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## BPH 298 – Group Study (1-5 units)

**Course Description:** Group study.

**Learning Activities:** Variable 1-5 hour(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

## BPH 299 – Research (1-12 units)

**Course Description:** Research.

**Learning Activities:** Variable 3-36 hour(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

# Biostatistics (BST)

## Graduate Studies

### BST 222 – Biostatistics: Survival Analysis (4 units)

**Course Description:** Incomplete data; life tables; nonparametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics.

**Prerequisite(s):** STA 131C.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

**Cross Listing:** STA 222.

**Grade Mode:** Letter.

### BST 223 – Biostatistics: Generalized Linear Models (4 units)

**Course Description:** Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs.

**Prerequisite(s):** STA 131C.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

**Cross Listing:** STA 223.

**Grade Mode:** Letter.

### BST 224 – Analysis of Longitudinal Data (4 units)

**Course Description:** Standard and advanced methodology, theory, algorithms, and applications relevant for analysis of repeated measurements and longitudinal data in biostatistical and statistical settings.

**Prerequisite(s):** (BST 222 or STA 222); (BST 223 or STA 223); STA 232B; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

**Cross Listing:** STA 224.

**Grade Mode:** Letter.

### BST 225 – Clinical Trials (4 units)

**Course Description:** Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials.

**Prerequisite(s):** BST 223 or STA 223; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

**Cross Listing:** STA 225.

**Grade Mode:** Letter.

## **BST 226 – Statistical Methods for Bioinformatics (4 units)**

*Course Description:* Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of -omics data.

*Prerequisite(s):* BST 131C or consent of instructor; data analysis experience recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 226.

*Grade Mode:* Letter.

## **BST 227 – Machine Learning in Genomics (4 units)**

*Course Description:* Emerging problems in molecular biology and current machine learning-based solutions to those problem. How deep learning, kernel methods, graphical models, feature selection, non-parametric models and other techniques can be applied to application areas such as gene editing, gene network inference and analysis, chromatin state inference, cancer genomics and single cell genomics.

*Prerequisite(s):* STA 208 or ECS 171; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

## **BST 252 – Advanced Topics in Biostatistics (4 units)**

*Course Description:* Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics.

*Prerequisite(s):* BST 222; BST 223.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Repeat Credit:* May be repeated when topic differs with consent of advisor.

*Cross Listing:* STA 252.

*Grade Mode:* Letter.

## **BST 290 – Seminar in Biostatistics (1 unit)**

*Course Description:* Seminar on advanced topics in the field of biostatistics. Presented by members of the Biostatistics Graduate Group and other guest speakers.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Repeat Credit:* May be repeated 12 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **BST 298 – Directed Group Study (1-5 units)**

*Course Description:* Special topics in Biostatistics appropriate for group study at the graduate level.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **BST 299 – Special Study for Biostat Graduate Students (1-12 units)**

*Course Description:* Special topics in Biostatistics appropriate for directed individual study on advanced topics not otherwise covered in the Biostatistics curriculum.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **BST 299D – Dissertation Research (1-12 units)**

*Course Description:* Research in Biostatistics under the supervision of major professor.

*Prerequisite(s):* Consent of instructor; advancement to Candidacy for Ph.D.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Biotechnology (BIT)**

College of Agricultural & Environmental Sciences

## **BIT 001Y – Introduction to Biotechnology (4 units)**

*Course Description:* Principles and technologies of biotechnology as applied to agriculture, the environment, and medicine. Business plans and presentation pitches for new biotechnology products. Bioinformatics approaches exploring genomic databases and DNA manipulations in silica.

*Learning Activities:* Lecture 2 hour(s), Web Virtual Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **BIT 091 – Undergraduate Seminars in Biotechnology (1 unit)**

*Course Description:* Undergraduate oriented seminar series focused on biotechnology research and product development. Speakers from campus and the private sectors discuss ongoing research, product development and biotechnology careers.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Pass/No Pass only.

## **BIT 092 – Internship in Biotechnology (1-12 units)**

*Course Description:* Work experience on or off campus in subject area pertaining to biotechnology or in a business, industry or agency associated with biotechnology. Internship supervised by faculty member in the animal or plant sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **BIT 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **BIT 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**BIT 150 – Applied Bioinformatics (4 units)**

*Course Description:* Concepts and programs needed to apply bioinformatics in biotechnology research. Sequence analysis and annotation and use of plant and animal databases for students in biological and agricultural sciences.

*Prerequisite(s):* BIS 101; (ECS 010 or ECS 015 or PLS 021 or PLS 021V); (PLS 120 or STA 013 or STA 013Y or STA 100); or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Credit Limitation(s):* Only 2 units of credit for students who have completed ECS 124.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**BIT 160 – Principles of Plant Biotechnology (3 units)**

*Course Description:* Principles and concepts of plant biotechnology including recombinant DNA technology, molecular biology, genomics, cell and tissue culture, gene transfer and crop improvement strategies using transgenic crops.

*Prerequisite(s):* (BIS 001A or BIS 002A); (BIS 101 or PLS 152).

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 160. (Former PLB 160.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIT 161A – Genetics & Biotechnology Laboratory (6 units)**

*Course Description:* Techniques of genetic analysis at the molecular level including recombinant DNA, gene mapping and basic computational biology.

*Prerequisite(s):* PLS 152 or BIS 101; and consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 9 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 161A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**BIT 161B – Plant Genetics & Biotechnology Laboratory (4 units)**

*Course Description:* Advanced techniques of genetic analysis at the molecular and cellular levels, including transformation, gene expression and analysis of transgenic plants.

*Prerequisite(s):* PLS 152 or BIS 101; and consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Laboratory 8 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken PLB 161B. (Former PLB 161B.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**BIT 171 – Professionalism & Ethics in Genomics & Biotechnology (3 units)**

*Course Description:* Real and hypothetical case studies to illustrate ethical issues in genomics and biotechnology. Training and practice in difficult ethical situations and evaluating personal and social consequences.

*Prerequisite(s):* Upper division standing in a natural science major.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**BIT 188 – Undergraduate Research Proposal (3 units)**

*Course Description:* Preparation and review of a scientific proposal.

Problem definition, identification of objectives, literature survey, hypothesis generation, design of experiments, data analysis planning, proposal outline and preparation.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* PLS 188.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**BIT 189L – Laboratory Research in Genomics & Biotechnology (2-5 units)**

*Course Description:* Formulating experimental approaches to current questions in biotechnology; performance of proposed experiments.

*Prerequisite(s):* BIT 188; and consent of instructor.

*Learning Activities:* Laboratory 3-12 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**BIT 192 – Internship in Biotechnology (1-12 units)**

*Course Description:* Work experience on or off campus in a subject area pertaining to biotechnology or in a business, industry or agency associated with biotechnology. Internship supervised by faculty member in the animal or plant sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**BIT 194H – Honors Thesis in Biotechnology (1-2 units)**

*Course Description:* Independent study of selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis.

*Prerequisite(s):* BIT 188; BIT 189L; consent of instructor; senior standing in Biotechnology with 3.250 GPA or higher.

*Learning Activities:* Independent Study 3-6 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**BIT 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**BIT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**Business Analytics (BAX)**

Graduate School of Management

**BAX 400 – Foundations of Analytics (4 units)**

*Course Description:* Focuses on teaching the fundamentals of R and SQL. Introduces the topic of numerical optimization, and review the concepts of linear algebra and calculus.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 401 – Information, Insight & Impact (3 units)**

*Course Description:* Introduction to the process of analyzing raw data to gain profitable business insight. Applications selected across organizational functions include prediction, process improvement, and general operational decision-making.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 402 – Organizational Issues in Implementing Analytics (3 units)**

*Course Description:* Review the evolution of analytics in business, how to assemble and manage analytics teams, and the decision life-cycle. Emphasis on structuring communications to improve buy-in from peers and non-quantitatively-inclined colleagues.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 403 – Organizational Effectiveness Workshop (2 units)**

*Course Description:* Examine leadership, communication, and project management within the business, legal and societal contexts in which analytics is applied. Emphasis on privacy, data security, responsibility, and ethics.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**BAX 411 – Problem Structuring (2 units)**

*Course Description:* Synthesize data-rich business challenges using analytic frameworks and techniques for modeling business problems. Emphasis on modeling uncertainty, optimizing multiple criteria, and building consensus.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**BAX 421 – Data Management (2 units)**

*Course Description:* Introduction to the extraction, assembly, storage and organization of data in IT systems.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**BAX 422 – Data Design & Representation (2 units)**

*Course Description:* Introduction to business applications involving standard, streaming, and network data. Emphasis on scalable technologies for processing and analyzing big data for diverse applications.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**BAX 423 – Big Data (3 units)**

*Course Description:* Learn computational reasoning about data representations by mapping conceptual data models to relational structures and analyzing database architectures and design trade-offs.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 424 – Analytics for Logistics & Supply Chain Management (3 units)**

*Course Description:* Introduction to various optimization methods in the domain of logistics and supply chains.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to students in Master of Business Analytics (MSBA) program only.

*Grade Mode:* Letter.

**BAX 431 – Data Visualization (2 units)**

*Course Description:* Extract insights using visualization tools in R, Python, ManyEyes, HTML/CSS, etc. Standard (histograms, boxplots, and dashboards) and specialized (3D, animation, word clouds) formats are covered.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**BAX 441 – Statistical Exploration & Reasoning (3 units)**

*Course Description:* Introduction to statistical reasoning and inference extraction from large data-sets. Learn to obtain preliminary insights and form initial hypotheses through exploratory data analysis (EDA).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 442 – Advanced Statistics (3 units)**

*Course Description:* Continue exploring statistical reasoning using maximum likelihood estimation, Bayesian models, nonparametric models, Monte Carlo Markov Chain, time series, model specification, model selection, and dimension reduction.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 443 – Analytic Decision Making (3 units)**

*Course Description:* Using spreadsheets and specialized modeling tools, explore structured problem solution through meta-heuristics, Monte Carlo simulation, and mathematical optimization.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 452 – Machine Learning (3 units)**

*Course Description:* Construct algorithms for learning from data and analyze the process for deriving business intelligence. Coverage of supervised and unsupervised learning, neural networks, etc.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 453 – Application Domains (3 units)**

*Course Description:* Students explore contemporary and emerging domains for high-yield applications of analytics. Topics: social network analytics, search analytics, health care analytics, Internet of things, supply chain/operations analytics, and marketing analytics.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 461 – Practicum Initiation (3 units)**

*Course Description:* Students form teams, scope their project in light of team capability and business opportunity, create a preliminary structure and solution approach for the core problem, and assess data quality and project risks.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 462 – Practicum Elaboration (2 units)**

*Course Description:* Building on problems chosen in BAX 461, teams refine the business opportunity and draw insights from exploratory data analysis.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**BAX 463 – Practicum Analysis & Implementation (3 units)**

*Course Description:* Focus on completing project deliverables by polishing statistical and non-statistical quantitative analysis, generating insights for technical and business stakeholders, integrating proposed solutions into partner workflows and organizations, and disseminating the findings and outcomes through presentations and publications.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**BAX 464 – Practicum Implementation (4 units)**

*Course Description:* Project teams complete analysis, plan deployment and obtain client buy-in. Culminates in a project presentation, preferably including representatives from the client organization.

*Learning Activities:* Lecture 2 hour(s), Project, Term Paper, Discussion.

*Grade Mode:* Letter.

**BAX 493 – People Analytics (3 units)**

*Course Description:* Students develop an understanding of how to position themselves as strategic partners in a company's talent management efforts. Explore a range of topics related to people analytics, including hiring and selection, performance evaluation, training/development, promotion, compensation, social networks, diversity, and retention.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Masters in Business Analytics Program only.

*Grade Mode:* Letter.

**BAX 493A – Topics in Business Analytics–Cloud Computing (1 unit)**

*Course Description:* Covers the foundations of cloud computing models including (IaaS) Infrastructure as a Service, (PaaS) Platform as a Service, and Software as a Service (SaaS).

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MSBA program only.

*Grade Mode:* Letter.

**BAX 493B – Topics in Business Analytics–Implementing Machine Learning on the Cloud (1 unit)**

*Course Description:* Covers the four layers of Machine Learning in the cloud: AI services, ML services, ML Engines & Frameworks, and Infrastructure & Serverless Environments and how to implement solutions on all of the layers by using the best abstraction for the task at hand.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MSBA program only.

*Grade Mode:* Letter.

**Cardiology (CAR)**

School of Medicine

**CAR 192 – Internship in Cardiology (1-12 units)**

*Course Description:* Supervised work experience in cardiology.

*Prerequisite(s):* Upper division standing; approval of project by preceptor prior to internship.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**CAR 199 – Cardiology Research (1-5 units)**

*Course Description:* Special study by individual arrangement in cardiovascular medicine. Work will include directed readings, laboratory and discussions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CAR 220 – Basic Science in Cardiology (1 unit)**

*Course Description:* Fundamentals underlying cardiovascular medicine. Including hemodynamics, neural control of the circulation, biochemistry and some experimental design and statistics. Experts in each of these fields will give current information in their areas.

*Prerequisite(s):* Graduate or medical student status.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CAR 299 – Cardiology Research (1-12 units)**

*Course Description:* Research or special studies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 40 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CAR 401 – Clinical Cardiology Clerkship: Kaiser (3-18 units)**

*Course Description:* Emphasis placed on history taking and physical examination of pediatric and adult patients with congenital and acquired cardiovascular disease. Hospital rounds in CCU and elsewhere. Roles of ECG, PCG, and cardiac fluoroscopy, etc., in office cardiology will be evaluated.

*Prerequisite(s):* Third- and fourth-year medical students with advance approval by Division of Cardiology.

*Learning Activities:* Clinical Activity 1-5 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**CAR 460 – Cardiology Clinical Clerkship (3-18 units)**

*Course Description:* Participation with members of subspecialty consultation service in initial clinical evaluation, work-up, management, and follow-up of patients with cardiologic disorders. Two outpatient clinics per week.

*Prerequisite(s):* IMD 430; third- and fourth-year medical students in good academic standing with consent of instructor.

*Learning Activities:* Clinical Activity 2-12 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **CAR 461 – Management of Coronary Artery Disease: Coronary Care Unit (3-18 units)**

*Course Description:* Research in laboratory and exercise testing to be determined by instructor. Current methods of clinical research involving certain aspects of diagnosis and treatment.

*Prerequisite(s):* Completion of second-year of medical school and advance approval by Division of Cardiology.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **CAR 462 – Management of Coronary Artery Disease (CICU) (4-8 units)**

This version has ended; see updated course, below.

*Course Description:* Research in laboratory and exercise testing to be determined by instructor. Current methods of clinical research involving certain aspects of diagnosis and treatment.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail Only.

### **CAR 462 – Management of Coronary Artery Disease (CICU) (3-8 units)**

*Course Description:* Research in laboratory and exercise testing to be determined by instructor. Current methods of clinical research involving certain aspects of diagnosis and treatment.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail Only.

This course version is effective from, and including: Fall Quarter 2023.

## **CAR 464 – Preventive Cardiology (3-6 units)**

*Course Description:* Clinical experience, weekly seminar and reading on primary and secondary prevention of cardiovascular disease. Will be carried out in Lipid and Hypertension Clinics, Exercise Laboratory, Cardiac Care Unit, Cardiac Catheterization, and Cardiac Surgery services.

*Prerequisite(s):* Consent of instructor; completion of third-year medical school.

*Learning Activities:* Seminar 2 hour(s), Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **CAR 480 – Insights in Cardiology (1-3 units)**

*Course Description:* Students attend one or more cardiovascular medicine clinics: general, hypertension, arrhythmia. Introduction to the diagnosis/treatment of common cardiovascular problems.

*Prerequisite(s):* Medical student in good academic standing and approval by Division of Cardiology.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **CAR 493 – Gender Specific Medicine SSM (6 units)**

*Course Description:* Special Studies Module, a four-week course on the topic Basic Science Principles Relating to Gender Specific Medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* UC Davis School of Medicine students only.

*Cross Listing:* OBG 493.

*Grade Mode:* Honors/Pass/Fail.

## **CAR 498 – Special Group Study: EKG Unit (1-12 units)**

*Course Description:* Special group study in cardiology for medical students in EKG unit. May include lectures, directed reading, and/or discussion groups.

*Prerequisite(s):* Medical student with advance approval by monthly attending faculty.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **CAR 499 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor; approval by Division of Cardiology.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

# **Cell Biology & Human Anatomy (CHA)**

## **School of Medicine**

### **CHA 101 – Human Gross Anatomy (4 units)**

*Course Description:* Detailed study of the gross anatomical structure of the human body, with emphasis on function and clinical relevance to students entering health care professions.

*Prerequisite(s):* BIS 002A; concurrent enrollment in EXB 106L or CHA 101L strongly recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Upper division students only; Pass One open to upper division Exercise Biology or Anthropology majors only; Pass Two open to Seniors in any major; open enrollment at the start of the quarter for upper division students in any major.

*Cross Listing:* EXB 106.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

### **CHA 101L – Human Gross Anatomy Laboratory (3 units)**

*Course Description:* Detailed study of prosected human cadavers in small group format with extensive hands-on experience.

*Prerequisite(s):* BIS 002A; (EXB 106 (can be concurrent) or CHA 101 (can be concurrent)); if EXB 106 or CHA 101 is not taken concurrently, it must have been already completed.

*Learning Activities:* Laboratory 9 hour(s).

*Enrollment Restriction(s):* Upper division students only; Pass One open to upper division Exercise Biology or Anthropology majors only; Pass Two open to Seniors in any major; open enrollment at the start of the quarter for upper division students in any major; mandatory attendance on first day of lab.

*Cross Listing:* EXB 106L.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **CHA 102 – Human Microscopic Anatomy: Structure & Function of Human Tissues & Organ Systems (4.5 units)**

*Course Description:* Complements Gross Anatomy by extending the study of structure to the microscopic level. Shows how cells are assembled into tissues, and tissues into organs, with an emphasis on demonstrating how microscopic structure explains function.

*Prerequisite(s):* BIS 104.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **CHA 103 – Human Clinical Neuroanatomy (4 units)**

*Course Description:* Clinically relevant anatomy of the normal human nervous system, including external and internal anatomy of the brain, spinal cord, and cranial nerves. Blood supply to the brain and spinal cord. Functional neuroanatomy of motor, sensory, and cognitive systems. Application of neuroanatomical principles relevant to clinical problem solving for students entering health care professions.

*Prerequisite(s):* CHA 101; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to upper division students.

*Cross Listing:* NEU 103.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **CHA 192 – Internship in Morphology (1-12 units)**

*Course Description:* Experience of supervised internship in research laboratories of members of the department.

*Prerequisite(s):* Upper division standing; laboratory science experience including some chemistry; approval of project by preceptor prior to period of internship.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **CHA 197T – Tutoring in Cell Biology & Human Anatomy (1-5 units)**

*Course Description:* Provides laboratory instruction in gross and microscopic human anatomy, with small groups of undergraduates under the supervision of the instructor.

*Prerequisite(s):* CHA 101 B or better; and consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Laboratory 6-9 hour(s).

*Grade Mode:* Pass/No Pass only.

## **CHA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed reading, discussion, and/or laboratory experience on selected topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1-10 hour(s).

*Grade Mode:* Pass/No Pass only.

## **CHA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CHA 200 – Graduate Human Gross Anatomy (6 units)**

*Course Description:* Lectures on human gross anatomy and cadaver dissection laboratory. Topics arranged by region; emphasis on osteology, neuromuscular anatomy, cardiovascular anatomy, gastrointestinal anatomy and anatomy of reproductive systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Open only to full-time graduate students.

*Credit Limitation(s):* Only 2 units of credit for students who have completed CHA 101.

*Grade Mode:* Letter.

## **CHA 202 – Microscopic Anatomy for Researchers (3 units)**

*Course Description:* The growing importance of the use of gene knock-out studies and imaging technology requires significant understanding of basic anatomy. Designed to familiarize students in diverse fields with anatomical, cellular and tissue organization of typical animal models.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the biomedical sciences (no consent required); advanced undergraduates seeking research careers in the biomedical sciences (consent of instructor required).

*Grade Mode:* Letter.

## **CHA 203 – Neurobiology (4 units)**

*Course Description:* Physiology and anatomy of the normal human nervous system in an integrated format.

*Prerequisite(s):* Consent of instructor. Two upper division or one graduate course in Neurobiology.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **CHA 290 – Seminar (1 unit)**

*Course Description:* Seminar.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CHA 290C – Research Group Conference (1 unit)**

*Course Description:* Discussion of problems, progress and literature groups relevant to current research undertaken by laboratory groups Human Anatomy.

*Prerequisite(s):* Consent of instructor. Graduate student with research experience (may be taken concurrently).

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CHA 298 – Advanced Group Study (1-5 units)**

*Course Description:* Advanced group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **CHA 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CHA 400 – Developmental, Gross & Radiologic Anatomy (7.5 units)**

*Course Description:* Integrated presentation of developmental, gross and radiologic anatomy. Embryology and radiology correlated with the dissection of the entire body. Embryology from implantation to birth.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 5 hour(s).

*Enrollment Restriction(s):* Medical students only.

*Grade Mode:* Pass/Fail only.

## **CHA 402 – Cell & Tissue Biology (4.5 units)**

*Course Description:* Microscopic structure of the basic cells, tissues and organs of the body with an emphasis on how structure explains function. Analysis and identification of sectioned material at the light microscopic and ultrastructural levels.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Enrollment Restriction(s):* Medical student only.

*Grade Mode:* Pass/Fail only.

## **CHA 403 – Medical Neuroanatomy (5 units)**

*Course Description:* Anatomy of the normal human nervous system, to include gross external and internal morphology of brain and spinal cord, and function neuroanatomy of motor, sensory and cognitive systems. Incorporates application of neuroanatomy to clinical problem solving.

*Prerequisite(s):* CHA 400; Block 1.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to medical students only.

*Cross Listing:* HPH 403.

*Grade Mode:* Pass/Fail only.

## **CHA 493B – Anatomy Medical Education Special Study Module (6 units)**

*Course Description:* Attend all of the lectures and laboratory sessions for CHA 400 and CHA 402 during the four-week section; approximately seven anatomy labs and three-four histology labs. Tutor first-year students during the laboratory sessions. Prepare and present a clinical correlate session.

*Prerequisite(s):* Consent of instructor. UC Davis School of Medicine students only.

*Learning Activities:* Seminar 10 hour(s), Clinical Activity 14 hour(s), Auto Tutorial 6 hour(s), Independent Study 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **CHA 497T – Tutoring in Human Anatomy (3-6 units)**

*Course Description:* Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum for the School of Medicine.

*Prerequisite(s):* Advanced standing or consent of instructor.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **CHA 498 – Advanced Group Study (1-12 units)**

*Course Description:* Directed reading and group discussions and/or laboratory experience on selected topics.

*Prerequisite(s):* Medical students, interns, and residents with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **CHA 499 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

# **Chemical Engineering (ECH)**

## **College of Engineering**

### **ECH 001 – Design of Coffee–An Introduction to Chemical Engineering (3 units)**

*Course Description:* Non-mathematical introduction to how chemical engineers think, illustrated by elucidation of the process of roasting and brewing coffee. Qualitative overview of the basic principles of engineering analysis and design. Corresponding experiments testing design choices on the sensory qualities of coffee.

*Learning Activities:* Lecture 1 hour(s), Laboratory 2 hour(s), Project 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 001Y, ECM 001, ECM 005 or ECH 005.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

### **ECH 001Y – Design of Coffee–An Introduction to Chemical Engineering (3 units)**

*Course Description:* Non-mathematical introduction to how chemical engineers think, illustrated by elucidation of the process of roasting and brewing coffee. Qualitative overview of the basic principles of engineering analysis and design. Corresponding experiments testing design choices on the sensory qualities of coffee.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Laboratory 2 hour(s), Project 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 001, ECM 001, ECM 005 or ECH 005.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

### **ECH 005 – Introduction to Analysis & Design in Chemical Engineering (3 units)**

*Course Description:* Quantitative introduction to the engineering principles of analysis and design. Applications of differential and integral calculus. Laboratory experiments using coffee to illustrate chemical engineering concepts and to conduct an engineering design competition.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Only 2 units of credit to students who have completed ECM 001 or ECH 001; not open for credit to students who have completed ECM 005.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**ECH 051 – Material Balances (4 units)**

*Course Description:* Application of the principle of conservation of mass to single and multicomponent systems in chemical process calculations. Studies of batch, semi-batch, and continuous processes involving mass transfer, phase change, and reaction stoichiometry.

*Prerequisite(s):* MAT 021B C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 151.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECH 060 – Numerical Methods in Engineering (4 units)**

This version has ended; see updated course, below.

*Course Description:* Problem solving in chemical, biochemical and materials engineering using MATLAB. Programming styles, data structures, working with lists, functions and rules. Applications drawn from material balances, statistics, numerical methods, bioinformatics, transport phenomena, kinetics, and computational analysis.

*Prerequisite(s):* MAT 021C.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**ECH 060 – Chemical Engineering Problem Solving (4 units)**

*Course Description:* Problem solving in chemical, biochemical and materials engineering. Programming styles, data structures, working with lists, functions and rules. Applications drawn from material balances, statistics, numerical methods, bioinformatics, transport phenomena, kinetics, and computational analysis.

*Prerequisite(s):* MAT 021C.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

This course version is effective from, and including: Fall Quarter 2023.

**ECH 080 – Chemical Engineering Profession (1 unit)**

*Course Description:* Professional opportunities and professional responsibilities of chemical engineers. Opportunities and needs for post-baccalaureate education. Relationship of chemical engineering to contemporary issues.

*Learning Activities:* Lecture/Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**ECH 090X – Honors Discussion Section (1 unit)**

*Course Description:* Examination of special topics covered in selected lower division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open only to students in the Chemical Engineering or Biochemical Engineering Honors Programs.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed Group Study.

*Prerequisite(s):* Consent of instructor. Lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ECH 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ECH 140 – Mathematical Methods in Biochemical & Chemical Engineering (4 units)**

This version has ended; see updated course, below.

*Course Description:* Mathematical methods for solving problems in chemical and biochemical engineering, with emphasis on transport phenomena. Fourier series and separation of variables. Sturm-Liouville eigenvalue problems. Similarity transformations. Tensor analysis. Finite difference methods for solving time-dependent diffusion problems.

*Prerequisite(s):* MAT 022B; (ECH 060 or ENG 006); or equivalents of ECH 060 or ENG 006.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 159.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECH 140 – Mathematical Methods in Biochemical & Chemical Engineering (4 units)**

*Course Description:* Mathematical and computational methods for solving problems in chemical/biochemical engineering, with an emphasis on transport phenomena. Tensor analysis. Solutions of nonlinear equations. Filtering data and images. Numerical differentiation and integration. Ordinary and partial differential equations. Finite difference methods. Fourier series and separation of variables. Sturm-Liouville eigenvalue problems. Similarity transformations. Bessel functions.

*Prerequisite(s):* MAT 022B; (ECH 060 or ECS 032A); or equivalents of ECH 060 or ECS 032A.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Chemical Engineering and Biochemical Engineering majors.

*Credit Limitation(s):* Not open for credit to students who have completed ECH 159.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

This course version is effective from, and including: Winter Quarter 2024.

**ECH 141 – Fluid Mechanics for Biochemical & Chemical Engineers (4 units)**

*Course Description:* Principles and applications of fluid mechanics in chemical and biochemical engineering. Hydrostatics. Stress tensor and Newton's law of viscosity.

*Prerequisite(s):* ECH 051 (can be concurrent); ECH 140 (can be concurrent).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 150B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECH 142 – Heat Transfer for Biochemical & Chemical Engineers (4 units)**

*Course Description:* Conduction, convection, and radiation of thermal energy in applications to chemical and biochemical engineering. Derivation of thermal and mechanical energy equations. Thermal boundary layers. Macroscopic balances. Applications: heat transfer in tubes, channels, and integrated circuits, and analysis of heat exchangers.

*Prerequisite(s):* ECH 141.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 153.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECH 143 – Mass Transfer for Biochemical & Chemical Engineers (4 units)**

*Course Description:* Derivation of species conservation equations describing convective and diffusive mass transfer. Fick's law and the Stefan-Maxwell constitutive equations. Mass transfer coefficients. Multicomponent mass transfer across gas/liquid interfaces. Applications include drying, heterogeneous chemical reactions, and membrane separations.

*Prerequisite(s):* ECH 142.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECH 144 – Rheology & Polymer Processing (3 units)**

*Course Description:* Deformation in steady shear, unsteady shear, and elongational flows. Linear and non-linear viscoelastic constitutive models. The principle of material indifference and admissibility of constitutive equations. Introduction to the unit operations of polymer processing.

*Prerequisite(s):* ECH 141.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 150C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECH 145A – Chemical Engineering Thermodynamics Laboratory (3 units)**

*Course Description:* Laboratory experiments in chemical engineering thermodynamics.

*Prerequisite(s):* ECH 152A (can be concurrent); UWP 102E (can be concurrent).

*Learning Activities:* Laboratory 2 hour(s), Discussion 2 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors in Chemical Engineering, Materials Science & Engineering, and Biochemical Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **ECH 145B – Chemical Engineering Transport Lab (3 units)**

*Course Description:* Laboratory experiments in chemical engineering transport phenomena.

*Prerequisite(s):* ECH 142; ECH 145A; UWP 102E.

*Learning Activities:* Laboratory 2 hour(s), Discussion 2 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors in Chemical Engineering, Materials Science & Engineering and Biochemical Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **ECH 148A – Chemical Kinetics & Reaction Engineering (3 units)**

*Course Description:* Ideal chemical reactors. Rate laws and stoichiometry. Design and analysis of isothermal reactors with multiple reactions.

*Prerequisite(s):* ECH 143; ECH 152B.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ECH 146 (Formerly ECH 146).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECH 148B – Chemical Kinetics & Reaction Engineering (4 units)**

*Course Description:* Design and analysis of non-isothermal reactors. Reactions in packed beds with pressure drop. Adsorption and heterogeneous catalysis. Transport limitations.

*Prerequisite(s):* ECH 148A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ECH 146 (Formerly ECH 146).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECH 152A – Chemical Engineering Thermodynamics (3 units)**

*Course Description:* Application of principles of thermodynamics to chemical processes.

*Prerequisite(s):* ECH 051; MAT 021C.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ENG 105 or ENG 105A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECH 152B – Chemical Engineering Thermodynamics (4 units)**

*Course Description:* Continuation of ECH 152A.

*Prerequisite(s):* ECH 152A.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECH 155 – Chemical Engineering Kinetics & Reactor Design Laboratory (4 units)**

*Course Description:* Laboratory experiments in chemical kinetics, reactor design and process control.

*Prerequisite(s):* ECH 145B; ECH 148B (can be concurrent); ECH 157 (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s), Discussion 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to majors in Chemical Engineering, Materials Science & Engineering, and Biochemical Engineering.

*Credit Limitation(s):* Not open for credit to students who have taken ECH 155B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

## **ECH 157 – Process Dynamics & Control (4 units)**

*Course Description:* Fundamentals of dynamics and modeling of chemical processes. Design and analysis of feedback control of chemical processes.

*Prerequisite(s):* ECH 140.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECH 158A – Process Economics & Green Design (4 units)**

*Course Description:* Senior design experience in process and product creation and design with multiple realistic constraints. Cost accounting and capital investment estimation. Profitability analysis techniques. Green chemistry, health risk assessment and life cycle assessment concepts.

*Prerequisite(s):* ECH 142; ECH 143.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Visual Literacy (VL).

## **ECH 158B – Separations & Unit Operations (4 units)**

*Course Description:* Senior design experience with multiple realistic constraints. Heuristic and rigorous design of chemical process equipment. Separation by filtration, distillation and extraction. Synthesis of reactor and separation networks, heat and power integration.

*Prerequisite(s):* ECH 158A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECH 158C – Plant Design Project (4 units)**

*Course Description:* Senior design experience for chemical and biochemical processes. Impact of multiple realistic constraints. Design, costing and profitability analysis of complete plants. Use of computer-aided design techniques.

*Prerequisite(s):* ECH 158B or ECH 161C.

*Learning Activities:* Discussion/Laboratory 2 hour(s), Project 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Visual Literacy (VL).

## **ECH 160 – Fundamentals of Biomanufacturing (3 units)**

*Course Description:* Principles of large scale bioreactor production of metabolites, enzymes, and recombinant proteins including the development of strains/cell lines, fermentor/bioreactor design, monitoring and operation, product recovery and purification, and biomanufacturing economics.

*Prerequisite(s):* MIC 102 or BIS 102 or ABI 102.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECH 161C or both ECH 161A and ECH 161B; only 2 units of credit to students who have completed either ECH 161A or ECH 161B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ECH 161A – Biochemical Engineering Fundamentals (4 units)**

*Course Description:* Biokinetics; bioreactor design and operation; transport phenomena in bioreactors; microbial, plant, and animal cell cultures.

*Prerequisite(s):* ECH 148A.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **ECH 161B – Bioseparations (4 units)**

*Course Description:* Product recovery and purification of biochemicals. Cell disruption, centrifugation, filtration, membrane separations, extraction, and chromatographic separation.

*Prerequisite(s):* ECH 143.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECH 161C – Biotechnology Facility Design & Regulatory Compliance (4 units)**

*Course Description:* Design of biotechnology manufacturing facilities.

Fermentation and purification equipment, and utility systems.

Introduction to current good manufacturing practices, regulatory compliance, and documentation.

*Prerequisite(s):* (ECH 158A, ECH 161A (can be concurrent), ECH 161B (can be concurrent)) or DEB 263 (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ECH 161L – Bioprocess Engineering Laboratory (4 units)**

*Course Description:* Laboratory experiments in the operation and analysis of bioreactors; determination of oxygen mass transfer coefficients in bioreactors and ion exchange chromatography.

*Prerequisite(s):* (ECH 145B, ECH 161A, ECH 161B) or VEN 186 or (BIS 103, MCB 120L).

*Learning Activities:* Laboratory 9 hour(s), Discussion 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One restricted to chemical/biochemical engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**ECH 166 – Catalysis (3 units)**

*Course Description:* Principles of catalysis based on an integration of principles of physical, organic, and inorganic chemistry and chemical kinetics and chemical reaction engineering. Catalysis in solution; catalysis by enzymes; catalysis in swellable polymers; catalysis in microscopic cages (zeolites); catalysis on surfaces.

*Prerequisite(s):* ECH 148A; consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECH 168 – Chemical & Engineering Principles in Whisky & Fuel Alcohol Production (3 units)**

*Course Description:* Chemical & engineering principles underlying the manufacture of whisky & fuel alcohol. Biochemistry of malting. Assessment of grain modification & diastatic power, and of the phenol content of peated malt. Lautering as a problem of fluidized bed compaction. Fermentation and its assessment. Fractional distillation and the Rayleigh equation. The fate of congeners in pot and column distillation. Chemical reactions affecting flavor from kilning to maturation.

*Prerequisite(s):* CHE 128A; CHE 128B (can be concurrent); or consent of instructor.

*Learning Activities:* Laboratory 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to students aged 21 years or older; open to seniors in chemical engineering and seniors in chemistry; non-majors require consent of instructor.

*Cross Listing:* CHE 168.

*Grade Mode:* Letter.

**ECH 169 – The Design of Cocktails: Applied Thermodynamics & Transport Phenomena in Mixed Drinks (1 unit)**

*Course Description:* Scientific and engineering principles underlying the preparation of mixed drinks. Thermodynamics and kinetics of ice crystallization; phase diagram of ethanol-water-ice mixtures; mass transfer of aromatics; solubility of sucrose and carbon dioxide; colloidal behavior of dispersed solids and emulsified oils. Corresponding laboratory experiments testing the effect of design choices on the sensory quality of cocktails.

*Prerequisite(s):* ECH 145B; ECH 152B; consent of instructor.

*Learning Activities:* Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Enrollment by permission of instructors only; limited to students over 21 years old.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ECH 170 – Introduction to Colloid & Surface Phenomena (3 units)**

*Course Description:* Introduction to the behavior of surfaces and disperse systems. Fundamentals will be applied to the solution of practical problems in colloid science. Should be of value to engineers, chemists, biologists, soil scientists, and related disciplines.

*Prerequisite(s):* CHE 110A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECH 171 – Chemical Engineering Principles in Food Processing (4 units)**

*Course Description:* Chemical engineering principles underlying the manufacture of food production. Chemical reactions affecting flavor and color. Food preservation and Raoult's Law. Emulsion stability and rheology. Manipulation of phase transition and food texture. Viscosity of food systems and pump design. Application of heat and mass transfer to food processes.

*Prerequisite(s):* ECH 142.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s), Project 1 hour(s).

*Grade Mode:* Letter.

**ECH 190C – Research Group Conference (1 unit)**

*Course Description:* Research group conferences.

*Prerequisite(s):* Consent of instructor; upper division standing in Chemical Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ECH 190X – Honors Discussion Section (1 unit)**

*Course Description:* Examination of special topics covered in selected upper division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open only to students in the Chemical Engineering or Biochemical Engineering Honors Programs.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 192 – Internship in Chemical or Biochemical Engineering (1-5 units)**

*Course Description:* Supervised work experience in Chemical or Biochemical Engineering.

*Prerequisite(s):* Consent of instructor; completion of a minimum of 84 units; project approval before period of internship.

*Learning Activities:* Internship 3-15 hour(s).

*Repeat Credit:* May be repeated when project differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ECH 198 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ECH 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECH 200 – Preparing for Graduate Student Success (1 unit)**

*Course Description:* Introduction to the soft-skills and campus resources needed to succeed in graduate school. Emphasis on the student-mentor relationship and the process of selecting a research mentor.

*Learning Activities:* Seminar 1.50 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Chemical Engineering.

*Cross Listing:* EMS 200.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ECH 206 – Biochemical Engineering (3 units)**

*Course Description:* Interaction of chemical engineering, biochemistry, and microbiology. Mathematical representations of microbial systems. Kinetics of growth, death, and metabolism. Continuous fermentation, agitation, mass transfer and scale-up in fermentation systems, product recovery, enzyme technology.

*Prerequisite(s):* MIC 102; MIC 102L; BIS 101; BIS 102; BIS 103; MCB 120L; MCB 200A; or consent of instructor; FST 205 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ECH 226 – Enzyme Engineering (3 units)**

*Course Description:* Application of basic biochemical and engineering principles of practical enzymatic processes. Lectures cover large scale production and separation of enzymes, immobilized enzyme systems, enzyme related biotechnology, reactor design and optimization, and new application of enzymes in genetic engineering.

*Prerequisite(s):* MIC 102; MIC 102L; BIS 102; BIS 103; MCB 122; MCB 120L; MCB 200A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ECH 245 – Micro- & Nano-Technology in Life Sciences (4 units)**

*Course Description:* Survey of biodevice design from engineering and biological perspectives; micro-/nano-fabrication techniques; surface science and mass transport; essential biological processes and models; proposal development skills on merging aforementioned themes.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* EEC 245, EMS 245, MAE 245.

*Grade Mode:* Letter.

## **ECH 246 – Advanced Biochemical Engineering (2 units)**

*Course Description:* Advances in the field of biotechnology including genetic engineering, enzyme engineering, fermentation science, and renewable resources development. The important results of original research will be evaluated for understanding of the fundamental principles and for potential practical application.

*Prerequisite(s):* ECH 206; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **ECH 252 – Statistical Thermodynamics (4 units)**

*Course Description:* A treatment of the statistical basis of thermodynamics; introduction to statistical mechanics; discussion of the laws of thermodynamics; application of thermodynamic relationships to phase and chemical reaction equilibrium; introduction to molecular simulations and the evaluation of thermodynamic properties from molecular simulations.

*Prerequisite(s):* ECH 152B; ENG 105B or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECH 253A – Advanced Fluid Mechanics (4 units)**

*Course Description:* Kinematics and basic principles of fluid flow. Principles of constitutive equations. Navier-Stokes equations for Newtonian fluids. Survey of rectilinear creeping flow, lubrication flow and boundary layer theory.

*Prerequisite(s):* ECH 141; ECH 259.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECH 253B – Advanced Heat Transport (4 units)**

*Course Description:* Fundamental energy postulates and derivation of microscopic and macroscopic energy equations. Mechanisms of conduction. Isotropic, thermoelastic and anisotropic materials solution problems using Greens functions and perturbation theory.

*Prerequisite(s):* ECH 142; ECH 259; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECH 253C – Advanced Mass Transfer (4 units)**

*Course Description:* Kinematics and basic conservation principles for multicomponent systems. Constitutive equations for momentum, heat and mass transfer, applications to binary and ternary systems. Details of diffusion with reaction, and the effects of concentration.

*Prerequisite(s):* ECH 253A; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECH 254 – Colloid & Surface Phenomena (4 units)**

*Course Description:* Thermodynamics and rate processes at interfaces. These fundamental processes will be applied to determine the collective properties of thin films and membranes, self-assembled systems, liquid crystals and colloidal systems. Experimental techniques in surface analysis.

*Prerequisite(s):* Graduate standing in science or engineering or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECH 256 – Chemical Kinetics & Reaction Engineering (4 units)**

*Course Description:* Analysis of the performance of chemical reactors and design of chemical reactors based on the principles of chemical kinetics and transport phenomena. Consideration of noncatalytic/catalytic reactions in single fluid phases and emphasis on reactions in multiphase mixtures, especially gas-solid reactors.

*Prerequisite(s):* ECH 146; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECH 259 – Advanced Engineering Mathematics (4 units)**

*Course Description:* Applications of methods of applied mathematics to the analytical and numerical solution of linear and nonlinear ordinary and partial differential equations arising in the study of transport phenomena.

*Prerequisite(s):* MAT 021D; MAT 022A; MAT 022B.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECH 261 – Molecular Modelling of Soft & Biological Matter (4 units)**

*Course Description:* Modern molecular simulation techniques with a focus on soft matter like polymers, biologically relevant systems, and glasses.

*Prerequisite(s):* EMS 247 or ECH 252; or equivalent course in advanced thermodynamics/statistical mechanics.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**ECH 262 – Transport Phenomena in Multiphase Systems (3 units)**

*Course Description:* Heat, mass and momentum transfer in multiphase, multicomponent systems with special emphasis on transport processes in porous media. Derivation of the averaging theorem and application of the method of volume averaging to multicomponent, reacting systems.

*Prerequisite(s):* ECH 253C.

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECH 263 – Rheology & Mechanics of Non-Newtonian Fluids (3 units)**

*Course Description:* Mechanics of polymer solutions and suspension, especially the development of properly invariant constitutive equations. Topics include: viscometry, linear and nonlinear viscoelasticity, continuum mechanics, kinetic theory.

*Prerequisite(s):* ECH 253A; ECH 259; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ECH 265 – Emulsions, Microemulsions & Bilayers (3 units)**

*Course Description:* Thermodynamic and mechanical descriptions of surfactant-laden interfaces. Forces between and within interfaces. Physics of micelle and microemulsion formation. Structure and stability of emulsions. Properties of phospholipid bilayers, with emphasis on vesicles.

*Prerequisite(s):* An undergraduate course in physical chemistry.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ECH 267 – Advanced Process Control (4 units)**

*Course Description:* Advanced course in analysis and synthesis of linear multivariable systems. Emphasis on frequency domain techniques and applications to chemical processes. Topics include singular value analysis, internal model control, robust controller design methods as well as self-tuning control techniques.

*Prerequisite(s):* ECH 157; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECH 268 – Polysaccharides Surface Interactions (3 units)**

*Course Description:* Study of fundamental surface science theories as applied to physical and chemical interactions of carbohydrates and polysaccharides.

*Prerequisite(s):* Graduate students in science or engineering.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EBS 268.

*Grade Mode:* Letter.

**ECH 269 – Cell & Molecular Biophysics for Bioengineers (4 units)**

*Course Description:* Introduction to fundamental mechanisms governing the structure, function, and assembly of bio-macromolecules. Emphasis is on a quantitative understanding of the nano-to-microscale interactions between and within individual molecules, as well as of their assemblies, in particular membranes.

*Prerequisite(s):* BIM 284; or equivalent; graduate standing; undergraduate students by consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIM 162.

*Cross Listing:* BIM 262.

*Grade Mode:* Letter.

**ECH 282 – Organic Electronic Materials, Processing & Devices (3 units)**

*Course Description:* Organic electronic materials synthesis and molecular design, methods for device fabrication, optical and electrical characteristics of the devices, discussion of the technology readiness, and a broad survey of methods used to characterize organic electronic materials and devices.

*Prerequisite(s):* Graduate major in Chemistry, Physics or Engineering discipline or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**ECH 289A – Special Topics in Chemical Engineering: Fluid Mechanics (1-5 units)**

*Course Description:* Special topics in Fluid Mechanics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289B – Special Topics in Chemical Engineering: Nonlinear Analysis & Numerical Methods (1-5 units)**

*Course Description:* Special topics in Nonlinear Analysis and Numerical Methods.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289C – Special Topics in Chemical Engineering: Process Control (1-5 units)**

*Course Description:* Special topics in Process Control.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289D – Special Topics in Chemical Engineering: Chemistry of Catalytic Processes (1-5 units)**

*Course Description:* Special topics in Chemistry of Catalytic Processes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289E – Special Topics in Chemical Engineering: Biotechnology (1-5 units)**

*Course Description:* Special topics in Biotechnology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289F – Special Topics in Chemical Engineering: Interfacial Engineering (1-5 units)**

*Course Description:* Special topics in Interfacial Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289G – Special Topics in Chemical Engineering: Molecular Thermodynamics (1-5 units)**

*Course Description:* Special topics in Molecular Thermodynamics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289H – Special Topics in Chemical Engineering: Membrane Separations (1-5 units)**

*Course Description:* Special topics in Membrane Separations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289I – Special Topics in Chemical Engineering: Advanced Materials Processing (1-5 units)**

*Course Description:* Special topics in Advanced Materials Processing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289J – Special Topics in Chemical Engineering: Novel Experimental Methods (1-5 units)**

*Course Description:* Special topics in Novel Experimental Methods.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289K – Special Topics in Chemical Engineering: Advanced Transport Phenomena (1-5 units)**

*Course Description:* Special topics in Advanced Transport Phenomena.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 289L – Special Topics in Chemical Engineering: Biomolecular Engineering (1-5 units)**

*Course Description:* Special topics in Biomolecular Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECH 290 – Seminar (1 unit)**

*Course Description:* Seminar.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECH 290C – Graduate Research Group Conference (1 unit)**

*Course Description:* Research problems, progress and techniques in chemical engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECH 294 – Current Progress in Biotechnology (1 unit)**

*Course Description:* Seminars presented by guest lecturers on subjects of their own research activities.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* DEB 294.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECH 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECH 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECH 390 – Teaching of Chemical Engineering (1 unit)**

*Course Description:* Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.

*Prerequisite(s):* Consent of instructor; qualifications and acceptance as teaching assistant and/or associate-in in chemical engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Chemistry (CHE)**

College of Letters & Science

**CHE 001 – Preparation for General Chemistry (3 units)**

*Course Description:* Preparation for the general chemistry series (CHE 002ABC & CHE 004ABC); unit conversion, dimensional analysis, periodic table, chemical equations, stoichiometry, and gases.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in CHE 002A or CHE 004A not allowed.

*Credit Limitation(s):* Not open for credit to students who have completed CHE 002A or CHE 004A with a grade of C- or better.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**CHE 001V – Preparation for General Chemistry (3 units)**

*Course Description:* Preparation for the general chemistry series (CHE 002ABC & CHE 004ABC); unit conversion, dimensional analysis, periodic table, chemical equations, stoichiometry, and gases.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in CHE 002A or CHE 004A not allowed.

*Credit Limitation(s):* Not open for credit to students who have completed CHE 002A or CHE 004A with a grade of C- or better.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**CHE 002A – General Chemistry (5 units)**

*Course Description:* Periodic table, stoichiometry, chemical equations, physical properties and kinetic theory of gases, chemical equilibrium, acids and bases. Laboratory experiments in stoichiometric relations, properties and collection of gases, atomic spectroscopy, introductory quantitative analysis and acids and bases.

*Prerequisite(s):* High school chemistry and physics, and concurrent enrollment in mathematics at or above the level of MAT 012 strongly recommended; must earn a qualifying score of 24 or better on the Chemistry Placement Exam or complete CHE 001V with a C- or higher; more information about the Chemistry Placement Requirements to ensure enrollment in CHE 002A can be found at <https://chemistry.ucdavis.edu/undergraduate/general-chemistry-series/chemistry-placement-requirements>.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Only three units of credit for students who have completed CHE 004A; not open for credit for students who have completed CHE 002AH or CHE 004B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**CHE 002AH – Honors General Chemistry (5 units)**

*Course Description:* Limited enrollment course with a more rigorous treatment of material covered in CHE 002A. Students completing CHE 002AH can continue with CHE 002BH or CHE 002C.

*Prerequisite(s):* Consent of instructor; high school chemistry and physics, and concurrent enrollment in mathematics at or above the level of MAT 012 strongly recommended; must earn a qualifying score of 33 or better on the Chemistry Placement Exam; more information about the Chemistry Placement Requirements to ensure enrollment in CHE 002A can be found at <https://chemistry.ucdavis.edu/undergraduate/general-chemistry-series/chemistry-placement-requirements>.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CHE 002A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**CHE 002B – General Chemistry (5 units)**

*Course Description:* Continuation of CHE 002A. Thermodynamics, atomic and molecular structure and chemical bonding, condensed phases and intermolecular forces, solubility. Laboratory experiments in thermochemistry, equilibria, and quantitative analysis using volumetric methods.

*Prerequisite(s):* CHE 002A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Only three units of credit for students who have completed CHE 004A; not open for credit for students who have completed CHE 002BH or CHE 004B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**CHE 002BH – Honors General Chemistry (5 units)**

*Course Description:* Limited enrollment course with a more rigorous treatment of material covered in CHE 002B. Students completing CHE 002BH can continue with CHE 002CH or CHE 002C.

*Prerequisite(s):* CHE 002A or CHE 002AH C or better; MAT 021B (can be concurrent); or consent of instructor; CHE 002A with consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CHE 002B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**CHE 002C – General Chemistry (5 units)**

*Course Description:* Continuation of CHE 002B. Kinetics, electrochemistry, spectroscopy, structure and bonding in transition metal compounds, application of principles to chemical reactions. Laboratory experiments in selected analytical methods and syntheses.

*Prerequisite(s):* CHE 002B C- or better or CHE 002BH C- or better or CHE 004B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CHE 002CH.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## CHE 002CH – Honors General Chemistry (5 units)

**Course Description:** Limited enrollment course with a more rigorous treatment of material covered in CHE 002C.

**Prerequisite(s):** CHE 002B or CHE 002BH C or better; MAT 021C (can be concurrent); or consent of instructor; CHE 002B with consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 6 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken CHE 002C.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## CHE 003A – Chemistry for Life Sciences: Determining Structure & Predicting Properties (5 units)

**Course Description:** Integrated General and Organic Chemistry intended for majors in the life sciences. Core concepts of chemical composition, structure and properties. Includes phase changes, separation methods, composition, spectroscopy, atomic & molecular structure, periodicity, bonding, charge distribution, intermolecular forces, and physical properties.

**Prerequisite(s):** High school chemistry and physics strongly recommended; satisfactory score on the Chemistry and Mathematics Placement Examinations or satisfactory completion of the ALEKS Summer Chemistry Prep Course; a satisfactory grade in WKL 041C ('P' or 'C' or better) will suffice in lieu of a satisfactory Chemistry Placement Examination score.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment with CHE 002A, CHE 002B, CHE 002C, CHE 002AH, CHE 002BH, CHE 002CH prohibited; not open for enrollment to students who have completed CHE 002C or 002CH with a C- or better.

**Credit Limitation(s):** Only 3 units credit for students who have completed CHE 002A or CHE 002AH with a C- or better; only 1 unit of credit to students who have completed CHE 002B or CHE 002BH with a C- or better.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## CHE 003B – Chemistry for Life Sciences: Predicting & Characterizing Chemical Change (5 units)

**Course Description:** Continuation of CHE 003A covering core concepts of characterization of chemical processes and predicting chemical changes. Includes modeling chemical reactions, understanding proportions/stoichiometry, tracking energy, activation energy, reaction kinetics, thermodynamics, and equilibrium.

**Prerequisite(s):** CHE 003A C- or better; note: C- or better in CHE 002A or 002AH does not satisfy the prerequisite requirement.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment with CHE 002A, CHE 002B, CHE 002C, CHE 002AH, CHE 002BH, CHE 002CH prohibited.

**Credit Limitation(s):** Only 3 units credit for students who have completed CHE 002B or CHE 002BH with a C- or better.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## CHE 003C – Chemistry for Life Sciences: Controlling Processes & Synthetic Pathways (5 units)

**Course Description:** Continuation of CHE 003B covering core concepts of harnessing energy, controlling reaction extent, and organic chemistry synthetic pathways. Includes acids and bases, thermodynamics, chemical equilibria, organic chemistry terminology and mechanisms.

**Prerequisite(s):** CHE 003B C- or better; note: C- or better in CHE 002B or 002BH does not satisfy the prerequisite requirement.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment with CHE 002A, CHE 002B, CHE 002C, CHE 002AH, CHE 002BH, CHE 002CH prohibited.

**Credit Limitation(s):** Only 3 units credit for students who have completed CHE 002C or CHE 002CH with a C- or better.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## CHE 004A – General Chemistry for the Physical Sciences & Engineering (5 units)

**Course Description:** General chemistry course with a more rigorous treatment of material covered in CHE 002A, intended for students majoring in the physical sciences and engineering.

**Prerequisite(s):** MAT 021A (can be concurrent); must earn a qualifying score of 28 or better on the Chemistry Placement Exam or complete CHE 001V with a C- or higher; high school chemistry and physics strongly recommended; more information about the Chemistry Placement Requirements to ensure enrollment in CHE 004A can be found at <https://chemistry.ucdavis.edu/undergraduate/general-chemistry-series/chemistry-placement-requirements>.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

**Credit Limitation(s):** Only 3 units of credit for students who have completed CHE 002A; not open for credit for students who have completed CHE 002AH or 002B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## CHE 004B – General Chemistry for the Physical Sciences & Engineering (5 units)

**Course Description:** General chemistry course with a more rigorous treatment of material covered in CHE 002B, intended for students majoring in the physical sciences and engineering.

**Prerequisite(s):** MAT 021B (can be concurrent); (CHE 004A C- or better or CHE 002AH C- or better); or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

**Credit Limitation(s):** Only three units of credit for students who have completed CHE 002A; not open for credit for students who have completed CHE 002B or 002BH.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **CHE 004C – General Chemistry for the Physical Sciences & Engineering (5 units)**

*Course Description:* General chemistry course with a more rigorous treatment of material covered in CHE 002C, intended for students majoring in the physical sciences and engineering.

*Prerequisite(s):* MAT 021C (can be concurrent); (CHE 004B C- or better or CHE 002B B or better or CHE 002BH B or better); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed CHE 002C or 002CH.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **CHE 008A – Organic Chemistry: Brief Course (2 units)**

*Course Description:* With CHE 008B, an introduction to the nomenclature, structure, chemistry, and reaction mechanisms of organic compounds. Intended for students majoring in areas other than organic chemistry.

*Prerequisite(s):* CHE 002B C- or better or CHE 002BH C- or better or CHE 004B C- or better.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* No credit to students who have completed CHE 118A or 128A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **CHE 008B – Organic Chemistry: Brief Course (4 units)**

*Course Description:* Laboratory concerned primarily with organic laboratory techniques and the chemistry of the common classes of organic compounds. Lecture portion a continuation of CHE 008A.

*Prerequisite(s):* CHE 008A or CHE 118A or CHE 128A.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Varying credit hours according to courses taken previously and corresponding expected workload for this course; full credit to students who complete CHE 118A or 128A; 3 units credit to students who have completed CHE 128A and CHE 129A (students who have completed CHE 129A are exempt from the laboratory portion of CHE 008B); 2 units credit to students who have completed CHE 128B; 1 unit credit to students who have completed CHE 118B or CHE 128B and CHE 129A (students who have completed CHE 118B are exempt from the laboratory portion of CHE 008B).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **CHE 010 – Concept of Chemistry (4 units)**

*Course Description:* Survey of basic concepts and contemporary applications of chemistry. Designed for non-science majors and not as preparation for CHE 002A.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have had CHE 002A; but students with credit for CHE 010 may take CHE 002A for full credit.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **CHE 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CHE 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CHE 100 – Environmental Water Chemistry (3 units)**

*Course Description:* Practical aspects of water chemistry in the environment, including thermodynamic relations, coordination chemistry, solubility calculations, redox reactions and rate laws. Computer modeling of the evolution in water chemistry from contact with minerals and gases.

*Prerequisite(s):* CHE 002C or CHE 002CH or CHE 004C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **CHE 103A – Chemistry for Life Sciences: Determining Organic Structures & Properties (5 units)**

*Course Description:* Continuation of PHE 003C. Core concepts of organic structure, nomenclature, functional groups, organic acids and bases, resonance and delocalization, aromaticity, intermolecular forces, three-dimensional structure and conformational analysis, spectroscopy.

*Prerequisite(s):* CHE 002C C- or better or CHE 002CH C- or better; (CHE 008A or CHE 118A or CHE 128A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Not open for enrollment to students who have completed CHE 008B, CHE 118B, CHE 118C, CHE 128B, CHE 128C with a C- or better.

*Credit Limitation(s):* Only 3 Units of credit for students who have completed CHE 008A with a C- or better; only 2 units of credit for students who have completed CHE 118A or CHE 128A with a C- or better; not open for credit to students who have completed CHE 008B, CHE 118B, CHE 118C, CHE 128B, CHE 128C with a C- or better.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **CHE 103B – Chemistry for Life Sciences: Predicting & Controlling Organic Pathways (5 units)**

*Course Description:* Continuation of CHE 103A. Core concepts of functional group transformations, synthesis, mechanisms, sustainable chemistry, structure and function of biomolecules, organic reactions in biological systems, molecular design, detection, separation, and identification of organic molecules.

*Prerequisite(s):* CHE 103A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Not open for enrollment to students who have completed CHE 008B, CHE 118B, CHE 118C, CHE 128B, or CHE 128C with a C- or better.

*Credit Limitation(s):* Not open for credit to students who have completed CHE 008B, CHE 118B, CHE 118C, CHE 128B, or CHE 128C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## CHE 104 – Forensic Applications of Analytical Chemistry (3 units)

*Course Description:* Theory and application of standard methods of chemical analysis to evidentiary samples. Use and evaluation of results from screening tests, FTIR, GC and GCMS to various sample types encountered in forensics.

*Prerequisite(s):* CHE 002C or CHE 002CH or CHE 004C.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## CHE 105 – Analytical & Physical Chemical Methods (4 units)

*Course Description:* Fundamental theory and laboratory techniques in analytical and physical chemistry, errors and data analysis methods, basic electrical circuits in instruments, advanced solution equilibria, potentiometric analysis, chromatographic separations, UV-visible spectroscopy, lasers.

*Prerequisite(s):* CHE 110A (can be concurrent) or CHE 107B (can be concurrent).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## CHE 107A – Physical Chemistry for the Life Sciences (3 units)

*Course Description:* Physical chemistry intended for majors in the life science area. Introductory development of classical and statistical thermodynamics including equilibrium processes and solutions of both non-electrolytes and electrolytes. The thermodynamic basis of electrochemistry and membrane potentials.

*Prerequisite(s):* (CHE 002C or CHE 002CH or CHE 004C); (MAT 016C or MAT 017C or MAT 021C); (PHY 007C or PHY 009C or PHY 009HC).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## CHE 107B – Physical Chemistry for the Life Sciences (3 units)

*Course Description:* Continuation of CHE 107A. Kinetic theory of gases and transport processes in liquids. Chemical kinetics, enzyme kinetics and theories of reaction rates. Introduction to quantum theory, atomic and molecular structure, and spectroscopy. Application to problems in the biological sciences.

*Prerequisite(s):* CHE 107A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## CHE 108 – Molecular Biochemistry (3 units)

*Course Description:* Chemical principles and experimental methods applied to the biological sciences to understand the molecular structure and function of proteins, nucleic acids, carbohydrates, and membrane lipids.

*Prerequisite(s):* CHE 128C or CHE 118C.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Chemistry majors.

*Grade Mode:* Letter.

## CHE 110A – Physical Chemistry: Introduction to Quantum Mechanics (4 units)

*Course Description:* Introduction to the postulates and general principles of quantum mechanics. Approximations based on variational method and time independent perturbation theory. Application to harmonic oscillator, rigid rotor, one-electron and many-electron atoms, and homo-and heteronuclear diatomic molecules.

*Prerequisite(s):* (PHY 007C or PHY 009C or PHY 009HC); (CHE 002C or CHE 002CH or CHE 004C); (MAT 016C or MAT 017C or MAT 021C); completion of MAT 021D, MAT 022A, MAT 022AL; PHY 009C or PHY 009HC, strongly recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## CHE 110B – Physical Chemistry: Properties of Atoms & Molecules (4 units)

*Course Description:* Group theory. Application of quantum mechanics to polyatomic molecules and molecular spectroscopy. Intermolecular forces and the gas, liquid and solid states. Distributions, ensembles and partition functions. Transport properties.

*Prerequisite(s):* CHE 110A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## CHE 110C – Physical Chemistry: Thermodynamics, Equilibria & Kinetics (4 units)

*Course Description:* Development and application of the general principles of thermodynamics and statistical thermodynamics. Chemical kinetics, rate laws for chemical reactions and reaction mechanisms.

*Prerequisite(s):* CHE 110B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## CHE 115 – Instrumental Analysis (4 units)

*Course Description:* Intermediate theory and laboratory techniques in analytical and physical chemistry. Advanced data analysis methods and goodness-of-fit criteria. Fourier-transform spectroscopic methods and instrumentation. Mass spectrometry. Electrochemistry. Liquid chromatography.

*Prerequisite(s):* CHE 105; (CHE 110B (can be concurrent) or (CHE 107A, CHE 107B)).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

## CHE 118A – Organic Chemistry for Health & Life Sciences (4 units)

**Course Description:** The 118A-C series is for students planning professional school studies in health and life sciences. Rigorous, in-depth presentation of basic principles with emphasis on stereochemistry and spectroscopy and preparations and reactions of nonaromatic hydrocarbons, haloalkanes, alcohols and ethers.

**Prerequisite(s):** CHE 002C C- or better or CHE 002CH C- or better or CHE 004C C- or better.

**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 1.50 hour(s).

**Credit Limitation(s):** Only 2 units credit for students who have completed CHE 008A; not open for credit to students who have completed CHE 008B or CHE 128A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## CHE 118B – Organic Chemistry for Health & Life Sciences (4 units)

**Course Description:** Continuation of CHE 118A, with emphasis on spectroscopy and the preparation and reactions of aromatic hydrocarbons, organometallic compounds, aldehydes and ketones.

**Prerequisite(s):** CHE 118A or CHE 128A.

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s).

**Credit Limitation(s):** Only 1 unit of credit to students who completed CHE 128B.; not open for credit to students who have completed 8 or more units of CHE 128 and CHE 129.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## CHE 118C – Organic Chemistry for Health & Life Sciences (4 units)

**Course Description:** Continuation of CHE 118B, with emphasis on the preparation, reactions and identification of carboxylic acids and their derivatives, alkyl and acyl amines,  $\beta$ -dicarbonyl compounds, and various classes of naturally occurring, biologically important compounds.

**Prerequisite(s):** CHE 118B or (CHE 128B, CHE 129A).

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s).

**Enrollment Restriction(s):** Open to students changing from the CHE 128 course sequence only if they have completed prior organic laboratory work (at least course CHE 129A).

**Credit Limitation(s):** Not open for credit to students who have completed CHE 128C.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## CHE 121 – Introduction to Molecular Structure & Spectra (4 units)

**Course Description:** Modern theoretical and experimental methods used to study problems of molecular structure and bonding; emphasis on spectroscopic techniques.

**Prerequisite(s):** CHE 110B.

**Learning Activities:** Lecture 4 hour(s).

**Grade Mode:** Letter.

## CHE 122 – Chemistry of Nanoparticles (3 units)

**Course Description:** Chemical and physical aspects of inorganic nanoparticles. Topics include synthesis, structure, colloidal behavior, catalytic activity, size and shape dependency of physical properties, analytical methods and applications.

**Prerequisite(s):** CHE 110C (can be concurrent) or CHE 107B (can be concurrent).

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 124A – Inorganic Chemistry: Fundamentals (3 units)

**Course Description:** Symmetry, molecular geometry and structure, molecular orbital theory of bonding (polyatomic molecules and transition metals), solid state chemistry, energetics and spectroscopy of inorganic compounds.

**Prerequisite(s):** CHE 002C or CHE 002CH or CHE 004C.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## CHE 124B – Inorganic Chemistry: Main Group Elements (3 units)

**Course Description:** Synthesis, structure and reactivity of inorganic and heteroorganic molecules containing the main group elements.

**Prerequisite(s):** CHE 124A.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 124C – Inorganic Chemistry: D & F Block Elements (3 units)

**Course Description:** Synthesis, structure and reactivity of transition metal complexes, organometallic and bioinorganic chemistry, the lanthanides and actinides.

**Prerequisite(s):** CHE 124A.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 124L – Laboratory Methods in Inorganic Chemistry (2 units)

**Course Description:** The preparation, purification and characterization of main group and transition metal inorganic and organometallic compounds.

**Prerequisite(s):** CHE 124B or CHE 124C (can be concurrent).

**Learning Activities:** Laboratory 6 hour(s).

**Grade Mode:** Letter.

## CHE 125 – Advanced Methods in Physical Chemistry (4 units)

**Course Description:** Advanced theory and laboratory techniques in analytical and physical chemistry. Advanced spectroscopic methods. Thermodynamics. Kinetics. Chemical literature. Digital electronics and computer interfacing. Laboratory measurements and vacuum techniques.

**Prerequisite(s):** CHE 110C (can be concurrent); CHE 115.

**Learning Activities:** Lecture 2 hour(s), Laboratory 6 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

## CHE 128A – Organic Chemistry (3 units)

**Course Description:** Introduction to the basic concepts of organic chemistry with emphasis on stereochemistry and the chemistry of hydrocarbons. Designed primarily for majors in chemistry. Chemistry majors should enroll in CHE 129A concurrently. May be taught abroad.

**Prerequisite(s):** CHE 002C C or better or CHE 002CH C or better or CHE 004C C- or better.

**Learning Activities:** Lecture 3 hour(s).

**Credit Limitation(s):** Only 2 units credit allowed for students who have completed CHE 008A; not open for credit to students who have completed CHE 008B or 118A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## CHE 128B – Organic Chemistry (3 units)

**Course Description:** Continuation of CHE 128A with emphasis on the chemistry of alcohols, ethers, their sulfur analogs, and carbonyl compounds. Introduction to the application of spectroscopic methods to organic chemistry. Introduction to synthesis of moderately complex organic molecules. May be taught abroad.

**Prerequisite(s):** CHE 128A; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s).

**Credit Limitation(s):** Full credit to students who completed CHE 008B or CHE 118A; not open for credit to students who have completed CHE 118B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## CHE 128C – Organic Chemistry (3 units)

**Course Description:** Continuation of CHE 128B with emphasis on enolate condensations and the chemistry of amines, phenols, and sugars; selected biologically important compounds. May be taught abroad.

**Prerequisite(s):** CHE 128B.

**Learning Activities:** Lecture 3 hour(s).

**Credit Limitation(s):** Full credit to students who completed CHE 118B; Not open for credit to students who have completed CHE 118C.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## CHE 129A – Organic Chemistry Laboratory (2 units)

**Course Description:** Introduction to laboratory techniques of organic chemistry. Emphasis on methods used for separation and purification of organic compounds. May be taught abroad.

**Prerequisite(s):** (CHE 002C C or better or CHE 002CH C or better or CHE 004C C- or better); CHE 128A (can be concurrent).

**Learning Activities:** Lecture 1 hour(s), Laboratory 3 hour(s).

**Credit Limitation(s):** Full credit to students who completed CHE 008B; not open for credit to students who have completed CHE 118B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## CHE 129B – Organic Chemistry Laboratory (2 units)

**Course Description:** Continuation of CHE 129A. Emphasis on methods used for synthesis and isolation of organic compounds.

**Prerequisite(s):** CHE 129A; CHE 128B (can be concurrent).

**Learning Activities:** Laboratory 6 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed CHE 118C.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## CHE 129C – Organic Chemistry Laboratory (2 units)

**Course Description:** continuation of PHE 129B.

**Prerequisite(s):** CHE 128C (can be concurrent); CHE 129B.

**Learning Activities:** Laboratory 6 hour(s).

**Grade Mode:** Letter.

## CHE 130A – Principles of Medicinal Chemistry (3 units)

**Course Description:** Examination of the design principles and experimental methods used in pharmaceutical and medicinal chemistry. May be taught abroad.

**Prerequisite(s):** CHE 118C or CHE 128C.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 130B – Computational Drug Design (3 units)

**Course Description:** Continuation of CHE 130A with emphasis on case studies of various drugs and the use of computational methods in drug design. May be taught abroad.

**Prerequisite(s):** CHE 130A (can be concurrent).

**Learning Activities:** Lecture 2 hour(s), Lecture/Lab 1 hour(s).

**Grade Mode:** Letter.

## CHE 130C – Case Studies in Medicinal Chemistry (1 unit)

**Course Description:** Seminar. Exploration of medicinal and pharmaceutical chemistry topics through seminars presented by professional chemists (and allied professionals). Designed to highlight career opportunities for students with a degree in pharmaceutical chemistry.

**Prerequisite(s):** CHE 130A (can be concurrent); CHE 130B (can be concurrent).

**Learning Activities:** Seminar 2 hour(s), Independent Study.

**Grade Mode:** Pass/No Pass only.

## CHE 131 – Modern Methods of Organic Synthesis (3 units)

**Course Description:** Introduction to modern synthetic methodology in organic chemistry with emphasis on retrosynthetic analysis, reaction mechanisms, and application to multistep syntheses of pharmaceuticals and natural products.

**Prerequisite(s):** CHE 128C or CHE 118C.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## CHE 135 – Drug Development Laboratory (3 units)

**Course Description:** Separation, purification, identification and biological evaluation of organic compounds using modern methods of synthesis, computational chemistry and instrumentation. Emphasis on pharmaceutical and medicinal substances.

**Prerequisite(s):** CHE 130B (can be concurrent).

**Learning Activities:** Lecture 1 hour(s), Laboratory 6 hour(s).

**Grade Mode:** Letter.

**CHE 145 – Good Quality Practices (3 units)**

*Course Description:* Preparation for work in GQP laboratories in both research and industry. Context within GQP-Good Quality Practices (GMP Good Manufacturing Practice, GCP Good Clinical Practices). Lab practice in GQP skills.

*Prerequisite(s):* CHE 118B or CHE 129B.

*Learning Activities:* Discussion 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Open to Chemistry and science majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**CHE 150 – Chemistry of Natural Products (3 units)**

*Course Description:* Chemistry of terpenes, steroids, acetogenins, and alkaloids: isolation, structure determination, biosynthesis, chemical transformations, and total synthesis. May be taught abroad.

*Prerequisite(s):* CHE 118C or CHE 128C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**CHE 155 – Scientific Programming for Chemistry (3 units)**

*Course Description:* Chemical applications of computer programming with Python. Numpy, Scipy, Matplotlib libraries. Multidimensional arrays, data visualization, linear algebra routines. Force fields and molecular dynamics simulations. Numerical integration of differential equations with applications to chemical kinetics. Least squares fitting of experimental data.

*Prerequisite(s):* ECS 032A recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 168 – Chemical & Engineering Principles in Whisky & Fuel Alcohol Production (3 units)**

*Course Description:* Chemical & engineering principles underlying the manufacture of whisky & fuel alcohol. Biochemistry of malting. Assessment of grain modification & diastatic power, and of the phenol content of peated malt. Lautering as a problem of fluidized bed compaction. Fermentation and its assessment. Fractional distillation and the Rayleigh equation. The fate of congeners in pot and column distillation. Chemical reactions affecting flavor from kilning to maturation.

*Prerequisite(s):* CHE 128A; CHE 128B (can be concurrent); or consent of instructor.

*Learning Activities:* Laboratory 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to students aged 21 years or older; open to seniors in chemical engineering and seniors in chemistry; non-majors require consent of instructor.

*Cross Listing:* ECH 168.

*Grade Mode:* Letter.

**CHE 192 – Internship in Chemistry (1-6 units)**

*Course Description:* Supervised internship in chemistry; requires a final written report.

*Prerequisite(s):* Upper division standing; project approval by faculty sponsor prior to enrollment.

*Learning Activities:* Internship 3-18 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

**CHE 194HA – Undergraduate Honors Research (2 units)**

*Course Description:* Original research under the guidance of a faculty advisor, culminating in the writing of an extensive report.

*Prerequisite(s):* Open only to chemistry majors who have completed 135 units and who qualify for the honors program.

*Learning Activities:* Independent Study 2 hour(s).

*Grade Mode:* Letter.

**CHE 194HB – Undergraduate Honors Research (2 units)**

*Course Description:* Original research under the guidance of a faculty advisor, culminating in the writing of an extensive report.

*Prerequisite(s):* Open only to chemistry majors who have completed 135 units and who qualify for the honors program.

*Learning Activities:* Independent Study 2 hour(s).

*Grade Mode:* Letter.

**CHE 194HC – Undergraduate Honors Research (2 units)**

*Course Description:* Original research under the guidance of a faculty advisor, culminating in the writing of an extensive report.

*Prerequisite(s):* Open only to chemistry majors who have completed 135 units and who qualify for the honors program.

*Learning Activities:* Independent Study 2 hour(s).

*Grade Mode:* Letter.

**CHE 195 – Careers in Chemistry (1 unit)**

*Course Description:* Designed to give Chemistry undergraduate students an in-depth appreciation of career opportunities with a bachelors degree in chemistry. Professional chemists (and allied professionals) describe research and provide career insights.

*Prerequisite(s):* Junior or senior standing in Chemistry.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**CHE 197 – Projects in Chemical Education (1-4 units)**

*Course Description:* Participation may include development of laboratory experiments, lecture demonstrations, autotutorial modules or assistance with laboratory sessions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion/Laboratory.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**CHE 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor based upon adequate preparation in chemistry, mathematics and physics.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CHE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates. May be taught abroad.

*Prerequisite(s):* Consent of instructor based upon adequate preparation in chemistry, mathematics, and physics.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## CHE 201 – Chemical Uses of Symmetry & Group Theory (3 units)

*Course Description:* Symmetry elements and operations, point groups, representations of groups. Applications to molecular orbital theory, ligand field theory, molecular vibrations, and angular momentum. Crystallographic symmetry.

*Prerequisite(s):* CHE 124A; CHE 110B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 204 – Mathematical Methods in Chemistry (3 units)

*Course Description:* Introduction to mathematical and numerical methods in chemistry. Real and complex functions. Methods of integration. Differential equations. Linear algebra and matrices. Special functions. Integral transforms. Statistics.

*Prerequisite(s):* CHE 110C.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Graduate standing in Chemistry.

*Grade Mode:* Letter.

## CHE 205 – Symmetry, Spectroscopy, & Structure (3 units)

*Course Description:* Vibrational and rotational spectra; electronic spectra and photoelectron spectroscopy; magnetism; electron spin and nuclear quadrupole resonance spectroscopy; nuclear magnetic resonance spectroscopy; other spectroscopic methods.

*Prerequisite(s):* CHE 201; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 209 – Special Topics in Physical Chemistry (3 units)

*Course Description:* Advanced topics in physical chemistry, biophysical chemistry or chemical physics chosen from areas of current research interest.

*Prerequisite(s):* CHE 210A; CHE 211A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Graduate standing in Chemistry.

*Repeat Credit:* May be repeated when topics differ.

*Grade Mode:* Letter.

## CHE 210A – Quantum Chemistry: Introduction & Stationary-State Properties (3 units)

*Course Description:* Stationary-state quantum chemistry: postulates of quantum mechanics, simple solutions, central field problems and angular momenta, hydrogen atom, perturbation theory, variational theory, atoms and molecules.

*Prerequisite(s):* CHE 110B; CHE 110C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 210B – Quantum Chemistry: Time-Dependent Systems (3 units)

*Course Description:* Matrix mechanics and time-dependent quantum chemistry: matrix formulation of quantum mechanics, Heisenberg representation, time-dependent perturbation theory, selection rules, density matrices, and miscellaneous molecular properties.

*Prerequisite(s):* CHE 210A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 210C – Quantum Chemistry: Molecular Spectroscopy (3 units)

*Course Description:* Molecular spectroscopy: Born-Oppenheimer approximation, rotational, vibrational and electronic spectroscopy, spin systems, and molecular photophysics.

*Prerequisite(s):* CHE 210B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 211A – Advanced Physical Chemistry: Statistical Thermodynamics (3 units)

*Course Description:* Principles and applications of statistical mechanics; ensemble theory; statistical thermodynamics of gases, solids, liquids, electrolyte solutions and polymers; chemical equilibrium.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 211B – Statistical Mechanics (3 units)

*Course Description:* Statistical mechanics of nonequilibrium systems, including the rigorous kinetic theory of gases, continuum mechanics transport in dense fluids, stochastic processes, brownian motion and linear response theory.

*Prerequisite(s):* CHE 211A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 212 – Chemical Dynamics (3 units)

*Course Description:* Introduction to modern concepts in chemical reaction dynamics for graduate students in chemistry. Emphasis will be placed on experimental techniques as well as emerging physical models for characterizing chemical reactivity at a microscopic level.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 215 – Theoretical & Computational Chemistry (3 units)

*Course Description:* Mathematics of wide utility in chemistry, computational methods for guidance or alternative to experiment, and modern formulations of chemical theory. Emphasis will vary in successive years.

*Prerequisite(s):* CHE 211A; CHE 210B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**CHE 216 – Magnetic Resonance Spectroscopy (3 units)**

*Course Description:* Quantum mechanics of spin and orbital angular momentum, nuclear magnetic resonance, theory of chemical shift and multiplet structures, electron spin resonance, theory of tensor in organic and transition ions, spin Hamiltonians, nuclear quadrupolar resonance, spin relaxation processes.

*Prerequisite(s):* CHE 210A; CHE 210B (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 217 – X-Ray Structure Determination (3 units)**

*Course Description:* Introduction to x-ray structure determination; crystals, symmetry, diffraction geometry, sample preparation and handling, diffraction apparatus and data collection, methods of structure solution and refinement, presentation of results, text, tables and graphics, crystallographic literature.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 218 – Macromolecules: Physical Principles (3 units)**

*Course Description:* Relationship of higher order macromolecular structure to subunit composition; equilibrium properties and macromolecular dynamics; physical chemical determination of macromolecular structure.

*Prerequisite(s):* CHE 110A; CHE 110B; CHE 110C; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 219 – Spectroscopy of Organic Compounds (3 units)**

*Course Description:* Identification of organic compounds and investigation of stereochemical and reaction mechanism phenomena using spectroscopic methods—principally NMR, IR and MS.

*Prerequisite(s):* CHE 128C; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2.50 hour(s).

*Grade Mode:* Letter.

**CHE 219L – Laboratory in Spectroscopy of Organic Compounds (1 unit)**

*Course Description:* Practical application of NMR, IR and MS techniques for organic molecules.

*Prerequisite(s):* CHE 219 (can be concurrent).

*Learning Activities:* Laboratory 2.50 hour(s).

*Enrollment Restriction(s):* Restricted to Chemistry graduate students only or consent of instructor.

*Grade Mode:* Letter.

**CHE 221A – Special Topics in Organic Chemistry (3 units)**

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 221B – Special Topics in Organic Chemistry (3 units)**

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 221C – Special Topics in Organic Chemistry (3 units)**

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 221D – Special Topics in Organic Chemistry (3 units)**

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 221E – Special Topics in Organic Chemistry (3 units)**

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 221F – Special Topics in Organic Chemistry (3 units)**

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**CHE 221G – Special Topics in Organic Chemistry (3 units)**

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 221H – Special Topics in Organic Chemistry (3 units)

*Course Description:* Selected topics of current interest in organic chemistry. Topics will vary each time the course is offered, and in general will emphasize the research interests of the staff member giving the course.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 222 – Chemistry of Nanoparticles (3 units)

*Course Description:* Chemical and physical aspects of inorganic nanoparticles, including synthesis, purification, reactivity, characterization, and applications for technology. Emphasis is on problems from the current literature.

*Prerequisite(s):* CHE 110C; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CHE 122.

*Grade Mode:* Letter.

## CHE 226 – Principles of Transition Metal Chemistry (3 units)

*Course Description:* Electronic structures, bonding, and reactivity of transition metal compounds.

*Prerequisite(s):* CHE 124A; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 228A – Bio-inorganic Chemistry (3 units)

*Course Description:* Defines role of inorganic chemistry in the functioning of biological systems by identifying the functions of metal ions and main group compounds in biological systems and discussing the chemistry of model and isolated biological compounds. Offered every third year.

*Prerequisite(s):* CHE 226; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 228B – Main Group Chemistry (3 units)

*Course Description:* Synthesis, physical properties, reactions and bonding of main group compounds. Discussions of concepts of electron deficiency, hypervalency, and non-classical bonding. Chemistry of the main group elements will be treated systematically. Offered every third year.

*Prerequisite(s):* CHE 226; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 228C – Solid-State Chemistry (3 units)

*Course Description:* Design and synthesis, structure and bonding of solid-state compounds; physical properties and characterization of solids; topics of current interest such as low-dimensional materials, inorganic polymers, materials for catalysis. Offered every third year.

*Prerequisite(s):* CHE 124A; CHE 110B; CHE 226; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 228D – Homogeneous Catalysis (3 units)

*Course Description:* Overview of homogeneous catalysis and related methods, with emphasis on kinetics, mechanisms, and applications for organic synthesis. The related methods may include cluster, colloid, phase transfer, enzymatic, heterogeneous and polymer-supported catalysis. Offered every third year.

*Prerequisite(s):* CHE 226.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 228E – Magnetochemistry (3 units)

*Course Description:* Covers the basic principles and concepts of magnetism, methods used for characterization of magnetic properties, as well as specific state-of-the-art magnetic materials and topics from the recent chemistry literature.

*Prerequisite(s):* CHE 124A or CHE 201; or an equivalent class from either Physics or Chemical Engineering and Materials Science.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## CHE 231A – Organic Synthesis: Methods & Strategies (4 units)

*Course Description:* Current strategies and methods in synthetic organic chemistry. Focus on construction of carbon frameworks, control of relative and absolute stereochemistry and retrosynthetic strategies. Use of databases and molecular modeling software in multistep strategies.

*Prerequisite(s):* CHE 128C; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

## CHE 231B – Advanced Organic Synthesis (3 units)

*Course Description:* Current strategies and methods in synthetic organic chemistry. Continuation of CHE 231A. Organic synthesis of complex target molecules. Stereochemical considerations and asymmetric synthesis. Organometallics for selective transformations. Carbocyclic and heterocyclic ring formation.

*Prerequisite(s):* CHE 231A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 233 – Physical-Organic Chemistry (3 units)

*Course Description:* Introduction to elementary concepts in physicalorganic chemistry including the application of simple numerical techniques in characterizing and modeling organic reactions.

*Prerequisite(s):* CHE 128A; CHE 128B; CHE 128C; CHE 110A; CHE 110B; CHE 110C; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 234 – Chemical & Molecular Neuroscience (3 units)

*Course Description:* Basic principles in chemistry and molecular biology applied to questions in neuroscience. Chemical and molecular tools driving innovative work in chemical and molecular biology.

*Prerequisite(s):* CHE 128C; BIS 102; or equivalent courses.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## CHE 235 – Organometallic Chemistry in Organic Synthesis (3 units)

**Course Description:** Current trends in use of organometallics for organic synthesis; preparations, properties, applications, and limitations of organometallic reagents derived from transition and/or main group metals.

**Prerequisite(s):** CHE 128C.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 236 – Chemistry of Natural Products (3 units)

**Course Description:** Advanced treatment of chemistry of naturally occurring compounds isolated from a variety of sources. Topics will include isolation, structure determination, chemical transformations, total synthesis, biological activity, and biosynthesis. Biosynthetic origin will be used as a unifying theme.

**Prerequisite(s):** CHE 128C; or equivalent.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 237 – Bio-Organic Chemistry (3 units)

**Course Description:** Structure and function of biomolecules; molecular recognition; enzyme reaction mechanisms; design of suicide substrates for enzymes; enzyme engineering; design of artificial enzymes and application of enzymes in organic synthesis.

**Prerequisite(s):** Graduate standing in Chemistry or consent of instructor.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 238 – Introduction to Chemical Biology (3 units)

**Course Description:** Synthesis of complex molecules in nature. Use of biosynthetic pathways in synthesis of new chemical entities. Applications of small molecules in chemical genetics and structural biology. Solving biological problems using synthetic biomolecules.

**Prerequisite(s):** CHE 118C or CHE 128C; or equivalent; CHE 130A, CHE 130B and BIS 102, BIS 103, and BIS 104, or the equivalents recommended.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 240 – Advanced Analytical Chemistry (3 units)

**Course Description:** Numerical treatment of experimental data; thermodynamics of electrolyte and non-electrolyte solutions; complex equilibria in aqueous and non-aqueous solutions; potentiometry and specific ion electrodes; mass transfer in liquid solutions; fundamentals of separation science, including column, gas and liquid chromatography.

**Prerequisite(s):** CHE 110A; CHE 115; or equivalent.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 241A – Surface Analytical Chemistry (3 units)

**Course Description:** Concepts of surfaces and interfaces: physical properties, unique chemistry and electronic effects. Focus on gas-solid interfaces, with some discussion of liquid-solid interfaces.

**Prerequisite(s):** CHE 110C; or equivalent.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 241B – Laser & X-ray Spectroscopy (3 units)

**Course Description:** Concepts and mechanisms of light-matter interactions. Chemical applications of modern spectroscopic methods, including multiphoton spectroscopy, time-resolved laser and x-ray photolysis, and phase-contrast x-ray imaging.

**Prerequisite(s):** CHE 110B; or equivalent.

**Learning Activities:** Lecture 3 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Letter.

## CHE 241C – Mass Spectrometry (3 units)

**Course Description:** Mass spectrometry and related methods with emphasis on ionization methods, mass analyzers, and detectors. Related methods may include ion-molecule reactions, unimolecular dissociation of organic and bio-organic compounds, and applications in biological and environmental analysis.

**Prerequisite(s):** CHE 110C; CHE 115; or equivalent.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 241D – Electroanalytical Chemistry (3 units)

**Course Description:** Electroanalytical chemistry with consideration of mass transfer and electrode kinetics for polarizable electrodes. Current-potential curves for a variety of conditions, including both potentiostatic and galvanostatic control, and their application in chemical analysis.

**Prerequisite(s):** CHE 110C; CHE 115; or equivalent.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 241E – Microscopy & Imaging Techniques (3 units)

**Course Description:** Introduction to modern microscopy and imaging techniques: scanning tunneling, atomic force, far-field optical, fluorescence, scanning near-field optical, and scanning electron microscopy. Application to nanoscience and analytical and bioanalytical chemistry. Some laboratory demonstrations.

**Prerequisite(s):** CHE 110C; CHE 115; or equivalent.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 245 – Mechanistic Enzymology (3 units)

**Course Description:** Advanced topics in chemical kinetics relevant to enzymes, enzyme kinetics, theory of enzyme catalysis, and the analysis of a selection of organic enzyme reaction mechanisms by the tools introduced in the first part of the course.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## CHE 261 – Current Topics in Chemical Research (2 units)

**Course Description:** Designed to help chemistry graduate students develop and maintain familiarity with the current and past literature in their immediate field of research and related areas.

**Prerequisite(s):** Graduate standing in Chemistry or consent of instructor.

**Learning Activities:** Lecture 2 hour(s).

**Repeat Credit:** May be repeated when topic differs.

**Grade Mode:** Letter.

**CHE 262 – Introduction to Chemistry Research (1 unit)**

*Course Description:* Group and individual discussion of research activities in the Department and research topic selection. Designed for incoming graduate students preparing for higher degrees in chemistry.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students; Pass Two open to all majors.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 263 – Introduction to Chemical Research Methodology (3 units)**

*Course Description:* Introduction to identification, formulation, and solution of meaningful scientific problems including experimental design and/or theoretical analyses of new and prevailing techniques, theories and hypotheses. May be repeated for credit when topic differs.

*Prerequisite(s):* CHE 293; and consent of instructor; graduate student standing in Chemistry.

*Learning Activities:* Discussion/Laboratory 9 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 264 – Advanced Chemical Research Methodology (6 units)**

*Course Description:* Applications of the methodology developed in CHE 263 to experimental and theoretical studies. Advanced methods of interpretation of results are developed. Includes the preparation of manuscripts for publication.

*Prerequisite(s):* CHE 263; or consent of instructor.

*Learning Activities:* Discussion/Laboratory 18 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 290 – Seminar (2 units)**

*Course Description:* Seminar.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 294 – Presentation of Chemistry Research (1 unit)**

*Course Description:* Introduces first- and second-year Chemistry graduate students to the process of giving an effective research presentation.

Advanced Ph.D. students give formal seminars describing the design and execution of their research projects.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Chemistry who have not yet given their departmental presentation.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 295 – Careers in Chemistry (1 unit)**

*Course Description:* Designed to give Chemistry graduate students an in-depth appreciation of career opportunities with a M.S. or Ph.D. degree in chemistry. Professional chemists (and allied professionals) give seminars describing both research and career insights.

*Prerequisite(s):* Graduate standing in Chemistry.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 296 – Research in Pharmaceutical Chemistry (6 units)**

*Course Description:* Laboratory provides qualified graduate students with the opportunity to pursue original investigation in Pharmaceutical Chemistry and allied fields in order to fulfill the letter-graded research requirement of the Integrated B.S./M.S. Program in Chemistry (Pharmaceutical Chemistry Emphasis).

*Prerequisite(s):* CHE 130A; CHE 130B; CHE 135; CHE 233 (can be concurrent); and consent of instructor.

*Learning Activities:* Laboratory 18 hour(s).

*Enrollment Restriction(s):* Restricted to students in the Integrated B.S./M.S. Program in Chemistry.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

**CHE 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**CHE 299 – Research (1-12 units)**

*Course Description:* The laboratory is open to qualified graduate students who wish to pursue original investigation. Students wishing to enroll should communicate with the department well in advance of the quarter in which the work is to be undertaken.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 390 – Methods of Teaching Chemistry (2 units)**

*Course Description:* Practical experience in methods and problems of teaching chemistry. Includes analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting of discussion sessions and student laboratories. Participation in the teaching program required for Ph.D. in chemistry.

*Prerequisite(s):* Consent of instructor; graduate student standing in Chemistry.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHE 392 – Advanced Methods of Teaching Chemistry (2 units)**

*Course Description:* Advanced topics in teaching chemistry. Analysis and discussion of curricular design, curricula materials, teaching methods and evaluation. For students who are planning a career in teaching chemistry.

*Prerequisite(s):* CHE 390.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Chicano Studies (CHI)**

**College of Letters & Science**

**CHI 010 – Introduction to Chicana/o Studies (4 units)**

*Course Description:* Analysis of the situation of the Chicana/o (Mexican-American) people, emphasizing their history, literature, political movements, education and related areas.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**CHI 021 – Chicana/o & Latina/o Health Care Issues (4 units)**

*Course Description:* Overview of health issues of Chicanas/os and Latinas/os in the State of California; role of poverty/lack of education in limited access to health care.

*Prerequisite(s):* CHI 010.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Writing Experience (WE).

**CHI 021S – Chicana/o & Latina/o Health Care Issues (4 units)**

*Course Description:* Overview of health issues of Chicanas/os and Latinas/os in the State of California; role of poverty/lack of education and limited access to health care. All course instruction in Spanish. May be taught abroad.

*Prerequisite(s):* SPA 003 or SPA 003V or SPA 003Y; or equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHI 021.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**CHI 023 – Qualitative Research Methods (4 units)**

*Course Description:* Dominant models of qualitative inquiry in educational and social science research as well as mestizo approaches to research with latinos. Emphasis given to choosing and designing culturally appropriate strategies to investigate latino health, education, social context, and policy issues.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

**CHI 030 – United States Political Institutions & Chicanas/os (4 units)**

*Course Description:* Overview of the major political institutions and ideologies of the United States and the Chicana/o people's historical and contemporary role in, effects from, and responses to them. Theory, method and critical analysis.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**CHI 040 – Comparative Health: Top Leading Causes of Death (4 units)**

*Course Description:* Introduction to the epidemiology of the leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer and die from chronic and infectious diseases and injuries and statistical methods used to calculate these rates.

*Prerequisite(s):* STA 013 or STA 013Y; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHI 040S.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

**CHI 040S – Comparative Health: Leading Causes of Death (4 units)**

*Course Description:* Introduction to epidemiology of leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer & die from chronic and infectious diseases & injuries & statistical methods used to calculate these rates. May be taught abroad.

*Prerequisite(s):* STA 013 or STA 013Y; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHI 040.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); World Cultures (WC); Writing Experience (WE).

**CHI 042 – Food Justice: Chicana/o & Indigenous Communities (4 units)**

*Course Description:* Issues surrounding food justice in Chicana/o and Indigenous Communities. Emphasis on discourses and practices of growing a food justice movement centered on the ecological care of the earth and decolonized environmental methodologies.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Scientific Literacy (SL); Visual Literacy (VL).

**CHI 050 – Chicana & Chicano Culture (4 units)**

*Course Description:* Interdisciplinary survey of Chicana/o cultural representation in the 20th century. Examines Chicana/o culture within a national and transnational context. Explores how Chicano cultural forms and practices intersect with social/material forces, intellectual formations and cultural discourses. (Former CHI 020.)

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **CHI 060 – Chicana & Chicano Representation in Cinema (4 units)**

*Course Description:* Introductory-level study of Chicana and Chicano representation in cinema. Depiction of Chicana and Chicano experience by Chicana/o filmmakers, as well as by non-Chicanos, including independent filmmakers and the commercial industry.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Film Viewing 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

## **CHI 065 – New Latin American Cinema (4 units)**

*Course Description:* Historical, critical, and theoretical survey of the cinemas of Latin America and their relationship to the emergence of U.S. Latino cinema. Emphasis on representation and social identity including gender, sexuality, class, race and ethnicity.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CHI 070 – Survey of Chicana/o Art (4 units)**

*Course Description:* Survey of contemporary Chicana/o art in context of the social turmoil from which it springs. Includes political use of the poster and the mural, the influence of the Mexican mural and graphic movement, and social responsibility of the artist.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CHI 073 – Chicana/o Art Expression Through Silk Screen (4 units)**

*Course Description:* Introductory level studio course using silk screen and basic printing techniques to explore and develop images of Chicana/o cultural themes and expressions. Students experiment with images and symbols from their immediate environment/culture. Integrated approach to Chicana/o philosophy of art.

*Learning Activities:* Studio 8 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

## **CHI 092 – Internship (1-12 units)**

*Course Description:* Academic guidance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/Chicano clients. Students will use their bilingual skills and knowledge of history, culture, economics, politics and social issues.

*Prerequisite(s):* CHI 010; or consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **CHI 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CHI 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CHI 100 – Chicana/o Theoretical Perspective (4 units)**

*Course Description:* Critical examination of emerging Chicana/o Studies theoretical perspectives in light of contemporary intellectual frameworks in the social sciences, arts, and humanities. Includes analysis of practices of self-representation, and socio-cultural developments in the Chicana/o community.

*Prerequisite(s):* CHI 010; CHI 050.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **CHI 102A – Chicana/o Feminist Theoretical Understandings of K-20 Educational Disparities (4 units)**

*Course Description:* Examination of educational disparities of the K-20 educational system. Chicana/o education theory and analysis with a specific emphasis on feminist frameworks and analytical tools used to guide and inform educational policy-making.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

## **CHI 102B – Grassroots Community Activism & Mobilization Efforts Challenging Educational Inequity (4 units)**

*Course Description:* Exploration and research on effective grassroots community activism and mobilization efforts by Chicana/o students, along with their teachers, families, and other allies to protest structured inequality of the U.S. educational system. Mentoring and tutoring in a school under the supervision of a faculty member is required.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

## **CHI 102C – Policy & Law Challenging Segregation & Educational Inequity (4 units)**

*Course Description:* Focus on successful lawsuits against school segregation of Mexican-origin children in the United States. Mentoring and tutoring in a school under the supervision of a faculty member is required.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

## **CHI 110 – Sociology of the Chicana/o Experience (4 units)**

*Course Description:* The Chicana/o experience in the American society and economy viewed from theoretical perspectives. Immigration, history of integration of Chicana/o labor into American class structure, education inequality, ethnicity, the family and Chicana/o politics. (Former course SOC 110.)

*Prerequisite(s):* CHI 010 or SOC 001.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 111 – Chicanas/Mexicanas in Contemporary Society (4 units)**

*Course Description:* Analysis of the role and status of Chicanas/Mexicanas in contemporary society. Special emphasis on their historical role, the political, economic and social institutions that have affected their status, and their contributions to society and their community. (Former CHI 102.)

*Prerequisite(s):* CHI 010 or CHI 050; (WMS 050 or HIS 169B).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CHI 112 – Globalization, Transnational Migration, & Chicana/o & Latina/o Communities (4 units)**

*Course Description:* Chicana/o and Latina/o migration experiences within a global context. Topics include national and/or transnational migration in Mexico, Central America, and the United States.

*Prerequisite(s):* CHI 010.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 113 – Latin American Women's Engagement in Social Movements (4 units)**

*Course Description:* Examination of how women of different racial/ethnic and class backgrounds in Latin America challenge their marginalization. Exploration of US foreign policy, its effects on Latin American's institutions and on Latin American citizens. Using Chicana feminist perspective.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **CHI 114 – Women of Color Reproductive Health & Reproductive Politics in a Global Perspective (4 units)**

*Course Description:* Study contemporary issues in reproductive health and reproductive politics, both globally and in the U.S., for women of color.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **CHI 114S – Women of Color Reproductive Health & Gender Politics in Cuba & the U.S. (4 units)**

*Course Description:* Study of contemporary issues in reproductive health, reproductive politics, and gender politics both in Cuba and in the U.S., for women of color.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **CHI 120 – Chicana/o Psychology (4 units)**

*Course Description:* Introduction to the field of Chicana/o psychology. Analysis of socio-cultural context of Chicanas/os and Latinas/os. Special attention to issues of ethnic identity development, bilingualism, and development of self esteem. Impact of minority experience, migration, acculturation are examined.

*Prerequisite(s):* CHI 021; Introductory psychology course recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 121 – Chicana/o Community Mental Health (4 units)**

*Course Description:* Mental health needs, problems, and service utilization patterns of Chicanas/os and Latinas/os will be analyzed. Analysis of social service policy, and the economic context of mental health programs.

*Prerequisite(s):* CHI 010; or CHI 020.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 122 – Psychology Perspectives Chicana/o & Latina/o Family (4 units)**

*Course Description:* Role of migration and acculturation on family structure and functioning. From a psychological and Chicana/o Studies perspective, contemporary gender roles and variations in family structures are examined. Special topics include family violence, addiction, family resilience and coping strategies.

*Prerequisite(s):* CHI 010; and consent of instructor; introductory psychology course highly recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CHI 122S – Psychology Perspectives Chicana/o & Latina/o Family (4 units)**

*Course Description:* Role of migration and acculturation on family structure and functioning. From a psychological and Chicana/o Studies perspective, contemporary gender roles and variations in family structures are examined. Special topics include family violence, addiction, family resilience and coping strategies. May be taught abroad.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHI 122.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **CHI 123 – Psychological perspectives on Chicana/o & Latina/o Children & Adolescents (4 units)**

*Course Description:* Psychological and educational development of Chicano/Latino children and adolescents, with particular attention to the formation of ethnic, gender, class, race, and sexual identities.

*Prerequisite(s):* CHI 010 or CHI 021.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 125S – Latino Families in the Age of Globalization: Migration & Transculturation (4 units)**

*Course Description:* Impact of globalization on Latino families in the American continent. Relationships of political structure, economics and family. Intimate partner violence, child maltreatment and alcohol/drug abuse in contemporary Latino families. Offered in a Spanish speaking country; may be taught abroad.

*Prerequisite(s):* SPA 003 or the equivalent highly recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **CHI 130 – United States-Mexican Border Relations (4 units)**

*Course Description:* Theories of U.S.-Mexican border relations, with an overview of the political, economic, and social relationships and an in-depth analysis of immigration issues, border industrialization, women's organizations, economic crises, and legal issues.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CHI 131 – Chicanas in Politics & Public Policy (4 units)**

*Course Description:* Historical and political analysis of Chicana/Latina political involvement and activities in the general political system, women's movement, Chicano movement, and Chicana movement. Examines the public policy process and the relationship of Chicanas/Latinas to public policy formation.

*Prerequisite(s):* CHI 030 or POL 001.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 131S – Chicanas in Politics & Public Policy (4 units)**

*Course Description:* Historical and political analysis of Chicana/Latina political involvement and activities in the general political system, women's movement, Chicano/a movement. Examines the public policy process and the relationship of Chicanas/Latinas to public policy formation. May be taught abroad.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHI 131.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **CHI 132 – Political Economy of Chicana/o Communities (4 units)**

*Course Description:* Historical and contemporary study of political and economic forces which define and influence the development of Chicana/o communities. Includes critiques of traditional and Marxian theories and concepts applicable to Chicana/o communities, case studies of Chicana/o communities, especially in California and Texas.

*Prerequisite(s):* Upper division standing; lower division Chicana/o Studies (CHI) course recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 135S – Transnational Latina/o Political Economy (4 units)**

*Course Description:* Intensive reading, discussion and research on selected topics from Latin America and the U.S. with regard to immigrant and native communities. Topics include comparative immigration and macroeconomic policies in the U.S. and Latin America. Offered in a Spanish speaking country; may be taught abroad.

*Prerequisite(s):* SPA 003 or SPA 003V or SPA 003Y; or consent of instructor, or equivalent; ECN 001A and ECN 001B recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**CHI 136 – Critical & Abolitionist Pedagogies (4 units)**

*Course Description:* How marginalized groups conceptualize learning and teaching as a practice of freedom. Foundational text and concepts in critical pedagogy. Diverse and intersecting intellectual traditions that inform how oppressed peoples use education as a tool of liberation.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CHI 140A – Quantitative Methods: Chicano/Latino Health Research (4 units)**

*Course Description:* Focuses on measuring Latino/Chicano health outcomes using a quantitative approach. Assesses main types of study designs and addresses measurement of disease frequency and health effects.

*Prerequisite(s):* Two years of high school algebra or the equivalent in college.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Quantitative Literacy (QL).

**CHI 141 – Community-Based Participatory Research & Chicana/o & Latina/o Health (4 units)**

*Course Description:* Overview of CBPR, as well as methodological CBPR considerations in building community partnerships, community assessment, issue analysis, research planning, data gathering, and data sharing with Chicana/o and Latina/o communities in particular.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Domestic Diversity (DD); Writing Experience (WE).

**CHI 145S – Bi-National Health (5 units)**

*Course Description:* Examination of health status and intervention strategies presented in public health care settings, private clinics and by indigenous healers in Mexico. Analysis of impact of high risk diseases. Offered in a Spanish speaking country under supervision of UC Davis faculty/lecturer; may be taught abroad.

*Prerequisite(s):* BIS 001A; BIS 001B; BIS 001C; (SPA 021 or SPA 021V or SPA 021Y or SPA 031); or consent of instructor. Upper division standing only.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**CHI 146S – Public Health in Latin America (5 units)**

*Course Description:* Critical examination of emerging Public Health issues in Latin America in light of economic, political and social conditions. Contemporary behavioral frameworks used in public health. Includes analysis of clinical medicine and health care systems.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper.

*Grade Mode:* Letter.

**CHI 147S – Indigenous Healing & Biodiversity in Latin America (5 units)**

*Course Description:* Contrast between western and traditional healing practices in Latin America and the role of the natural environment in creating sustainable health delivery systems. Questions of health status attributable to public health and environmental risk factors. May be taught abroad.

*Learning Activities:* Lecture 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**CHI 148 – Decolonizing Spirit (4 units)**

*Course Description:* Legacies of colonization and decolonization; indigenous forms of spirituality and sacredness. Emphasis on remembering traditions, practices, relations, and forms of indigenous knowledge.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CHI 150 – The Chicana & Chicano Movement (4 units)**

*Course Description:* Development of the Chicano Movement within the context of the socio-political movements of the 1960's in a national and global perspective. Ideological/political perspectives and the implications for political strategies.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**CHI 154 – The Chicana/o Novel (4 units)**

*Course Description:* Introduction to the forms and themes of the Chicana/o novel with special attention to the construction of gender, nationality, sexuality, social class, and the family by contemporary Chicana/o novelists. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course SPA 126A.)

*Prerequisite(s):* Intermediate Spanish or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**CHI 155 – Chicana/o Theater (4 units)**

*Course Description:* Examination of the formal and thematic dimensions of Chicana/o theater in the contemporary period with special emphasis on El Teatro Campesino and Chicana Feminist Theater. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course SPA 126B.)

*Prerequisite(s):* Intermediate Spanish or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CHI 156 – Chicana/o Poetry (4 units)**

*Course Description:* Survey of Chicana/o poetry with special emphasis on its thematic and formal dimensions. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course SPA 126C.)

*Prerequisite(s):* Intermediate Spanish or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**CHI 157 – Chicana & Chicano Narrative (4 units)**

*Course Description:* Exploration of contemporary forms of the Chicana and Chicano narrative, encompassing visual art, fiction, poetry, film, theater, and creative nonfiction. Exposure to a variety of artists and scholars whose work shapes our evolving understanding of the Chicana/o experience.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CHI 158 – Contemporary Issues in Latinx Literature (4 units)**

*Course Description:* Contemporary Chicanx Literature within the broader umbrella of Latinx Literature. Genres, including fiction, nonfiction, and poetry, but also hybrid and mixed genre texts. New trends and topics relating to 21st Century Latinx authors, including intersectionality and multiple identities, AfroLatinx and Indigenous identity, Queer representation, Young Adult literature, and undocumented writers.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CHI 160 – Mexican Film & Greater Mexican Identity (4 units)**

*Course Description:* Survey of the role Mexican cinema plays in consolidation and contestation of post-revolutionary Mexican state and in the formation of a Greater Mexican cultural identity including Chicana/o identity. Showcases genres, perios, auteurs, movements and emphasis on gendered and sexualized narratives.

*Prerequisite(s):* Intermediate Spanish.

*Learning Activities:* Lecture/Discussion 4 hour(s), Film Viewing 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CHI 161 – Queer Latinidad (4 units)**

*Course Description:* Introduction to queer Latina and Latino studies with a focus on Chicana and Chicano theory and cultural production.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**CHI 165 – Chicanas, Latinas & Mexicanas in Commercial Media (4 units)**

*Course Description:* The portrayal of Chicanas, Latinas and Mexicanas in commercial media. The relation between the representation of Chicana, Latina, and Mexicana women in commercial television and cinema and the role of women in Mexican and U.S. societies.

*Prerequisite(s):* CHI 060; or other film or feminist theory course; conversational fluency in Spanish.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CHI 170 – Contemporary Issues in Chicano Art (4 units)**

*Course Description:* Issues and conflicts in the dismantling of the Contemporary Chicano Art Movement. Response and challenge to the dominant culture.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CHI 171 – Mexican & Chicano Mural Workshop (4 units)**

*Course Description:* The Mural: a collective art process that empowers students and people through design and execution of mural paintings in the tradition of the Mexican Mural Movement; introduces materials and techniques.

*Prerequisite(s):* CHI 070; and consent of instructor.

*Learning Activities:* Studio 8 hour(s), Independent Study 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Cross Listing:* ART 171.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CHI 172 – Chicana/o Voice/Poster Silk Screen Workshop (4 units)**

*Course Description:* The poster as a voice art form used by Chicanas/os and other people of color to point to the defects of social and political existence and the possibility for change, from the Chicana/o artists' perspective.

*Prerequisite(s):* CHI 070 or CHI 073; and consent of instructor.

*Learning Activities:* Studio 8 hour(s), Independent Study 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

**CHI 180 – Grant Writing in the Chicana/o/Latina/o Community (4 units)**

*Course Description:* Overview of key elements for grant writing. Topics include community needs assessments, development of human subjects protocols, data collection, methods, evaluation designs and community based methodologies for grant development applications in the Latino community.

*Prerequisite(s):* CHI 010 or CHI 023; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Upper division standing.

*Grade Mode:* Letter.

## **CHI 181 – Chicanas & Latinas in the U.S.: Historical Perspectives (4 units)**

*Course Description:* Historical issues in the lives of Chicanas and Latinas in the U.S. and their diverse countries of origin.

*Prerequisite(s):* CHI 010 or WMS 050.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CHI 182 – Race & Juvenile Justice (4 units)**

*Course Description:* Individual and institutional responses to "troublesome" youth of color through history and in contemporary society. Emphasis on how race, as well as ethnicity, class, and gender have informed the treatment of "delinquent" youth.

*Prerequisite(s):* CHI 010; or equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **CHI 184 – Latino Youth Gangs in Global Perspective (4 units)**

*Course Description:* Comparative analysis of Latino youth gangs in Europe, Latin America, and the United States. Social, economic, political, and cultural factors leading to youth gangs as well as the responses are considered within a global perspective.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed CHI 184S.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **CHI 184S – Latino Youth Gangs in Global Perspective (4 units)**

*Course Description:* Comparative analysis of Latino youth gangs in Europe, Latin America, and the United States. Social, economic, political, and cultural factors leading to youth gangs as well as the responses to the youths are considered within a global perspective. May be taught abroad.

*Learning Activities:* Lecture/Discussion 12 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHI 184.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **CHI 192 – Internship in the Chicana/Chicano/Latina/ Latino Community (1-12 units)**

*Course Description:* Academic guidance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/ Chicano clients. Use of bilingual skills and knowledge of history, culture, economics, politics and social issues. Internship project required.

*Prerequisite(s):* (CHI 010 or CHI 021 or CHI 050); (SPA 003 or SPA 003V or SPA 003Y); or equivalent of SPA 003.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Oral Skills (OL).

## **CHI 192S – Internship (1-12 units)**

*Course Description:* Internship. May be taught abroad.

*Prerequisite(s):* (CHI 010 or CHI 021 or CHI 050); (SPA 003 or SPA 003V or SPA 003Y); and consent of instructor, or equivalent of SPA 003, SPA 003V, SPA 003Y.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **CHI 194HA – Senior Honors Research Project (2-5 units)**

*Course Description:* Student is required to read, research, and write Honors Thesis on Chicana/o Studies topics.

*Prerequisite(s):* Consent of instructor; senior standing in Chicana/o Studies major.

*Learning Activities:* Independent Study 6-15 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Writing Experience (WE).

## **CHI 194HB – Senior Honors Research Project (2-5 units)**

*Course Description:* Student is required to read, research, and write Honors Thesis on Chicana/o Studies topics.

*Prerequisite(s):* Consent of instructor; senior standing in Chicana/o Studies major.

*Learning Activities:* Independent Study 6-15 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Writing Experience (WE).

## **CHI 194HC – Senior Honors Research Project (2-5 units)**

*Course Description:* Student is required to read, research, and write Honors Thesis on Chicana/o Studies topics.

*Prerequisite(s):* Consent of instructor; senior standing in Chicana/o Studies major.

*Learning Activities:* Independent Study 6-15 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Writing Experience (WE).

## **CHI 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Upper division standing and consent of Program Chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CHI 198S – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**CHI 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Upper division standing and consent of Program Chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CHI 199S – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**CHI 230 – Chicano/Latino Hispanic Politics (4 units)**

*Course Description:* Examination of Chicano/Latino political experiences. Evaluate theories, ideology, and practice of Chicano politics. Brief history of Chicano/Latino/Hispanic political activity, comparisons among political modes, gendered politics, and understanding relationships among Chicano, Mexican, American and world politics.

*Prerequisite(s):* Two undergraduate courses in Chicana/o Studies (CHI) or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CHI 241 – Community Based Participatory Research (4 units)**

*Course Description:* Provides knowledge & skills to plan and implement participatory & community based projects that highlight community empowerment framework.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CHI 298 – Group Study for Graduate Students (1-5 units)**

*Course Description:* Group study for graduate students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* .

*Repeat Credit:* May be repeated when topics differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHI 299 – Special Study for Graduate Students (1-12 units)**

*Course Description:* Special study for graduate students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* .

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHI 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Chinese (CHN)****College of Letters & Science****CHN 001 – Elementary Chinese (5 units)**

*Course Description:* Developing elementary level skills of listening, speaking, reading and writing in Mandarin Chinese in everyday communication settings. Introduction of fundamentals of pronunciation, grammar, and Chinese characters will be introduced.

*Prerequisite(s):* No background in Chinese or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**CHN 001A – Accelerated Intensive Elementary Chinese (15 units)**

*Course Description:* Introduction and practice in contexts of pronunciation, writing system, basic grammar and vocabulary as basis of communicative competency in Mandarin Chinese within a special nine-week intensive course which combines CHN 001, CHN 002 and CHN 003.

*Prerequisite(s):* No background in Chinese or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 001, CHN 002, or CHN 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**CHN 001BL – Accelerated Written Chinese I (5 units)**

*Course Description:* Trainings on all the communicative skills of listening, speaking, reading, and writing for students who already have elementary level ability to understand or speak Mandarin Chinese. Emphasizes on standard Mandarin pronunciation, Chinese characters, and discourse level conversations.

*Prerequisite(s):* Placement exam or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 008.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 001CN – Mandarin for Cantonese Speakers I (5 units)**

*Course Description:* Training in spoken Mandarin, particularly in the phonetic transcription system known as pinyin, for students who already read and write Chinese.

*Prerequisite(s):* Placement exam or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 007.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 002 – Elementary Chinese (5 units)**

*Course Description:* Continuation of elementary level skill development in listening, speaking, reading and writing Mandarin Chinese in everyday communication settings. Continued introduction of basic vocabulary and characters as well as core grammar, and further train pronunciation.

*Prerequisite(s):* CHN 001; or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 002BL – Accelerated Written Chinese II (5 units)**

*Course Description:* Further trainings on all the communicative skills of listening, speaking, reading, and writing for students that already have elementary level ability to understand or speak Mandarin Chinese. Emphases on standard Mandarin pronunciation, Chinese characters, and discourse level conversations.

*Prerequisite(s):* CHN 001BL; or placement exam or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 018.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 002CN – Mandarin for Cantonese Speakers II (5 units)**

*Course Description:* Continuation of CHN 001CN. Training in spoken Mandarin for students who can already read and write Chinese.

*Prerequisite(s):* CHN 001CN; or placement exam or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 017.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 003 – Elementary Chinese (5 units)**

*Course Description:* Continuation of elementary level skill development in listening, speaking, reading and writing Mandarin Chinese in everyday communication settings. Continued introduction of basic vocabulary and characters as well as core grammar, and further train pronunciation.

*Prerequisite(s):* CHN 002; or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 003BL – Accelerated Written Chinese III (5 units)**

*Course Description:* Continuation of CHN 002BL with further trainings on all the communicative skills of listening, speaking, reading, and writing with emphases on standard Mandarin pronunciation, Chinese characters, and discourse level conversations in more communication settings.

*Prerequisite(s):* CHN 002BL; or placement exam or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 028.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 003CN – Mandarin for Cantonese Speakers III (5 units)**

*Course Description:* Continuation of CHN 002CN. Prepares students for entering upper division courses in Chinese.

*Prerequisite(s):* CHN 002CN; or placement exam or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 027.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 004 – Intermediate Chinese (5 units)**

*Course Description:* Continuation of intermediate-level communication skills in spoken and written Mandarin, based on language skills developed in CHN 003.

*Prerequisite(s):* CHN 003 or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 004A – Accelerated Intensive Intermediate Chinese (15 units)**

*Course Description:* Special nine-week accelerated, intensive summer session course that combines the work of CHN 004, CHN 005, and CHN 006. Intermediate-level training in spoken and written Chinese in cultural and communicative contexts, based on language skills developed in CHN 003 or CHN 001A.

*Prerequisite(s):* CHN 003 or CHN 001A or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open to students who have completed CHN 004, CHN 005, or CHN 006.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 005 – Intermediate Chinese (5 units)**

*Course Description:* Training continues at intermediate-level in spoken and written Chinese in cultural contexts, based on language skills developed in CHN 004.

*Prerequisite(s):* CHN 004 or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**CHN 006 – Intermediate Chinese (5 units)**

*Course Description:* Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in CHN 005.

*Prerequisite(s):* CHN 005; CHN 005 or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**CHN 007 – Chinese Business Culture (4 units)**

*Course Description:* Introduction to business culture of China. Basic conversation and Romanization of Chinese words.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to non-heritage students who have no prior knowledge of, or background in, the Chinese language; anyone who has taken Chinese language classes before or after being enrolled at UC Davis, or anyone who is currently enrolled in a Chinese language class, or who speaks any Mandarin or Chinese dialect (e.g., Cantonese), cannot take the course for credit without the instructor's permission.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC).

**CHN 009 – Introduction to Chinese Language & Culture (4 units)**

*Course Description:* Chinese culture through the lens of Chinese language. Relationship of language to religion, food, arts, ethnic groups, dialects, writing systems, etc. All readings are in English; no previous background is necessary.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 010 – Modern Chinese Literature (In English) (4 units)**

*Course Description:* Introductory course requiring no knowledge of Chinese language or history. Reading and discussion of short stories and novels and viewing of two films. Designed to convey a feeling for what China has experienced in the 20th century.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have already taken, or are taking concurrently, CHN 104.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 011 – Great Books of China (in English) (4 units)**

*Course Description:* Readings in English translation of classical and medieval Chinese poetry, Chinese historiography, tales of the supernatural, Tang romances, opera, and late imperial era vernacular literature, with key works by Sima Qian, Gan Bao, Tao Qian, Han Yu, and Feng Menglong. Background information on periods, authors and the interrelationships of culture, literature and social change.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 050 – Introduction to the Literature of China & Japan (4 units)**

*Course Description:* Methods of literary analysis and their application to major works from the various genres of Chinese and Japanese literature (in translation), including film. East Asian cultural traditions will also be introduced.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* JPN 050.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CHN 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CHN 100A – Daoist Traditions (4 units)**

*Course Description:* English-language survey of key Daoist texts and scholarship. Topics include Daoist concepts of the cosmos, the natural world, scripture, the body, and immortality; Daoist divinities; Daoism and the state.

*Prerequisite(s):* A course in Chinese history recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* RST 175A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CHN 100B – Confucian Traditions (4 units)**

*Course Description:* Key aspects of the Confucian tradition in dynastic China. Major themes addressed include ritual, classical studies, and Confucian influences on the Chinese family and state.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 101 – Chinese Film (4 units)**

*Course Description:* English language survey of Chinese film, from its inception to the end of the 20th century. Chinese films as important texts for understanding national, transnational, racial, gender, and class politics of modern China.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**CHN 103 – Modern Chinese Drama (4 units)**

*Course Description:* English language survey of modern Chinese spoken drama in the 20th century and its major playwrights, in the context of Chinese history and the interaction of Chinese culture with other cultures.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**CHN 104 – Modern Chinese Fiction (in English) (4 units)**

*Course Description:* English language survey of Chinese fiction as it evolved amidst the great historical, social and cultural changes of the 20th century. Thorough study of the most influential writers and genres.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 105 – Western Influences on 20th-Century Chinese Literature (in English) (4 units)**

*Course Description:* Introduction of Western literary thought into modern China, the experimentation with Western literary forms and techniques, and the development of Marxism in contemporary literary writing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 106 – Chinese Poetry (in English) (4 units)**

*Course Description:* Organized topically and chronologically, the lyric tradition is explored from the dawn of folk songs down to modern expressions of social protest. Topics include friendship, love, oppression, war, parting, death, ecstasy and beauty. All readings are in English.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 107 – Traditional Chinese Fiction (in English) (4 units)**

*Course Description:* Dawn of Chinese fiction and its development down to modern times. Survey of literary history with close reading of representative works. Readings, lectures, and discussions in English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CHN 108 – Poetry of China & Japan (in English) (4 units)**

*Course Description:* A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* JPN 108.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 109A – Topics in Chinese Literature: Crime & Punishment (4 units)**

*Course Description:* Examines how crime and punishment have been represented in traditional Chinese short stories, novels, operas, and histories.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CHN 109C – Topics in Chinese Literature: Women Writers (in English) (4 units)**

*Course Description:* Topics in Chinese literature; women writers.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 109D – Topics in Chinese Literature: The Knight-Errant (in English) (4 units)**

*Course Description:* Topics in Chinese literature; the knight-errant.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 109E – Topics in Chinese Literature: The City in Fiction (in English) (4 units)**

*Course Description:* Topics in Chinese literature; the city in fiction.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 109G – Topics in Chinese Literature: The Literature of 20th-Century Taiwan (in English) (4 units)**

*Course Description:* Topics in Chinese literature; the literature of 20th-century Taiwan.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 109H – Topics in Chinese Literature: Popular Literature (in English) (4 units)**

*Course Description:* Topics in Chinese literature; popular literature.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 109I – Topics in Chinese Literature: Scholar & The Courtesan (in English) (4 units)**

*Course Description:* Chinese romance stories, focusing on depictions of scholars and courtesans in Tang fables, late imperial operas, Ming short-stories, and 19th-century novels.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **CHN 110 – Great Writers of China: Texts & Context (in English) (4 units)**

**Course Description:** Examination of major theoretical concepts and interpretive methods in the study of literature by using examples from the Chinese tradition; discussions of classical and modern works with an emphasis on the relations between literature, author, society, and culture.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); World Cultures (WC).

## **CHN 111 – Modern Chinese: Reading & Discussion (4 units)**

**Course Description:** Building on Chinese 006/003BL, further development of communication skills in Modern Standard Mandarin-speaking environments. Reading of dialogues/articles pertaining to contemporary China.

**Prerequisite(s):** CHN 006 C- or better or CHN 003BL C- or better or CHN 004A C- or better; or placement exam or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment in Chinese language courses is not allowed.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 111A – Intensive Third-Year Chinese (12 units)**

**Course Description:** Nine-week intensive summer course combines CHN 111, CHN 112, and CHN 113. Training at intermediate-high and advanced-low level in spoken and written Chinese in cultural and communicative contexts based on language skills developed in CHN 006.

**Prerequisite(s):** CHN 006 or CHN 003BL or CHN 004A; or placement exam or consent of instructor.

**Learning Activities:** Lecture/Discussion 13.30 hour(s).

**Enrollment Restriction(s):** Not open to students who have completed CHN 111, CHN 112, or CHN 113.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 112 – Modern Chinese: Reading & Discussion (4 units)**

**Course Description:** Further development of communication skills from CHN 111 in Modern Standard Mandarin-speaking environments. Reading dialogues/articles pertaining to contemporary China issues and discussing ethical, moral, aesthetic, social, and cultural concerns.

**Prerequisite(s):** CHN 111; or placement exam or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment in Chinese language courses is not allowed.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 113 – Modern Chinese: Reading & Discussion (4 units)**

**Course Description:** Continuation of CHN 112, further developing communication skills in Modern Standard Mandarin-speaking environments. Read dialogues/articles pertaining to contemporary China issues and discuss ethical, moral, aesthetic, social, and cultural concerns. Study strategies for moving between simplified and traditional Chinese characters.

**Prerequisite(s):** CHN 112; or placement exam or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment in Chinese language courses is not allowed.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **CHN 114 – Introduction to Classical Chinese (4 units)**

**Course Description:** Introduction to the language in which, until the 20th century, most official, documentary, scholarly, and belle-lettristic Chinese literature was written.

**Prerequisite(s):** CHN 112; or equivalent language proficiency; consent of instructor.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); World Cultures (WC).

## **CHN 115 – Introduction to Classical Chinese II (4 units)**

**Course Description:** Continuation of enhancing classical Chinese reading skills with literature ranging from the prose found in Han dynasty historical works, Six Dynasties anecdotal literature, and Tang occasional texts, as well as the poetic shi and fu genres.

**Prerequisite(s):** CHN 114; or Consent of instructor.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); World Cultures (WC).

## **CHN 116 – Introduction to Classical Chinese III (4 units)**

**Course Description:** Translations of extended readings in the original sources and brief analyses of syntax. These sources will include texts written by well-known figures from the 8th through 15th centuries, composing in a wide variety of genres.

**Prerequisite(s):** CHN 115; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); World Cultures (WC).

## **CHN 118 – Advanced Chinese for Non-Native Speakers (4 units)**

**Course Description:** Analysis of material from various genres (literature, newspapers, blogs, TV, film, etc) with focus on Chinese society and culture. Advanced reading, writing, aural comprehension, and formal speech in Mandarin Chinese. For students who have completed the third-year Chinese series (CHN 111-113), but do not have substantial background as heritage or native speakers of Chinese.

**Prerequisite(s):** CHN 113; or equivalent language proficiency; consent of instructor.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**CHN 120 – Advanced Chinese (4 units)**

*Course Description:* Evaluation of readings from various genres (literature, newspapers, TV and movies, etc.) develop advanced reading, writing, aural comprehension, and formal/professional speech skills in Mandarin Chinese. Chinese society/cultural studies, especially those sociocultural issues reflected in the language used in learning materials.

*Prerequisite(s):* CHN 113; or placement exam or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when material is different for each quarter of an academic year; cannot be for the same quarter taken in a previous academic year.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**CHN 122V – Business Chinese (3 units)**

*Course Description:* Mandarin Chinese language for business and professional purposes. Appropriate usages and protocols within the context of Chinese business culture.

*Prerequisite(s):* CHN 113 or consent of instructor.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**CHN 130 – Readings in Traditional Chinese Fiction (4 units)**

*Course Description:* Examination of representative works of traditional Chinese fiction popular from the 12th Century until the 17th and 18th centuries. Translations in English of the Chinese texts will be available to students as reference.

*Prerequisite(s):* CHN 111; or equivalent language proficiency.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**CHN 131 – Readings in Traditional Chinese Poetry (4 units)**

*Course Description:* Traditional Chinese poetry from its beginnings to the golden ages of Tang and Song, surveying forms and poets that best reveal the Chinese poetic sensibility and the genius of the language of Chinese poetry.

*Prerequisite(s):* CHN 111; consent of instructor, or equivalent language proficiency.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CHN 132 – Readings in Modern Chinese Poetry (4 units)**

*Course Description:* Chinese poetry from the Literary Revolution of 1917 to the present, surveying works that embody exciting innovations and reflect the modernity of 20th-century Chinese society and culture.

*Prerequisite(s):* CHN 111; consent of instructor, or equivalent language proficiency.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 133 – Readings in Modern Chinese Prose & Drama (4 units)**

*Course Description:* Literary works and scholarly essays on selected topics of Chinese prose and drama, development of a deep understanding of Chinese culture and society through sophisticated reading materials of these two important genres of the modern period.

*Prerequisite(s):* CHN 111; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 134 – Chinese Film in Chinese Language (4 units)**

*Course Description:* Chinese film and scholarly essays on Chinese cinema and film history. Develop a deep understanding of Chinese culture and society through viewing and studying Chinese films in the Chinese language.

*Prerequisite(s):* CHN 111; or equivalent language proficiency.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

**CHN 140 – Readings in Classical Chinese (4 units)**

*Course Description:* Study and philological analysis of selected texts from the first millennium of Imperial China.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CHN 150 – Fifth-Year Chinese: Selected Topics in Chinese Language, Literature, & Culture (4 units)**

*Course Description:* Examination of literary works and scholarly essays on selected topics of Chinese culture and society. Development of a deep understanding of Chinese culture and society through sophisticated Chinese speaking and writing exercises.

*Prerequisite(s):* CHN 120; or placement exam or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in Chinese language courses is not allowed.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**CHN 160 – The Chinese Language (4 units)**

*Course Description:* Introduction to structural features of Chinese (Mandarin) sounds, lexicon, grammar, and writing (characters), as well as relevant dialectal and sociolinguistic issues of the language.

*Prerequisite(s):* CHN 006 (can be concurrent) or CHN 003BL (can be concurrent) or CHN 003CN (can be concurrent) or CHN 004A (can be concurrent); or placement exam or consent of instructor; LIN 001 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CHN 192 – Chinese Internship (1-12 units)**

*Course Description:* Work experience in the Chinese language, with

analytical term paper on a topic approved by instructor.

*Prerequisite(s):* Upper division standing and consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**CHN 194H – Senior Thesis Honors Project (1-5 units)**

*Course Description:* Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Chinese literature, civilization, or language studies.

*Prerequisite(s):* Consent of instructor; senior standing and qualification for the Chinese honors program.

*Learning Activities:* Independent Study 3-15 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CHN 197T – Tutoring in Chinese (1-4 units)**

*Course Description:* Leading of small voluntary discussion groups affiliated with one of the Department's regular courses.

*Prerequisite(s):* Consent of Department.

*Learning Activities:* Tutorial 1-4 hour(s).

*Repeat Credit:* May be repeated 4 unit(s).

*Grade Mode:* Pass/No Pass only.

**CHN 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CHN 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CHN 297 – Directed Independent Study (4 units)**

*Course Description:* Directed independent study on a topic culminating in a term paper. Independent studies may only be arranged with consent of the instructor and when graduate seminars are unavailable.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Term Paper, Independent Study, Conference 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

**CHN 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CHN 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Any course taught by a graduate student under the direction of the Director.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Cinema & Digital Media (CDM)**

**College of Letters & Science**

**CDM 001 – Introduction to Film Studies (4 units)**

*Course Description:* Analysis of film form and narrative, including cinematography, editing, and sound. Issues in film studies including authorship, stardom, race, gender, class, and cultural identity. Introduction to selected cinematic movements and national film traditions.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CDM 002 – Introduction to Technocultural Studies (4 units)**

*Course Description:* Contemporary developments in the fine and performing arts, media arts, digital arts, and literature as they relate to technological and scientific practices.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken TCS 001.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**CDM 003 – Media Archaeology (4 units)**

*Course Description:* Evolution of media technologies and practices beginning in the 19th century as they relate to contemporary digital arts practices. Special focus on the reconstruction of the social and artistic possibilities of lost and obsolete media technologies.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have taken TCS 005.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

**CDM 012 – Introduction to Media Computation (4 units)**

*Course Description:* Introduction to key computational ideas necessary to understand and produce digital media. Fundamentals of programming and analysis of how media are represented and transmitted in digital form. Aimed primarily at non-computer science students.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Two units of credit for students that have taken ECS 010, ECS 030, ECS 032A, ECS 036A, or ENG 006.

*Cross Listing:* ECS 012.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**CDM 020 – Filmmaking Foundations (5 units)**

*Course Description:* Introduction to filmmaking concepts, principles, and methods. Emphasis on form, content and historical dialectic between classical narrative filmmaking conventions and artists' challenges to these conventions.

*Prerequisite(s):* CDM 001 and/or CDM 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Film Viewing 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CTS 020.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 020V – Filmmaking Foundations (5 units)**

*Course Description:* Introduction to filmmaking concepts, principles, and methods. Emphasis on form, content and historical dialectic between classical narrative filmmaking conventions and artists' challenges to these conventions.

*Prerequisite(s):* CDM 001 and/or CDM 003 recommended.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 3 hour(s), Film Viewing.

*Credit Limitation(s):* Not open for credit to students who have taken CTS 020 or CDM 020.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 041A – History of Cinema from 1895-1945 (4 units)**

*Course Description:* Examination of the cultural context of the emergence of cinema. Discussion of cinema as a product of the age of industrialization and conquest, as well as an element of urban culture, and mass transportation.

*Prerequisite(s):* CDM 001 recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CTS 041A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CDM 041B – History of Cinema from 1945-Present (4 units)**

*Course Description:* Examines cinema from 1945 through the present, with focus on neo-realist, new wave and third-world movements. Examines social critique in cinema from studio system to New Wave, Cine Novo, postcolonial cinema and contemporary independent cinema.

*Prerequisite(s):* CDM 001 recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CDM 041BV – History of Cinema from 1945-Present (4 units)**

*Course Description:* Examines cinema from 1945 through the present, with focus on neo-realist, new wave and third-world movements. Examines social critique in cinema from studio system to New Wave, Cine Novo, postcolonial cinema and contemporary independent cinema.

*Prerequisite(s):* CDM 001 recommended.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s), Film Viewing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CDM 072 – Introduction to Games (4 units)**

*Course Description:* Introduction to the history, theory, and practice of play. Survey of both analog and digital games. Overview of gaming cultures, aesthetics, industries, and technologies.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Cross Listing:* ENL 072.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 092 – Internship (1-12 units)**

*Course Description:* Supervised internship, on or off campus, in the area of cinema and digital media.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 1-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**CDM 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study in cinema and digital media.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topics differ.

*Grade Mode:* Pass/No Pass only.

**CDM 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates in cinema and digital media.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**CDM 100 – Experimental Digital Cinema I (4 units)**

*Course Description:* Experimental approaches to the making of film and video in the age of digital technologies. Builds upon the foundation provided by CDM 020. Instruction in technical, conceptual, creative, and critical skills for taking a project from idea to fruition.

*Prerequisite(s):* CDM 020 or ART 012; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

**CDM 101 – Experimental Digital Cinema II (4 units)**

*Course Description:* Continuation of CDM 100 with further exploration of digital cinema creation. Additional topics include new modes of distribution, streaming, installation and exhibition.

*Prerequisite(s):* CDM 100; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 103 – Interactivity & Animation (4 units)**

*Course Description:* Fundamentals of creating interactive screen-based work. Theories of interactivity, linear versus non-linear structures & audience involvement and participation. Use of digital production tools to produce class projects.

*Learning Activities:* Laboratory 3 hour(s), Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 104 – Documentary Production (4 units)**

*Course Description:* Traditional and new forms of documentary, with focus on technocultural issues. Skills and strategies for producing work in various media. Progression through all stages of production, from conception through post-production to critique.

*Prerequisite(s):* CDM 020; CDM 155; TCS 155; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 105 – Feminist Media Production (6 units)**

*Course Description:* Media production as a mode of cultural criticism, furthering feminist and social justice goals. Fundamentals of camera, editing and distribution via a social engagement model. Study and hands-on response to key historic and contemporary feminist and social justice media discourses.

*Prerequisite(s):* (CTS 020 or CDM 020); or two WMS courses.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s), Fieldwork 6 hour(s).

*Cross Listing:* WMS 165.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL).

**CDM 107 – Acting for Camera (4 units)**

*Course Description:* Analysis and practice of acting skills required for camera work and digital media.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when instructor differs.

*Cross Listing:* DRA 174.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CDM 111 – Community Media Production (4 units)**

*Course Description:* Use of video and new media tools to address social issues among neighborhood and community groups. Use basic video, sound, and lighting techniques while working with local groups in a group video project.

*Prerequisite(s):* CDM 020 recommended.

*Learning Activities:* Laboratory 3 hour(s), Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 113 – Community Networks & Social Media (4 units)**

*Course Description:* Impact and implications of computer-based networks in community, civic, and social life. Subjects may include community-access computer sites, neighborhood wireless networks, the digital divide, open-source software, and citizen action.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**CDM 121 – Introduction to Sonic Arts (4 units)**

*Course Description:* Introduction to the use of sound within the arts. Techniques and aesthetics of experimental contemporary practices. Creation of original sound works.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**CDM 121V – Introduction to Sonic Arts (4 units)**

*Course Description:* Introduction to use of sound within the arts. Techniques and aesthetics of experimental contemporary practices. Creation of original sound works.

*Learning Activities:* Web Virtual Lecture 3 hour(s); Web Electronic Discussion.

*Grade Mode:* Letter.

**CDM 122 – Intermediate Sonic Arts (4 units)**

*Course Description:* Techniques of recording, editing, mixing, and synthesis to combine voice, field recordings, and electronic signals. Incorporating live, recorded, found sounds to create multidimensional stories. Presentation of live performances, etc.

*Prerequisite(s):* CDM 121 or CDM 121V; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**CDM 122V – Intermediate Sonic Arts (4 units)**

*Course Description:* Techniques of recording, editing, mixing, and synthesis to combine voice, field recordings, and electronic signals. Incorporating live, recorded, found sounds to create multidimensional stories. Presentation of live performances, etc.

*Prerequisite(s):* CDM 121 or CDM 121V; or consent of instructor.

*Learning Activities:* Web Virtual Lecture 3 hour(s); Web Electronic Discussion.

*Grade Mode:* Letter.

**CDM 123 – Sight & Soundtrack (4 units)**

*Course Description:* Use of sound to articulate, lend mood or subconsciously underscore visual, environmental, or performative situations, combining music, voice, sound effects and other noises to create sound designs that enhance, alter or support action and movement.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CDM 125 – Advanced Sound: Performance & Improvisation (4 units)**

*Course Description:* Culmination of CDM sound courses. Focuses on performance and improvisation, culminating in a final public performance. Expectation of extensive reading and rehearsal outside of class time.

*Prerequisite(s):* (CDM 121 or CDM 121V); (CDM 122 or CDM 122V); or consent of instructor.

*Learning Activities:* Practice 3 hour(s), Workshop 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CDM 130 – Fundamentals of Computer Graphics (4 units)**

*Course Description:* Foundation course teaches the theory of three-dimensional computer graphics, including modeling, rendering and animation. Development of practical skills through the use of professional software to create computer graphics.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken TCS 130.

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**CDM 131 – Character Animation (4 units)**

*Course Description:* The art of character animation in three dimensional computer animation. Movement theory, principles of animation, animation timing. Development of technical and practical skills.

*Prerequisite(s):* CDM 130 or TCS 130.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken TCS 131.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CDM 135 – Object-Oriented Programming for Artists (4 units)**

*Course Description:* Introduction to object-oriented programming for artists. Focus on understanding the metaphors and potential of object-oriented programming for sound, video, performance, and interactive installations.

*Prerequisite(s):* CDM 002 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**CDM 136 – Electronics for Artists (4 units)**

*Course Description:* Creative application of electronic technology relevant to media and fine arts involving both electronic principles and hands-on application.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**CDM 137 – Topics in Virtuality (4 units)**

*Course Description:* Social, political, economic, and aesthetic factors in virtual reality. Artificial environments, telepresence, and simulated experience. Focus on contemporary artists' work and writing.

*Prerequisite(s):* CDM 002 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CDM 151 – Media Theory (5 units)**

*Course Description:* Critical and theoretical approaches to the emergence of new technologies since the invention of photography. Examine various approaches to media (formalist, semiotic, structuralist, Frankfurt School, cybernetics, visual and game theory).

*Prerequisite(s):* CDM 002 or CDM 003 recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s), Extensive Writing.

*Cross Listing:* STS 151.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**CDM 156 – Epic Television: The Golden Age of TV? Sopranos, Wire, Girls, Walking Dead (4 units)**

*Course Description:* Critically celebrated scripted television since the mid-1990s. Key themes including class, ethnicity, race, violence, and US politics. Major developments in the medium's history as context for recent wave of epic television.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**CDM 158 – Technology & the Modern American Body (4 units)**

*Course Description:* History and analysis of relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have taken TCS 158.

*Cross Listing:* AMS 158.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **CDM 163 – Art & Cinema: Between the White Cube & the Black Box (4 units)**

*Course Description:* Current debates between cinema studies and contemporary art. Issues covered include, experimental modes of filming, montaging, installing, screening, and displaying images between the White Cube (gallery/museum) and the Black Box (cinema).

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Enrollment Restriction(s):* Open to students with upper division standing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **CDM 163V – Art & Cinema: Between the White Cube & the Black Box (4 units)**

*Course Description:* Current debates between cinema studies and contemporary art. Experimental modes of filming, montaging, installing, screening, and displaying images between the White Cube (gallery/museum) and the Black Box (cinema).

*Learning Activities:* Web Virtual Lecture 3 hour(s), Film Viewing.

*Enrollment Restriction(s):* Open to students with upper division standing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **CDM 165E – Nazi & Fascist Cinema: Film & other Visual Media (4 units)**

*Course Description:* Analysis of nefarious and noxious cultural products in history: films made under the Nazis and other fascists, 1933-1945. Questions at heart of humanistic studies: relationship of culture to propaganda, politics, and even unfathomable crime.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing.

*Cross Listing:* GER 165E.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CDM 166 – Topics in U.S. Film History (4 units)**

*Course Description:* Study of an aspect of American film history (such as the silent era; the studio system; U.S. avant-garde cinema), including the influences of technological, economic, regulatory, cultural, and artistic forces.

*Prerequisite(s):* CDM 001; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **CDM 167 – Topics in Film Genres (4 units)**

*Course Description:* Study of one or more of the film genres (such as musicals, film noir, screwball comedy, or westerns), including genre theory and the relationship of the genre(s) to culture, history, and film industry practices. May be taught abroad.

*Prerequisite(s):* CDM 001; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **CDM 172 – Video Games & Culture (4 units)**

*Course Description:* Critical approaches to the study of video games, focusing on formal, historical, and cultural modes of analysis. History of software and hardware in North American and global contexts. Relations of games to society, politics, economics, media, etc.

*Prerequisite(s):* CDM 072 or ENL 072 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CTS 172 (former course CTS 172).

*Cross Listing:* STS 172, ENL 172.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

## **CDM 173 – Introduction to Analog Game Design (4 units)**

*Course Description:* Fundamental theories and practices of analog game design. Pen & paper, dice & cards, checkers & chess to riddles & stories, track & field, and other forms of play. Prototype, playtest, and presentation of original analog games.

*Prerequisite(s):* CDM 072 or CDM 172 or CTS 172; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **CDM 174 – Special Topics in Analog Game Design (4 units)**

*Course Description:* Special topics in analog game design for upper division students.

*Prerequisite(s):* CDM 072 or CDM 172 or CTS 172; or consent of instructor; Recommended: CDM 173, CDM 175 or CDM 177.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when topic or instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **CDM 175 – Introduction to Digital Game Development (4 units)**

*Course Description:* Digital game development. Theories of control, interface, game feel, glitch, mechanics. Design, demo, and distribution of new digital games.

*Prerequisite(s):* CDM 072 or CDM 172 or CTS 172; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Visual Literacy (VL).

## **CDM 176 – Special Topics in Digital Game Development (4 units)**

*Course Description:* Special topics in digital game development for upper division students.

*Prerequisite(s):* CDM 072 or CDM 172 or CTS 172; or consent of instructor; Recommended: CDM 173, CDM 175 or CDM 177.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when instructor or topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Visual Literacy (VL).

**CDM 177 – Introduction to Game Programming (4 units)**

*Course Description:* Introduction to computer science concepts and programming practices for video games.

*Prerequisite(s):* CDM 072 or CDM 172 or CTS 172; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE);

Quantitative Literacy (QL); Visual Literacy (VL).

**CDM 178 – Special Topics in Game Programming (4 units)**

*Course Description:* Special topics in game programming for upper division students.

*Prerequisite(s):* CDM 072 or CDM 172 or CTS 172; or consent of instructor.

*Recommended:* CDM 173, CDM 175 or CDM 177.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when instructor or topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE);

Quantitative Literacy (QL); Visual Literacy (VL).

**CDM 189 – Special Topics in Cinema & Digital Media (4 units)**

*Course Description:* Special topics in cinema & digital media.

*Prerequisite(s):* CDM 001 or CDM 002 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing

Experience (WE).

**CDM 190 – Research Methods in Cinema & Digital Media (4 units)**

*Course Description:* Introduction to basic research methods for Cinema and Digital Media; e.g., electronic & archived images, sounds & data, etc.

*Learning Activities:* Lecture 3 hour(s); Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**CDM 192 – Internship (1-12 units)**

*Course Description:* Supervised internship, on or off campus, in the area of cinema and digital media.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 1-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**CDM 195HA – Honors Project in Cinema & Digital Media (1-5 units)**

*Course Description:* Directed reading, research and writing culminating in the completion of a senior honors thesis or significant creative project under direction of faculty sponsor.

*Prerequisite(s):* Consent of instructor; GPA of at least 3.500; senior standing.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Letter.

**CDM 195HB – Honors Project in Cinema & Digital Media (1-5 units)**

*Course Description:* Directed reading, research and writing culminating in the completion of a senior honors thesis or significant creative project under direction of faculty sponsor.

*Prerequisite(s):* Consent of instructor; GPA of at least 3.500; senior standing.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Letter.

**CDM 197T – Tutoring in Cinema & Digital Media (1-5 units)**

*Course Description:* Leading small voluntary discussion groups affiliated with departmental courses under the supervision of the course instructor.

*Prerequisite(s):* Consent of instructor. Consent of Department Chair.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

**CDM 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study in cinema and digital media. For students with upper division standing. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**CDM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study in cinema and digital media. For advanced undergraduates with upper division standing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**CDM 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Cinema & Technocultural Studies (CTS)**

College of Letters & Science

## **CTS 040A – Media History 1, Guttenberg to Oppenheimer (4 units)**

*Course Description:* History of Media to 1945, with particular focus on mechanically reproduced mass media technologies including the printing press, the newspaper, photography, cinema, radio and early computing technology. Analysis of inter-related cultural and political topics.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Film Viewing 2 hour(s), Extensive Writing.

*Cross Listing:* STS 040A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **CTS 040B – Media History 2 1945-Present (4 units)**

*Course Description:* History of media from 1945 to present, with particular focus on the development of the computer, digital network and Internet technologies in the context of other media infrastructures like radio, television and satellite networks. Analysis of inter-related cultural/political topics.

*Prerequisite(s):* CTS 040A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Film Viewing 2 hour(s), Extensive Writing.

*Cross Listing:* STS 040B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **CTS 116 – Design on Screen (4 units)**

*Course Description:* Analysis of the contribution of outstanding designers for cinema, television and filmed entertainment. Study of diverse aesthetic theories of production design and art direction, costume design, or cinematography. Introductory principles and practice, history.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Cross Listing:* DRA 116.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **CTS 124E – Costume Design for Film (4 units)**

*Course Description:* Theory and practice of the art and business of film costume design. Script analysis, costume research, developing design concepts, budgeting, and current production practices and methods. Execution of designs for period and contemporary films. Viewing of current films.

*Prerequisite(s):* DRA 024; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Theatre & Dance majors.

*Cross Listing:* DRA 124E.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

## **CTS 146A – Modern Iranian Cinema (4 units)**

*Course Description:* Iranian cinema of the 20th century in the context of profound cultural and social changes in Iran especially since the Iranian Revolution. Productions by representative directors such as Kiarostami, Makhmalbaf, Bahram Beizaie are included. Knowledge of Persian not required.

*Prerequisite(s):* Upper division standing, or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* MSA 131A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CTS 146B – Modern South Asia Cinema (4 units)**

*Course Description:* South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* MSA 131B, ANT 147.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CTS 148B – Japanese Literature on Film (4 units)**

*Course Description:* Survey of films based on works of Japanese literature, emphasis on pre-modern and early modern texts. Introduction to major directors of Japan, with a focus on cinematic adaptation. Lectures and readings in English. Films in Japanese with English subtitles.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* JPN 156.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CTS 162 – Surveillance Technologies & Social Media (4 units)**

*Course Description:* Study of the ubiquitous presence of CCTV, face recognition software, global tracking systems, biosensors, and data mining practices that have made surveillance part of our daily life. Study boundaries between security and control, information and spying.

*Prerequisite(s):* TCS 001 or STS 020.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s), Term Paper.

*Cross Listing:* STS 162.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **Civil & Environmental Engineering (ECI)**

**College of Engineering**

## **ECI 003 – Civil & Environmental Infrastructure & Society (4 units)**

*Course Description:* Introduction to civil infrastructure and its relationship with society and the natural environment. Exposure to innovative research on civil engineering and environmental systems. Participation in laboratory experiments illustrative of the solution of representative but simplified engineering problems.

*Prerequisite(s):* MAT 021A (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Civil Engineering and Environmental Engineering majors; not open for credit to upper division students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

## **ECI 016 – Spatial Data Analysis (2 units)**

*Course Description:* Computer-aided design and geographic information systems in civil engineering practice.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Civil Engineering, Environmental Engineering and Biological Systems Engineering majors; non-majors accommodated on a space-available basis.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECI 040 – Introduction to Environmental Engineering (4 units)**

This version has ended; see updated course, below.

*Course Description:* Introduction to topics in environmental engineering; discussion on influence of literary work, art, and media on the evolution of environmental engineering practice, relevant laws, and regulations; presentations of historical case studies.

*Prerequisite(s):* CHE 002B.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to students in the College of Engineering.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **ECI 040 – Introduction to Environmental Engineering (4 units)**

*Course Description:* Introduction to topics in environmental engineering; discussion on influence of literary work, art, and media on the evolution of environmental engineering practice, relevant laws, and regulations; presentations of historical case studies. Major themes include sustainability, environmental justice, and laws/regulations.

*Prerequisite(s):* CHE 002B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to College of Engineering students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

This course version is effective from, and including: Fall Quarter 2023.

## **ECI 090X – Lower Division Seminar (1-4 units)**

*Course Description:* Examination of a special topic in a small group setting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 092 – Internship for Engineering (1-5 units)**

*Course Description:* Supervised work experience in civil engineering.

*Prerequisite(s):* Lower division standing; approval of project prior to period of internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECI 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor. Lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECI 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor. Lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECI 100 – Introduction to Fluid Mechanics for Civil & Environmental Engineers (4 units)**

*Course Description:* Fluid flow in civil & environmental engineering, basis for design, buoyancy, hydrostatics, gravity dams, hydraulic modeling: similarity & scaling, conservation laws, flow in bends, nozzles, pipes, pumps, turbines, complimentary lab experiments.

*Prerequisite(s):* ENG 035 C- or better; (MAT 022B C- or better or MAT 027B C- or better); PHY 009B C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Civil Engineering, Environmental Engineering and Hydrology majors.

*Credit Limitation(s):* Not open for credit to students who have taken ENG 103.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 101 – Transfer Transition for Civil & Environmental Engineering (4 units)**

*Course Description:* Introduction for transfer students to the Department of Civil and Environmental Engineering, civil and environmental engineering disciplines, and active areas of research in the department. Interaction with faculty in the department and campus student services that can support them while at UC Davis.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to first-quarter transfer students in Civil Engineering and Environmental Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 114 – Probabilistic Systems Analysis for Civil & Environmental Engineers (4 units)**

**Course Description:** Probabilistic concepts and models in engineering. Statistical analysis of engineering experimental and field data. Introduction to stochastic processes and models of engineering systems. **Prerequisite(s):** MAT 021C C- or better. **Learning Activities:** Lecture 4 hour(s). **Credit Limitation(s):** Not open for credit to students who have completed STA 120. **Grade Mode:** Letter. **General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## **ECI 115 – Computer Methods in Civil & Environmental Engineering (4 units)**

**Course Description:** Presentation, implementation and application of numerical algorithms and computer models for the solution of practical problems in Civil and Environmental Engineering. **Prerequisite(s):** (ENG 006 C- or better or ECS 030 C- or better or ECS 032A C- or better); (MAT 022B C- or better or MAT 027B C- or better). **Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s). **Enrollment Restriction(s):** Pass One: Open to Civil Engineering and Environmental Engineering majors only. **Grade Mode:** Letter. **General Education:** Science & Engineering (SE).

## **ECI 123 – Urban Systems & Sustainability (4 units)**

**Course Description:** Systems-level approach of how to evaluate and then modify sustainability of urban systems based on interaction with natural environments. Topics include: definition/metrics of urban sustainability; system analyses of urban systems; enabling technology, policies, legislation; measures and modification of ecological footprints. **Prerequisite(s):** Upper division standing. **Learning Activities:** Lecture 4 hour(s). **Grade Mode:** Letter. **General Education:** Science & Engineering (SE) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Scientific Literacy (SL); Writing Experience (WE).

## **ECI 125 – Building Energy Performance (4 units)**

**Course Description:** Mechanisms of energy consumption in buildings including end uses, thermal loads, ventilation, air infiltration, thermal energy distribution, and HVAC systems; energy performance simulation; methods and strategies of energy efficiency. **Prerequisite(s):** Upper division standing in Engineering. **Learning Activities:** Lecture 4 hour(s). **Enrollment Restriction(s):** Open to students in the College of Engineering. **Grade Mode:** Letter. **General Education:** Science & Engineering (SE).

## **ECI 130 – Structural Analysis (4 units)**

**Course Description:** Elastic structural analysis of determinate and indeterminate trusses, beams and frames. Plastic bending and limit analysis. **Prerequisite(s):** ENG 104 C- or better; (MAT 022A or MAT 027A). **Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s). **Enrollment Restriction(s):** Open to Civil Engineering majors. **Grade Mode:** Letter. **General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## **ECI 131 – Matrix Structural Analysis (4 units)**

**Course Description:** Matrix formulation and computer analysis of statically indeterminate structures. Stiffness and flexibility formulations for elastic structures. Finite element methods for elasticity and bending problems. **Prerequisite(s):** ENG 104 C- or better; ENG 006. **Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s). **Enrollment Restriction(s):** Open to Engineering majors only. **Grade Mode:** Letter. **General Education:** Science & Engineering (SE).

## **ECI 132 – Structural Design: Metallic Elements (4 units)**

**Course Description:** Design of metallic beams, columns, and other members for various types of loading and boundary conditions; design of connections between members; member performance within structural systems. **Prerequisite(s):** ECI 130 C- or better. **Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s). **Grade Mode:** Letter. **General Education:** Science & Engineering (SE); Visual Literacy (VL).

## **ECI 133 – Structure & Properties of Civil Engineering Materials (4 units)**

**Course Description:** Structures & properties of common civil engineering materials including concrete, alloys, plastics, and wood. Mechanical behavior of elastic & plastic response to loading, thermal conductivity and resistivity, diffusivity, and deterioration mechanisms. **Prerequisite(s):** CHE 002A C- or better; ENG 035 C- or better. **Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s). **Enrollment Restriction(s):** Pass One restricted to College of Engineering students. **Grade Mode:** Letter. **General Education:** Science & Engineering (SE).

## **ECI 134 – Structural Loads: Calculation & Modeling (4 units)**

**Course Description:** Structural analysis process and model idealization; design codes, standards, and guidelines (e.g., IBC & ASCE 7); load paths for vertical and horizontal loads; load cases and load combinations; modeling of loads using finite element software; dead and live loads; snow loads; wind loads; climate change effects on snow and wind loads. **Prerequisite(s):** ECI 130 C- or better. **Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s). **Enrollment Restriction(s):** Open to Civil Engineering majors only. **Grade Mode:** Letter.

## **ECI 135 – Structural Design: Concrete Elements (4 units)**

**Course Description:** Strength design procedures for columns, rectangular beams, T-beams and beams of general cross-section. Building code requirements for bending, shear, axial load, combined stresses and bond. Introduction to prestressed concrete. **Prerequisite(s):** ECI 130 C- or better. **Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s). **Enrollment Restriction(s):** Restricted to Civil Engineering, Civil Engineering/Materials Science and Engineering, and Materials Science and Engineering majors only. **Grade Mode:** Letter. **General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

**ECI 136 – Building Design (4 units)**

*Course Description:* Design of a building structure for a specific need under the multiple constraints of safety, serviceability, cost and aesthetics.

*Prerequisite(s):* (ECI 130 C- or better or ECI 131 C- or better); (ECI 135 or ECI 132).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 137 – Construction Principles & Project Management (4 units)**

*Course Description:* Project management, with civil engineering construction and design applications, including project scope, schedule, resources, cost, quality, risk, and control. Construction industry overview. Interactions between planning, design, construction, operations. Construction operations analysis. Contract issues. Project management software, field trips, guest lectures.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing in Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL).

**ECI 138 – Earthquake Loads on Structures (4 units)**

*Course Description:* Determination of loads on structures due to earthquakes. Methods of estimating equivalent static lateral forces; response spectrum and time history analysis. Concepts of mass, damping and stiffness for typical structures. Design for inelastic behavior. Numerical solutions and Code requirements.

*Prerequisite(s):* ECI 130 C- or better or ECI 131 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 139 – Advanced Structural Mechanics (4 units)**

*Course Description:* Review of stress, strain, equilibrium, compatibility, and elastic material behavior. Plane stress and plane strain problems in elasticity; energy methods. Theories for unsymmetric bending, straight and curved beams. Beams on elastic foundations; stresses in plates and shells; elastic stability.

*Prerequisite(s):* ENG 104 C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**ECI 140A – Environmental Analysis of Aqueous Systems (4 units)**

*Course Description:* Introduction to "wet chemical" and instrumental techniques commonly used in the examination of water and wastewater and associated data analysis.

*Prerequisite(s):* CHE 002B C- or better; ECI 040 (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Environmental Engineering majors.

*Credit Limitation(s):* Not open for credit to students who have taken ECH 140 or CHE 100.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 140B – Chemical Principles for Environmental Engineers (4 units)**

*Course Description:* Aqueous chemistry; equilibrium relationships; carbonate system; thermodynamics; kinetics & rate laws; precipitation, adsorption, & volatilization phenomenon; oxidation & reduction reactions; pH, pE and predominance diagrams; organic chemicals.

*Prerequisite(s):* CHE 002B C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ECI 140.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 140C – Biological Principles for Environmental Engineering (4 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Fundamental microbiology concepts for environmental engineers; provides background needed for the application of water and wastewater treatment, bioremediation, air pollution control and biotransformations in environmental engineered systems.

*Prerequisite(s):* ECI 140B C- or better; ECI 040.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have taken MIC 101 or MIC 102.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 140D – Water & Wastewater Treatment System Design (4 units)**

*Course Description:* Evaluation and design of water and wastewater treatment systems.

*Prerequisite(s):* ECI 140B C- or better; ECI 140C C- or better; ECI 040.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ECI 148B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 141 – Engineering Hydraulics (3 units)**

*Course Description:* Nature of flow of a real fluid; flow in pipes; open channel flow; turbomachinery; fluid forces on objects: boundary layers, lift and drag.

*Prerequisite(s):* ENG 103 C- or better or ECI 100 C- or better.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 141L – Engineering Hydraulics Laboratory (1 unit)**

*Course Description:* Laboratory experiments and demonstrations on flow measurements, sluice gates, hydraulic jump, flow characteristics, and centrifugal pumps.

*Prerequisite(s):* ECI 141 (can be concurrent).

*Learning Activities:* Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Engineering students only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 142 – Engineering Hydrology (4 units)**

*Course Description:* The hydrologic cycle. Evapotranspiration, interception, depression storage and infiltration. Streamflow analysis and modeling. Flood routing through channels and reservoirs. Frequency analysis of hydrologic variables. Precipitation analysis for hydrologic design. Hydrologic design.

*Prerequisite(s):* ECI 141 (can be concurrent).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to students in the College of Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECI 144 – Groundwater Systems Design (4 units)**

*Course Description:* Groundwater occurrence, distribution, and movement; groundwater flow systems; radial flow to wells and aquifer testing; aquifer management; groundwater contamination; solute transport by groundwater; fate and transport of subsurface contaminants. Groundwater supply and transport modeling.

*Prerequisite(s):* ECI 141.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 145 – Hydraulic Structure Design (4 units)**

*Course Description:* Project-based course on the design of an integrated urban drainage system with focus on consideration of design alternatives, multiple realistic constraints, quantification of uncertainty, codes and standards, technical drawing and cost analysis.

*Prerequisite(s):* ECI 141 C- or better.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 146 – Water Resources Simulation (4 units)**

*Course Description:* Computer simulation techniques in the analysis, design and operation of surface water systems; modeling concepts and practices with application to surface runoff; water quality in rivers and streams and dispersion of contaminants in water bodies.

*Prerequisite(s):* ECI 141 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 149 – Air Pollution (4 units)**

*Course Description:* Physical and technical aspects of air pollution. Factors that determine local, regional, and global air quality; climate change; and physical and chemical properties of pollutants.

*Prerequisite(s):* MAT 021D; (MAT 022B or MAT 027B); CHE 002B C- or better; (ATM 121A or ENG 103 C- or better or ECI 100 C- or better).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ATM 149.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **ECI 149L – Air Pollution Lab (1 unit)**

*Course Description:* Laboratory characterization of air pollutants; data analysis; experimental design.

*Prerequisite(s):* ECI 149 C- or better (can be concurrent).

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **ECI 153 – Deterministic Optimization & Design (4 units)**

*Course Description:* Operations research. Optimization techniques such as linear programming, dynamic programming, and non-linear programming. Applications in civil engineering disciplines, including multiple realistic constraints, through computer-based course projects.

*Prerequisite(s):* MAT 021C; (MAT 022A or MAT 027A); computer programming course.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **ECI 155 – Water Resources Engineering Planning (4 units)**

*Course Description:* Basic engineering planning concepts; role of engineering, economic, environmental and social information and analysis; institutional, political and legal aspects. Case studies and computer models illustrate the planning of water resource systems.

*Prerequisite(s):* (ENG 106 or ECN 001A or ECN 001AY or ECN 001AV); ECI 114.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL); Writing Experience (WE).

## **ECI 161 – Transportation System Operations (4 units)**

*Course Description:* Principles of transportation system operations; traffic characteristics and methods of measurement; models of transportation operations and congestion applied to urban streets and freeways.

*Prerequisite(s):* MAT 021C C- or better; PHY 009A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECI 163 – Energy & Environmental Aspects of Transportation (4 units)**

*Course Description:* Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption in light of institutional and political constraints. Evaluation of vehicle emission models.

*Prerequisite(s):* Upper division standing in engineering or economics or environmental studies.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Cross Listing:* ESP 163.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

**ECI 165 – Transportation Policy (4 units)**

*Course Description:* Transportation and associated environmental problems confronting urban areas, and prospective technological and institutional solutions. Draws upon concepts and methods from economics, engineering, political science and environmental studies.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**ECI 171 – Soil Mechanics (4 units)**

*Course Description:* Soil formations, mass-volume relationships, soil classification, effective stress, soil-water-void relationships, compaction, seepage, capillarity, compressibility, consolidation, strength, states of stress and failure, lateral earth pressures, and slope stability.

*Prerequisite(s):* (ENG 103 (can be concurrent) or ECI 100 (can be concurrent)); ENG 104 C- or better; ECI 171L (can be concurrent); ECI 171L required concurrently.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Civil Engineering and Environmental Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 171L – Soil Mechanics Laboratory (1 unit)**

*Course Description:* Laboratory studies utilizing standard testing methods to determine physical, mechanical and hydraulic properties of soil and demonstration of basic principles of soil behavior.

*Prerequisite(s):* ECI 171 (can be concurrent); ECI 171 required concurrently.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 173 – Foundation Design (4 units)**

*Course Description:* Foundation analysis and design, including site characterization, evaluation of shallow and deep foundation alternatives, evaluation of bearing capacity and settlements, design of retaining structures, and case-based design experiences.

*Prerequisite(s):* ECI 171.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 175 – Geotechnical Earthquake Engineering (4 units)**

*Course Description:* Tectonics, faults, site response, and probabilistic ground motion prediction equations. Cyclic loading and liquefaction of soil elements and layers. Empirical procedures and field tests for evaluation of triggering and consequences, of liquefaction.

*Prerequisite(s):* ECI 171 C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 178 – Pavement Engineering & Design (4 units)**

*Course Description:* Pavement types (rigid, flexible, unsurfaced, rail), their applications (roads, airfields, ports, rail) and distress mechanisms. Materials, traffic and environment characterization. Empirical and mechanistic-empirical design procedures. Construction quality; asphalt concrete mix design.

*Prerequisite(s):* ENG 104 C- or better; ECI 171 C- or better recommended.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**ECI 179 – Pavement Engineering (4 units)**

This version has ended; see updated course, below.

*Course Description:* Pavement types (rigid, flexible, unsurfaced, rail), their applications (roads, airfields, ports, rail) and distress mechanisms. Materials, traffic and environment characterization. Empirical and mechanistic-empirical design procedures. Maintenance, rehabilitation and reconstruction; construction quality; asphalt concrete mix design.

*Prerequisite(s):* ENG 104 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**ECI 179 – Pavement Management, Evaluation, & Rehabilitation (4 units)**

*Course Description:* Engineering concepts and practices to evaluate, preserve, maintain and rehabilitate highway pavements, focusing on pavement asset management, pavement failure mechanisms, site investigation for rehabilitation design, flexible and rigid pavement preservation and maintenance, flexible & rigid overlays, economic analysis of rehabilitation alternatives and selection of the most suitable strategy.

*Prerequisite(s):* ENG 104 C- or better; ECI 178 C- or better recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

This course version is effective from, and including: Fall Quarter 2023.

**ECI 181 – Construction Cost Estimation (4 units)**

This version has ended; see updated course, below.

*Course Description:* Fundamentals of cost estimation within the construction industry. Methodologies and use of estimating processes through each stage of project acquisition and delivery. Case-study based projects involve current technologies and estimating practices.

*Prerequisite(s):* ECI 137.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECI 181 – Construction Cost Estimation (4 units)**

*Course Description:* Fundamentals of cost estimation within the construction industry. Methodologies and use of estimating processes through each stage of project acquisition and delivery. Case-study based projects involve current technologies and estimating practices.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**ECI 181 – Construction Cost Estimation & Analysis (4 units)**

*Course Description:* Fundamentals of cost estimation within the construction industry. Methodologies and use of estimating processes through each stage of project acquisition and delivery. Case-study based projects involve current technologies and estimating practices.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

This course version is effective from, and including: Winter Quarter 2024.

**ECI 182 – Buildings: Assemblage & Construction Quality Management (4 units)**

*Course Description:* Materials and methods used in building construction. Assemblage of construction materials in building systems and related effects on productivity, equipment selection and job site layout.

*Prerequisite(s):* ECI 137.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECI 189A – Selected Topics in Civil Engineering: Environmental Engineering (1-5 units)**

*Course Description:* Directed group study in Environmental Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 189B – Selected Topics in Civil Engineering: Hydraulics & Hydrologic Engineering (1-5 units)**

*Course Description:* Directed group study in Hydraulics & Hydrologic Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 189C – Selected Topics in Civil Engineering: Engineering Planning (1-5 units)**

*Course Description:* Directed group study in Engineering Planning.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 189D – Selected Topics in Civil Engineering: Geotechnical Engineering (1-5 units)**

*Course Description:* Directed group study in Geotechnical Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 189E – Selected Topics in Civil Engineering: Structural Engineering (1-5 units)**

*Course Description:* Directed group study in Structural Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 189F – Selected Topics in Civil Engineering: Structural Mechanics (1-5 units)**

*Course Description:* Directed group study in Structural Mechanics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 189G – Selected Topics in Civil Engineering: Transportation Engineering (1-5 units)**

*Course Description:* Directed group study in Transportation Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECI 189H – Selected Topics in Civil Engineering: Transportation Planning (1-5 units)**

*Course Description:* Directed group study in Transportation Planning.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 189I – Selected Topics in Civil Engineering: Water Resources Engineering (1-5 units)**

*Course Description:* Directed group study in Water Resources Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 189J – Selected Topics in Civil Engineering: Water Resources Planning (1-5 units)**

*Course Description:* Directed group study in Water Resources Planning.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECI 190C – Research Group Conferences in Civil & Environmental Engineering (1 unit)**

*Course Description:* Research group conferences.

*Prerequisite(s):* Consent of instructor. Upper division standing in Civil and Environmental Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECI 192 – Internship in Engineering (1-5 units)**

*Course Description:* Supervised work experience in civil engineering.

*Prerequisite(s):* Upper division standing; approval of project prior to the period of the internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECI 193A – Civil & Environmental Engineering Senior Design (4 units)**

*Course Description:* Culminating design experience for civil engineering and environmental engineering majors. Student teams work closely with faculty, city officials or consulting clients to propose, implement and validate a unique solution to a real-world problem.

*Prerequisite(s):* ECI 140D C- or better or (ECI 171 C- or better, ECI 171L C- or better) or (ECI 132 C- or better or ECI 135 C- or better) or (ECI 161 C- or better or ECI 163 C- or better) or (ECI 141 C- or better, ECI 141L C- or better); consent of instructor; one other ECI major depth course with a C- or better; students must be in their final year of study.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to seniors in Civil Engineering and Environmental Engineering only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

## **ECI 193B – Civil & Environmental Engineering Senior Design (4 units)**

*Course Description:* Culminating design experience for civil engineering and environmental engineering majors. Student teams work closely with faculty, city officials or consulting clients to propose, implement and validate a unique solution to a real-world problem.

*Prerequisite(s):* ECI 193A.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to seniors in Civil Engineering and Environmental Engineering only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL).

## **ECI 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECI 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ECI 201 – Introduction to Theory of Elasticity (4 units)**

*Course Description:* Fundamental equations of elasticity in three dimensions; plane stress and plane strain; flexure and torsion of bars of various shapes. Introduction to variational and approximate methods.

*Prerequisite(s):* ENG 104.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECI 203 – Inelastic Behavior of Solids (4 units)**

*Course Description:* Fundamentals of theories of plasticity, viscoelasticity and viscoplasticity for solids. Macroscopic constitutive modelling for engineering materials, e.g., metals, polymers, soils, etc., and microscopic motivation.

*Prerequisite(s):* ECI 201.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **ECI 205 – Continuum Mechanics (4 units)**

*Course Description:* Tensor formulation of the field equations for continuum mechanics, including large deformation effects. Invariance and symmetry requirements. Introduction to nonlinear thermoelasticity and thermodynamics. Solution of three-dimensional problems. Selected topics.

*Prerequisite(s):* ECI 201.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 206 – Fracture Mechanics (4 units)**

*Course Description:* Linear and nonlinear fracture mechanics, stress analysis, energy concepts, brittle fracture criteria, path independent integrals, Dugdale-Barenblatt model, general cohesive zone models, ductile fracture criteria, crack tip fields for stationary and propagating cracks, fatigue. Application of numerical methods for fracture mechanics.

*Prerequisite(s):* ECI 201; ENG 104.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 211A – Advanced Matrix Structural Analysis (4 units)**

*Course Description:* Matrix structural analysis for automated analysis of structures using computers. Application of matrix analysis techniques to complex problems in structural engineering arising from soil-structure interactions, three-dimensional effects, and nonlinear material response.

*Prerequisite(s):* ECI 130; or equivalent or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 211B – Nonlinear Structural Analysis (4 units)**

*Course Description:* Geometric and material nonlinear response of framed structures, and methods for computational simulation of such response. Applications of these concepts and techniques to structural design within modern performance assessment frameworks and software platforms.

*Prerequisite(s):* ECI 211A; or equivalent or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 212A – Finite Element Procedures in Applied Mechanics (4 units)**

*Course Description:* Weighted-residual and Rayleigh-Ritz methods. Weak/variational formulation and development of discrete equations using finite element approximations. Application to one- and two-dimensional problems (heat conduction).

*Prerequisite(s):* EAD 115 or (MAT 128A, MAT 128B (can be concurrent)).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 212B – Finite Elements: Application to Linear & Non-Linear Structural Mechanics Problems (4 units)**

*Course Description:* Application to linear and nonlinear structural mechanics problems. Linear elasticity, weak form, and finite element approximation. Incompressible media problems. Non-linear problems with material nonlinearity.

*Prerequisite(s):* ECI 212A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 213 – Structural Dynamics (4 units)**

*Course Description:* Analysis of structures subjected to dynamic loading; single and multi-degree of freedom systems; response spectrum analysis; numerical methods for analysis of linear systems.

*Prerequisite(s):* ECI 138; Or equivalent or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 214 – Probabilistic Seismic Hazard Analysis & Design Ground Motions (4 units)**

*Course Description:* Probabilistic seismic hazard analysis for use in developing design spectra and for seismic risk analyses, including the development of earthquake ground motion time series for use in dynamic analyses of structures.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 216 – Meshfree Methods & Partition of Unity Finite Elements (4 units)**

*Course Description:* Advanced discretization techniques such as meshfree methods and partition of unity finite elements for the Galerkin solution of boundary-value problems in solid and structural mechanics. Application of meshfree and extended finite element methods in computational fracture.

*Prerequisite(s):* ECI 201; ECI 212A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 221 – Theory of Plates & Introduction to Shells (3 units)**

*Course Description:* Development of classical and refined plate theories. Application to isotropic, orthotropic and composite plates. Solutions for rectangular and circular plates. Membrane theory for axisymmetric shells and bending of circular shells.

*Prerequisite(s):* ECI 201 (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ECI 223 – Advanced Dynamics, Signal Processing, & Smart Structures Technology (4 units)**

*Course Description:* Signal processing and system identification of structures under dynamic excitations; Fourier and Laplace transforms; data acquisition and sensor design fundamentals; sensor technologies/techniques for nondestructive evaluation; structural control; actuators and dampers for smart structures; piezoelectrics and acoustic emissions; micro- and nano-fabrication.

*Prerequisite(s):* ECI 213; or equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 224 – Structural Reliability Analysis (4 units)**

*Course Description:* Review of probability theory (probability distributions, conditional probability, functions of random variables); component reliability analysis (exact solutions, FORM, SORM); system reliability analysis (series systems, parallel systems, general systems); simulation methods (Monte Carlo simulation, variance reduction techniques); probabilistic codified design and reliability-based design; applications to earthquake and wind engineering.

*Prerequisite(s):* Highly recommended, but not required, that students have taken a graduate/undergraduate level course in Matrix and/or Indeterminate Structural Analysis and an undergraduate course in Probability Theory.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 225 – Random Vibrations (4 units)**

*Course Description:* Probability theory; stochastic processes/random fields (time/frequency domain description, stationarity, mean square calculus, multivariate processes); response of linear systems under stochastic excitations (single-/multi-DOF systems, time/frequency domain, state space approach); reliability-based structural design (first-excursion and fatigue failures); applications to earthquake and wind engineering.

*Prerequisite(s):* Graduate level course in (deterministic) Structural Dynamics such as ECI 213 required (can be concurrent).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 232 – Advanced Topics in Concrete Structures (4 units)**

*Course Description:* Ductility of reinforced concrete; strength of two-way slabs; modified compression field theory.

*Prerequisite(s):* ECI 130; ECI 135; ECI 138; graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 233 – Advanced Design of Steel Structures (4 units)**

*Course Description:* Review of Load and Resistance Factor Design (LRFD); design of indeterminate systems; moment frames and bracing systems; connection design; seismic design of steel structures; direct analysis method for stability design; and performance assessment of steel structures.

*Prerequisite(s):* (ECI 130 or ECI 131); ECI 132.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

**ECI 234 – Prestressed Concrete (4 units)**

*Course Description:* Survey of methods and applications; prestressing materials and systems; prestress losses; flexural design; design for shear and torsion; deflection computation and control; continuous beams and indeterminate structures; floor systems; partial prestressing; design of compression members; strut-and-tie models.

*Prerequisite(s):* ECI 135; (ECI 130 or ECI 131).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 235 – Cement Composites (4 units)**

*Course Description:* Applications of cement composites; materials selection and proportioning; component and composite properties; hydration reactions and microstructure development; mechanisms of failure; nondestructive test methods; fiber reinforcement; concrete durability; novel reinforcing materials; ferrocement; repair and retrofit technologies; applications to structural design.

*Prerequisite(s):* ENG 104.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECI 236 – Design of Fiber Reinforced Polymer Composite Structures (4 units)**

*Course Description:* Basics of mechanics and design of polymer matrix composites: composite classification, manufacturing process, micromechanical property determination, classical lamination theory, strength theories, first-ply-failure, test methods, design practice, strengthening and retrofitting of existing reinforced concrete structures.

*Prerequisite(s):* ECI 135.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECI 237 – Bridge Design (4 units)**

*Course Description:* Bridge types, behavior and construction characteristics; design philosophy, details according to Caltrans and American Association of State Highway and Transportation Officials codes, principles; seismic design and retrofit of concrete bridges; modern bridges using advanced fiber reinforced polymer composites; fieldtrip required.

*Prerequisite(s):* ECI 130; ECI 135; ECI 234 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students only.

*Grade Mode:* Letter.

**ECI 238 – Performance-Based Seismic Engineering (4 units)**

*Course Description:* Modern seismic design; performance-based seismic design; seismic hazard; seismic demands: linear and nonlinear procedures; performance assessment: deterministic and probabilistic procedure; review of FEMA-350, FEMA-356, ATC-40 and other performance-based guidelines.

*Prerequisite(s):* ECI 138; ECI 213.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 239 – Design of Materials & Systems for Sustainability (4 units)**

*Course Description:* Effects on environmental impacts from materials selection and design in the built environment. Material mechanics, design constraints, and life cycle assessment in the development of "greener" materials and systems. Design of engineered materials through selecting constituents & processing techniques and the influence on mechanical properties, microstructure, and environmental impacts. Role of materials in the environmental impacts of buildings, infrastructure, and other systems.

*Prerequisite(s):* ENG 104 C or better; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Students.

*Grade Mode:* Letter.

**ECI 240 – Water Quality (4 units)**

*Course Description:* Quality requirements for beneficial uses of water. Hydrologic cycle of quality. Hydromechanics in relation to quality of surface and groundwaters; transport and fate of waterborne pollutants. Heat budget for surface waters; predictive methods; introduction to water quality modeling.

*Prerequisite(s):* ECI 141; ECI 142.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 241 – Environmental Reactive Chemical Transport Modeling (4 units)**

*Course Description:* Modeling of reactive chemical transport in air and water including kinetic reactions, equilibrium reactions, and phase partitioning. Emphasis on numerical solution schemes and programming techniques to provide deeper insight into model performance and limitations.

*Prerequisite(s):* CHE 002A or CHE 002B or ECI 149; or equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 242 – Air Quality (4 units)**

*Course Description:* Factors determining air quality. Effects of air pollutants. Physical and chemical fundamentals of atmospheric transport and reaction. Introduction to dispersion modeling.

*Prerequisite(s):* ENG 105; ECI 141; ECI 149; or equivalents.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 243A – Water & Waste Treatment (4 units)**

*Course Description:* Characteristics of water and airborne wastes; treatment processes and process kinetics; treatment system design.

*Prerequisite(s):* ECI 148A; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate majors only.

*Grade Mode:* Letter.

## **ECI 243B – Water & Waste Treatment (4 units)**

*Course Description:* Continuation of ECI 243A. Aeration, thickening, biological processes, design of biological treatment systems.

*Prerequisite(s):* ECI 243A.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate majors only.

*Grade Mode:* Letter.

## **ECI 243L – Pilot Plant Laboratory (4 units)**

*Course Description:* Laboratory investigation of physical, chemical, and biological processes for water and wastewater treatment.

*Prerequisite(s):* ECI 243A; ECI 243B (can be concurrent); or consent of instructor. Graduate standing.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Open to graduate majors only.

*Grade Mode:* Letter.

## **ECI 244A – Life Cycle Assessment for Sustainable Engineering (4 units)**

*Course Description:* Life cycle assessment methodology. Emphasis on applications to infrastructure and energy systems. Life cycle design, life cycle cost methods, other tools from industrial ecology, and links to policy.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Enrollment restricted to graduate students.

*Credit Limitation(s):* Not open to students who have taken ECI 244.

*Cross Listing:* EGG 201.

*Grade Mode:* Letter.

## **ECI 244B – Advanced Methods in Industrial Ecology (4 units)**

*Course Description:* Implementation, interpretation, and methodological issues and advances in life cycle assessment and other complementary methods from the field of Industrial Ecology with a focus on use in research.

*Prerequisite(s):* ECI 244A; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 245A – Applied Environmental Chemistry: Inorganic (4 units)**

*Course Description:* Chemistry of natural and polluted waters. Topics include chemical, kinetic and equilibrium principles, redox reactions, gas solution and solid-solution equilibria, thermodynamics, carbonate systems, coordination chemistry, interfacial phenomena.

*Prerequisite(s):* ENG 105; ECI 140; CHE 002B; or the equivalent of CHE 002B; CHE 002C or CHE 107A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECI 245B – Applied Environmental Chemistry: Organic (4 units)**

*Course Description:* Transport and transformation of organic chemicals in the environment. Topics include application of thermodynamics to predict solubility and activity coefficients; distribution of organic chemicals between the aqueous phase and air, solvent, or solid phases; chemical, photochemical and biological transformation reactions.

*Prerequisite(s):* CHE 128A; CHE 128B; CHE 128C; or the equivalent; CHE 002C or CHE 107A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECI 246N – Understanding Climate Change: Causes & Consequences (4 units)**

*Course Description:* Diverse physical processes that govern climate and drive climate change. Observational, experimental and modeling techniques and methods used in the development of our scientific understanding of the Earth system.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students.

*Grade Mode:* Letter.

## **ECI 247 – Aerosols (4 units)**

*Course Description:* Behavior of airborne particles including particle formation, modification, and removal processes.

*Prerequisite(s):* ENG 103; ENG 105; ECI 141; ECI 149.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 247L – Aerosols Laboratory (4 units)**

*Course Description:* Methods of generation and characterization of aerosols. Detailed topics may include flow rate measurement, aerosol generation, aerosol collection, ions measurement, metals measurement, and carbon measurement.

*Prerequisite(s):* ECI 247.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**ECI 249 – Probabilistic Design & Optimization (4 units)**

*Course Description:* Design by optimization for probabilistic systems, decision theory, the value of information, probabilistic linear programming, probabilistic dynamic programming, nonlinear probabilistic optimization. Applications in civil engineering design, project evaluation, and risk management.

*Prerequisite(s):* ECI 114; ECI 153; ENG 106; or equivalents.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 250 – Civil Infrastructure System Optimization & Identification (4 units)**

*Course Description:* Applied mathematics with a focus on modeling, identifying, and controlling dynamic, stochastic, and underdetermined systems. Applications in transportation networks, water resource planning, and other civil infrastructure systems.

*Prerequisite(s):* MAT 021C; MAT 022A; programming course; EAD 115 and mathematical modeling course recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

**ECI 251 – Transportation Demand Analysis (4 units)**

*Course Description:* Procedures used in urban travel demand forecasting. Principles and assumptions of model components (trip generation, trip distribution, model split). New methods of estimating travel demand. Computer exercises using empirical data to calibrate models and forecast travel demand.

*Prerequisite(s):* ECI 114; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 253 – Dynamic Programming & Multistage Decision Processes (4 units)**

*Course Description:* Operations research. Optimization techniques with a focus on dynamic programming in treating deterministic, stochastic, and adaptive multistage decision processes. Brief review of linear programming and non-linear programming. Applications in transportation networks and other civil infrastructure systems.

*Prerequisite(s):* MAT 021C; MAT 022A; programming course; EAD 115 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 254 – Exploring Data from Built Environment Using R (4 units)**

*Course Description:* Introduction to modern data science, specifically data acquisition, exploratory data analysis, visualization, and beginning data analysis using R. Emphasizes computational reasoning and working with tabular and non-standard data. Focus will be on data generated in the built environment.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* GEO 279.

*Grade Mode:* Letter.

**ECI 256 – Urban Traffic Management & Control (4 units)**

*Course Description:* Basic concepts, models, and methods related to the branch of traffic science that deals with the movement of vehicles on a road network, including travel speed, travel time, congestion concepts, car-following and hydrodynamic traffic models.

*Prerequisite(s):* ECI 114.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 257 – Flow in Transportation Networks (4 units)**

*Course Description:* Elements of graph theory, a survey of pertinent optimization techniques, extremal principles in network flow problems, deterministic equilibrium assignment, stochastic equilibrium assignment, extensions of equilibrium assignments and dynamic transportation network assignment.

*Prerequisite(s):* ECI 153; ECI 161 or ECI 256 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 259 – Asphalt & Asphalt Mixes (4 units)**

*Course Description:* Asphalts and asphalt mix types and their use in civil engineering structures, with primary emphasis on pavements. Asphalt, aggregate properties and effects on mix properties. Design, construction, recycling. Recent developments and research.

*Prerequisite(s):* ECI 179; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 260 – Sediment Transport (4 units)**

*Course Description:* Sediment transport in hydrologic systems. Process-oriented course which will emphasize how sediment moves and the physical processes that affect sediment transport. Field trip.

*Prerequisite(s):* ECI 141; or equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 261 – Colloids in Soil & Water (4 units)**

*Course Description:* Colloid occurrence, properties, behavior in different environments, and transport mechanisms in water and soils. Emphasis on their role in water contamination.

*Prerequisite(s):* CHE 002B; (ENG 103 or ECI 100); upper division or graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate standing; Pass Two restricted to upper division standing or graduate standing.

*Grade Mode:* Letter.

**ECI 262 – Turbulent Land-Water-Atmosphere Interactions in the Atmospheric Boundary Layer (4 units)**

*Course Description:* Atmospheric boundary layer and the associated thermodynamics, surface energy balance partitioning, equations of motion for the atmospheric boundary layer, turbulent scalar (e.g., heat, water vapor, pollution, etc.) transport equations for stratified flow, atmospheric stability, land-water-atmosphere interactions, similarity relations, modeling parameterizations, and field data analysis.

*Prerequisite(s):* MAT 022B; ECI 100; ECI 141; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

**ECI 263 – Evolutionary Algorithms (4 units)**

*Course Description:* Engineering systems design via approximate optimization of simulation models. Local vs. global search. Genetic algorithms, evolutionary strategies, genetic programming. Multi-objective methods. Parameter sensitivity and convergence assessment. Surrogate modeling.

*Prerequisite(s):* ECI 153 C or better; or consent of instructor. Computer programming experience required.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students.

*Grade Mode:* Letter.

**ECI 264A – Transport, Mixing & Water Quality in River & Lakes (4 units)**

*Course Description:* Principal causes of mixing and transport in rivers, lakes and reservoirs, and their impacts on water quality. Case studies of specific lakes and rivers.

*Prerequisite(s):* ECI 141; ECI 240.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 264B – Transport, Mixing & Water Quality in Estuaries & Wetlands (4 units)**

*Course Description:* Principal causes of mixing and transport in estuaries and wetlands, and their impacts on water quality. Topics include advection/diffusion; tides; transverse mixing; longitudinal dispersion; sediment transport; nutrient cycling; computer modeling of estuaries. Case studies of specific systems.

*Prerequisite(s):* ECI 141; ECI 240.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 265 – Stochastic Hydrology & Hydraulics (4 units)**

*Course Description:* Physics-based stochastic methods in modeling hydrologic and hydraulic processes; theory for modeling hydrologic-hydraulic governing equations as stochastic partial differential equations applied to various hydrologic-hydraulic processes under uncertainty, including transport, open channel flow, overland flow, soil water flow, and groundwater.

*Prerequisite(s):* ECI 266; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 266 – Applied Stochastic Methods in Engineering (4 units)**

*Course Description:* Stochastic processes classification; Gaussian random fields; stochastic calculus in mean square; Ito and Stratonovich stochastic differential equations; Fokker-Planck equation; stochastic differential equations with random coefficients.

*Prerequisite(s):* ECI 114 or MAT 131 or STA 130A or STA 131A or MAT 118A (can be concurrent).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 267 – Water Resource Management (4 units)**

*Course Description:* Engineering, institutional, economic, and social basis for managing local and regional water resources. Examples in the context of California's water development and management. Uses of computer modeling to improve water management.

*Prerequisite(s):* ECI 114; ECI 142; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* GEO 212.

*Grade Mode:* Letter.

**ECI 268 – Infrastructure Economics (4 units)**

*Course Description:* Economics applied to infrastructure engineering planning, operations, maintenance, and management problems; microeconomic and macroeconomic theories; benefit-cost analysis; effect of uncertainty; optimization economics; non-classical economics; public finance.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); ENG 106; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 269 – Transportation-Air Quality: Theory & Practice (4 units)**

*Course Description:* Health and regulatory aspects of airborne pollutants. Principles of modeling vehicle emissions. Conformity issues and the regulatory framework. Regional and micro-scale modeling.

*Prerequisite(s):* ECI 149; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECI 270 – Advanced Water Resources Management (3 units)**

*Course Description:* Discussion of technical papers related to planning theory, system maintenance, regionalization, multi-objective methods, risk analysis, institutional issues, pricing model application, economic development, forecasting, operations, and other topics.

*Prerequisite(s):* ECI 153; ECI 267; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ECI 271 – Inverse Problems (4 units)**

*Course Description:* Inverse calibration of distributed parameter models, using data representing model outputs. Forward and inverse mappings, stability, uniqueness, identifiability. Optimization formulation of inverse problems, maximum likelihood and other objective functions, indirect and direct approaches, solution by UCODE in hands-on project format.

*Prerequisite(s):* ECI 114; ECI 144; or equivalents.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 272N – Contaminant Fate & Transport in Porous Media (4 units)**

*Course Description:* Solute and colloid mass transport processes in porous media. Characterizing and quantifying physical processes of advection, diffusion/dispersion, sorption, as well as basic biogeochemical reactions. Colloid-facilitated transport in porous media. Analytical and numerical solutions to the reactive advection-dispersion equation in Eulerian and Lagrangian forms with an introduction to advanced random walk models.

*Prerequisite(s):* ECI 144; MAT 021A; MAT 021B; MAT 021C; MAT 022A; MAT 022B; Ability to program.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to upper division and graduate students only.

*Grade Mode:* Letter.

## **ECI 273 – Water Resources Systems Engineering (4 units)**

*Course Description:* Planning and management of water resource systems. Deterministic and stochastic simulation and optimization techniques. Capacity design and operation of reservoir systems for water supply, hydropower, flood control, and environmental objectives.

*Prerequisite(s):* ECI 114; ECI 153; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 274 – Introduction to Turbulence (4 units)**

*Course Description:* Fundamental theory, statistics, analysis tools and models for turbulence and turbulent flows. Practical skills related to the analysis and study of turbulence.

*Prerequisite(s):* MAT 022B; ECI 100; ECI 141; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **ECI 275 – Hydrologic Time-Series Analysis (4 units)**

*Course Description:* Application of statistical methods for analysis and modeling of hydrologic series. Statistical simulation and prediction of hydrologic sequences using time series methodology.

*Prerequisite(s):* ECI 114; ECI 142.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 276 – Watershed Hydrology (4 units)**

*Course Description:* Analysis and mathematical modeling of hydrologic processes taking place in a watershed. Precipitation analysis and modeling. Theory of overland flow and its kinematic wave approximation. Analysis and modeling of saturated and unsaturated subsurface flow processes taking place on a hill slope.

*Prerequisite(s):* ECI 142; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 277A – Computational River Mechanics I (4 units)**

*Course Description:* Unsteady open channel flows, computation of water surface profiles, shallow water equations, St. Venant equations, method of characteristics, finite difference methods, stability and accuracy of explicit and implicit schemes, flood routing in simple and compound channels, advection of plumes.

*Prerequisite(s):* EAD 115 (can be concurrent); ECI 141 (can be concurrent).

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ECI 277.

*Grade Mode:* Letter.

## **ECI 277B – Computational River Mechanics II (4 units)**

*Course Description:* Open channel flows, physical aspects of river mechanics, formulation of depth-averaged equations, boundary conditions, coordinates transformation and grid generation, finite-difference solution techniques, applications to two-dimensional momentum and pollutant transport in rivers.

*Prerequisite(s):* ECI 277A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 277C – Turbulence & Mixing Processes (4 units)**

*Course Description:* Nature of turbulent flows, conservation equations, momentum, heat and mass transport in free and wall-bounded flows, body forces and mixing, roughness effects, turbulence modeling and simulation.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 278 – Hydrodynamics (3 units)**

*Course Description:* Perturbation methods. Basic water waves. Governing equations for fluid motion on a rotating earth. Rotation effects, vorticity dynamics, Ekman layer. Stratification effects, internal waves and turbulent mixing. Combined effects.

*Prerequisite(s):* ECI 141.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ECI 279 – Advanced Mechanics of Fluids (4 units)**

*Course Description:* Rotational flows. Navier-Stokes equations and solutions for laminar flow; boundary layer equations and solution techniques. Nature of turbulence. Reynolds equations. Introduction to turbulence modeling.

*Prerequisite(s):* ECI 141.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ECI 280A – Nonlinear Finite Elements for Elastic-Plastic Problems (4 units)**

*Course Description:* State of the art finite element methods and tools for elastic-plastic problems, including computational techniques based on the finite element method and the theory of elastoplasticity.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 280B – Nonlinear Dynamic Finite Elements (4 units)**

*Course Description:* State of the art computational methods and tools for analyzing linear and nonlinear dynamics problems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 281A – Advanced Soil Mechanics (4 units)**

*Course Description:* Consolidation and secondary compression. Preloading and wick drains. Seepage and seepage pressures. Filtration, drainage, and dewatering. Shear strength: friction, cohesion, dilatancy and critical states.

*Prerequisite(s):* ECI 171.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 281B – Advanced Soil Mechanics (5 units)**

*Course Description:* Site investigation and soil characterization within the context of slope stability analysis.

*Prerequisite(s):* ECI 281A.

*Learning Activities:* Lecture 4 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECI 282 – Pavement Design & Rehabilitation (4 units)**

*Course Description:* Advanced pavement design and structural/functional condition evaluation for concrete and asphalt pavements. Highways, airfields, port facilities; new facilities, rehabilitation, reconstruction. Mechanistic-empirical procedures, materials, climate and traffic characterization. Use of current design methods; recent developments and research.

*Prerequisite(s):* ECI 179; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 283 – Physico-Chemical Aspects of Soil Behavior (4 units)**

*Course Description:* Study of the geotechnical behavior of soils considering formation, transport, mineralogy, soil-fluid-electrolyte systems, surface tension, particle mechanics, shape, fabric, and structure. Laboratories demonstrate effects of fundamental interparticle forces (contact, Van Der Waals, capillarity and chemical).

*Prerequisite(s):* ECI 171.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ECI 284 – Theoretical Geomechanics (4 units)**

*Course Description:* Elasticity, plasticity, micromechanics, coupled behavior and large deformations for geomaterials. Prediction of stress-strain-volume change behavior of geomaterials. Monotonic and cyclic loading, anisotropy, bifurcation of deformation.

*Prerequisite(s):* ECI 171.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 286 – Advanced Foundation Design (4 units)**

*Course Description:* Design and analysis of pile and pier foundations, including seismic effects; deep excavation systems; tie-back, nailing, and anchor systems; coffer dams; loads on buried conduits; ground modification techniques; and other related topics.

*Prerequisite(s):* ECI 173.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 287 – Geotechnical Earthquake Engineering (4 units)**

*Course Description:* Characteristics and estimation of earthquake ground motions; wave propagation and local site response; liquefaction potential and remediation; residual strength and stability considerations; ground deformations; dynamic soil-structure interaction.

*Prerequisite(s):* ECI 138; ECI 281A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 288 – Earth & Rockfill Dams (4 units)**

*Course Description:* Site selection; design considerations; layout; seismic effects including considerations of fault movements; construction; environmental considerations, instrumentation; maintenance remediation and retrofit of existing dams.

*Prerequisite(s):* ECI 281A; ECI 281B (can be concurrent).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ECI 289A – Selected Topics in Civil Engineering: Environmental Engineering (1-5 units)**

*Course Description:* Directed group study in Environmental Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ECI 289B – Selected Topics in Civil Engineering: Hydraulics & Hydrologic Engineering (1-5 units)**

*Course Description:* Directed group study in Hydraulics & Hydrologic Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ECI 289C – Selected Topics in Civil Engineering: Engineering Planning (1-5 units)**

*Course Description:* Directed group study in Engineering Planning.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ECI 289D – Selected Topics in Civil Engineering: Geotechnical Engineering (1-5 units)**

*Course Description:* Directed group study in Geotechnical Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ECI 289E – Selected Topics in Civil Engineering: Structural Engineering (1-5 units)**

*Course Description:* Directed group study in Structural Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ECI 289F – Selected Topics in Civil Engineering: Structural Mechanics (1-5 units)**

*Course Description:* Directed group study in Structural Mechanics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ECI 289G – Selected Topics in Civil Engineering: Transportation Engineering (1-5 units)**

*Course Description:* Directed group study in Transportation Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ECI 289H – Selected Topics in Civil Engineering: Transportation Planning (1-5 units)**

*Course Description:* Directed group study in Transportation Planning.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ECI 289I – Selected Topics in Civil Engineering: Water Resources Engineering (1-5 units)**

*Course Description:* Directed group study in Water Resources Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **ECI 290 – Seminar (1 unit)**

*Course Description:* Discussion of current graduate research, and guest lectures on recent advances. Oral presentation of individual study.

Required of graduate degree candidates.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ECI 290C – Graduate Research Group Conference (1 unit)**

*Course Description:* Research problems, progress, and techniques in civil engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ECI 291 – Projects for Environmental & Water Resources (4 units)**

*Course Description:* Capstone independent literature-based research project. Project development, reading and mining the literature, strategies and best-practices for writing and oral communication.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Project 2 hour(s)

*Enrollment Restriction(s):* Open to Graduate Students only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ECI 292A – Geotechnical Professional Practice 1 (1 unit)**

*Course Description:* Geotechnical practice issues that affect the delivery of technical solutions for geotechnical projects, including business and management practices, contract documents, legal constraints, public policy and societal concerns, ethics, and professional development. Part 1 of three part series that includes a capstone project.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **ECI 292B – Geotechnical Professional Practice 2 (1 unit)**

*Course Description:* Geotechnical practice issues that affect the delivery of technical solutions for geotechnical projects, including business and management practices, contract documents, legal constraints, public policy and societal concerns, ethics, and professional development. Part 2 of three part series that includes a capstone project.

*Prerequisite(s):* ECI 292A; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **ECI 292C – Geotechnical Professional Practice 3 (2 units)**

*Course Description:* Geotechnical practice issues that affect the delivery of technical solutions for geotechnical projects, including business and management practices, contract documents, legal constraints, public policy and societal concerns, ethics, and professional development. Part 3 of three part series that includes a capstone project.

*Prerequisite(s):* ECI 292B; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **ECI 296 – Topics in Water & Environmental Engineering (1 unit)**

*Course Description:* Seminars presented by visiting lecturers, UC Davis faculty, and graduate students.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ECI 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECI 299 – Research (1-12 units)***Course Description:* Research.*Learning Activities:* Variable.*Grade Mode:* Satisfactory/Unsatisfactory only.**ECI 390 – The Teaching of Civil Engineering (1 unit)***Course Description:* Participation as teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.*Prerequisite(s):* Meet qualifications for teaching assistant and/or associate-in in Civil Engineering.*Learning Activities:* Discussion 1 hour(s).*Repeat Credit:* May be repeated 9 unit(s).*Grade Mode:* Satisfactory/Unsatisfactory only.**Classics (CLA)**

College of Letters &amp; Science

**CLA 001 – Ancient Near East & Early Greece: 3000-500 B.C.E. (4 units)***Course Description:* Introduction to the literature, art, and social and political institutions of ancient Mesopotamia, Egypt, Palestine, and early Greece from 3000 to 500 B.C.E.*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).**CLA 002 – Ancient Greece & the Near East: 500-146 B.C.E. (4 units)***Course Description:* Introduction to the literature, art and thought and the political and social institutions and values of Greece and its eastern Mediterranean neighbors—the Persians, Egyptians, and Judeans.*Learning Activities:* Lecture 3 hour(s), Term Paper.*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).**CLA 003 – Rome & the Mediterranean: 800 B.C.E.-500 C.E. (4 units)***Course Description:* Introduction to the history, literature, material culture, political and social institutions and values of Roman Civilization, with an emphasis on the development of the Roman Empire and the interactions of Roman culture with other Mediterranean cultures.*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).**CLA 004 – Late Antiquity (4 units)***Course Description:* History and culture of the Roman and Byzantine empires from the 3rd to the 8th century. Transformation of the classical Mediterranean world through political and cultural interactions, rise of Christianity and Islam, beginning of the medieval period in Europe.*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).**CLA 008 – World Classical Cultures (4 units)***Course Description:* Study of selected ancient cultures of the world.

Analysis of the construction of terms such as "classics," "civilization," and "culture." Examination of the plural legacies of classical cultures in the modern world. Ancient cultures examined may include the Greco-Roman Mediterranean, Egypt, Maya Mesoamerica, Han China, Maurya South Asia, Mesopotamia.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).**CLA 010 – Greek, Roman, & Near Eastern Mythology (3 units)***Course Description:* Examination of major myths of Greece, Rome, and the Ancient Near East; their place in the religion, literature and art of the societies that produced them; their subsequent development, influence and interpretation.*Learning Activities:* Lecture 3 hour(s).*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).**CLA 010Y – Greek, Roman, & Near Eastern Mythology–Hybrid (3 units)***Course Description:* Examination of major myths of Greece, Rome, and the Ancient Near East; their place in the religion, literature and art of the societies that produced them; their subsequent development, influence and interpretation.*Learning Activities:* Lecture 2 hour(s), Web Virtual Lecture 1 hour(s).*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).**CLA 015 – Women & Gender in Classical Antiquity (4 units)***Course Description:* Lives and roles of women and men in ancient Greece and Rome. Readings from history, philosophy, medical and legal documents, literature and myth.*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).**CLA 020 – Pompeii AD 79 (4 units)***Course Description:* Roman life in an urban community at the time of the eruption of Vesuvius. Slide presentations of the archeological evidence will be supplemented by selected readings from Petronius' Satyricon and other ancient authors.*Learning Activities:* Lecture 3 hour(s), Term Paper.*Grade Mode:* Letter.*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CLA 025 – The Classical Heritage in America (4 units)**

*Course Description:* Classical heritage in the New World, with emphasis on the United States from its colonial past to the present day. The reception of Greco-Roman thought and values as expressed in art, architecture, education, law, government, literature, and film.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**CLA 030 – Greek & Latin Elements in English****Vocabulary (3 units)**

*Course Description:* Knowledge of Latin and Greek not required. Elements of Greek and Latin vocabulary for increased understanding of English word formation and improved ability to understand and retain unfamiliar words. Emphasis on Greek and Latin elements but other languages not neglected.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CLA 030F.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CLA 030F – Greek & Latin Elements in English****Vocabulary (3 units)**

*Course Description:* Knowledge of Latin and Greek not required. Elements of Greek and Latin vocabulary for increased understanding of English word formation and improved ability to understand and retain unfamiliar words. Emphasis on Greek and Latin elements but other languages not neglected.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to incoming freshmen.

*Credit Limitation(s):* Not open for credit to students who have completed CLA 030.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CLA 031 – Greek & Latin Elements in Technical Vocabulary (3 units)**

*Course Description:* Knowledge of Greek and Latin not required. Elements of Greek and Latin vocabulary to increase understanding of English word formation in medical, scientific and technical terminology and improve ability to understand and retain unfamiliar terms.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**CLA 035 – Food & Wine in the Ancient Mediterranean (3 units)**

*Course Description:* Social, political, and economic history of food and wine in ancient Mediterranean cultures. Development of agriculture and technology, trade, empires. Representation of food and wine in literary and visual arts, religious significance.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CLA 036V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**CLA 036V – Food & Wine in Ancient Greece (4 units)**

*Course Description:* Social, political, and economic history of food and wine in Ancient Greece. Development of agriculture and technology, trade, cross-cultural exchanges. Representation of food and wine in literary and visual arts, religious significance. Online format combining asynchronous discussion with technologically based materials.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have taken CLA 035.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CLA 040 – Life & Economy in the Ancient Mediterranean World (4 units)**

*Course Description:* Characterization of ancient Mediterranean economies, with emphasis on Greece and Rome. Utilization of archaeological, art historical, and literary evidence. Craft production, labor specialization, trade networks, ancient technology, urban growth, agricultural productivity, coinage systems, and household economies.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CLA 045 – Sport & Spectacle in the Ancient Mediterranean (3 units)**

*Course Description:* Cultural practices and attitudes related to sport and spectacle in the ancient Mediterranean. Secular and ritual festivals and competitions, funerary games, gladiatorial combat and violent mass entertainment, royal hunts and imperial triumphs, and literary, artistic, and philosophical depictions of ancient athletes and physical performances and competitions.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CLA 045V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**CLA 050 – Ancient Science (4 units)**

*Course Description:* Study of science in ancient Greece and Rome; consideration of its social context; concentration on the basic concepts of physics, the world of medicine and biology, the history of mathematics, and the practices of astronomy, astrology and meteorology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* STS 050.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 051 – Ancient Medicine (4 units)**

*Course Description:* Medicine in ancient Greece and Rome; physiological conceptions of the body within scientific and social frameworks; exploration of sanitation technology and health in antiquity; medical treatment of the female body; medicine and the economy.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* STS 051.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 060 – Magic in the Ancient Greco-Roman World (4 units)**

*Course Description:* Magical practices and theories in ancient Greece and Rome and in the wider Mediterranean, including Mesopotamia and Egypt. Curses and spells in material culture, literary depictions of spell-casters, magic's place in ancient society, and the modern afterlife of ancient magical practices.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CLA 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/No Pass only.

**CLA 101A – Topics in Ancient Mediterranean Civilizations (4 units)**

*Course Description:* Topics may be ordered by time or place (e.g. Hellenistic Egypt) or by theme or genre (e.g. slavery in the ancient world).

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 101B – Topics in Greek Civilization (4 units)**

*Course Description:* Topics may be ordered by time or place (e.g. the world of Homer) or by theme or genre (e.g. the Greek art of war).

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 101C – Topics in Roman Civilization (4 units)**

*Course Description:* Topics may be ordered by time or place (e.g. Julius Caesar and his age) or by theme or genre (e.g. gladiators: blood in the arena).

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 101D – Topics in Classical Receptions (4 units)**

*Course Description:* Topics in classical reception from late antiquity to the present. Topics may be ordered by time or place (e.g. the classical tradition in Washington, D.C.) or by theme or genre (e.g. cinematic representations of the ancient world).

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 101E – Topics in Ancient Science (4 units)**

*Course Description:* Topics may be ordered by discipline (e.g. ancient medicine), historical figure (e.g. Galen) or topic (e.g. science and the economy).

*Prerequisite(s):* CLA 050 or CLA 051; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**CLA 102 – Film & the Classical World (4 units)**

*Course Description:* Classical World as portrayed in films. Viewings and discussions of modern versions of ancient dramas, modern dramas set in the Ancient Mediterranean world, and films imbued with classical themes and allusions. Supplementary readings in ancient literature and mythology.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 2.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**CLA 103 – Love & Beauty in the Ancient World (4 units)**

*Course Description:* Philosophical and literary traditions connecting love, beauty, and goodness in ancient thought. Moral and ethical implications, ideologies of sexuality and gender; transmission into the medieval and modern world.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **CLA 104 – Death & Dying in the Ancient Mediterranean (4 units)**

*Course Description:* Ideas and practices related to death in the ancient Mediterranean. Burial rituals and spaces, philosophical and medical theories of death and the afterlife, the dying and dead in social life, and literary and artistic depictions of violence and the dead.

*Prerequisite(s):* One lower-division Classics (CLA) course; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CLA 105 – Theory & Practice of Greek & Roman Mythology (4 units)**

*Course Description:* Thematically focused study of mythological narratives. Emphasis on the historical development of myths and the variety of theoretical approaches for the study of myth.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **CLA 106 – Latine/x & Latin American Perspectives & the Classical Tradition (4 units)**

*Course Description:* Latine/x and Latin American engagement with the classical tradition. Literary, cinematic, and artistic adaptations of Greco-Roman literature, art, and material culture. Social and political responses to the intellectual milieu of the ancient Mediterranean.

*Prerequisite(s):* One lower division Classics (CLA) course; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **CLA 110 – Origins of Rhetoric (4 units)**

*Course Description:* Issues in the development of rhetoric from its origins in ancient Greece to A.D.430. Special attention to works of Plato, Aristotle, Cicero, and Quintilian. Role of grammar and rhetoric in schools of Roman Empire. The Christian rhetoric of Saint Augustine.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed RCM 110 or CMN 110. (Former RCM 110.)

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **CLA 111 – Forms of Knowledge in the Ancient World (4 units)**

*Course Description:* History of knowledge preservation and transfer in the ancient Mediterranean. Oral tradition, technology, innovations, forms of writing, libraries, ancient scholarship, cultural exchange and influence.

*Learning Activities:* Extensive Writing, Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **CLA 120 – Greek & Roman Historiography (4 units)**

*Course Description:* Survey of Greek and Roman historical writing in English translation. Authors to be read may include Herodotus, Thucydides, Sallust, Livy, and Tacitus. Focus on the development of historical writing as a literary genre.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **CLA 125 – Roman Political Thought (4 units)**

*Course Description:* Survey of Roman thinking about politics, as expressed both in formal theorizing and in a variety of other contexts, including oratory, historiography, and epic. Study of Roman political reflection in its historical, cultural, and literary context.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **CLA 140 – Homer & Ancient Epic (4 units)**

*Course Description:* Reading of the classical epics of Homer (*Iliad*, *Odyssey*) and Virgil (*Aeneid*) in English. Discussion of techniques of composition, the beliefs and values of their respective societies, and the generic tradition of ancient epic.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **CLA 141 – Greek & Roman Comedy (4 units)**

*Course Description:* Readings in Aristophanes, Menander, Plautus, and Terence; lectures on the development of ancient comedy.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Conference 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **CLA 142 – Greek & Roman Novel (4 units)**

*Course Description:* Examination of the ancient Greek romances and their development into the grotesque realism of Petronius' *Satyricon*, and the religious mysticism of Apuleius' *The Golden Ass*.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 143 – Greek Tragedy (4 units)**

*Course Description:* Reading in English of selected plays of Aeschylus, Sophocles, and Euripides. Discussion of the development and influence of Athenian tragedy.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**CLA 150 – Socrates & Classical Athens (4 units)**

*Course Description:* Study of the major sources of our knowledge of Socrates, assessment of his role in the politics and culture of ancient Athens, his method of teaching, and his place in Western thought.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CLA 170 – Cultural Interactions in the Ancient Mediterranean World (4 units)**

*Course Description:* Exploration of the role of colonial encounters in the spread of ideas throughout the ancient Mediterranean from an archaeological and artistic perspective. Emphasis on material and literary expressions of culture, trade routes, and theories pertaining to culture contact.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CLA 171 – Mediterranean Bronze Age Archaeology (4 units)**

*Course Description:* Archaeological monuments of the ancient Near East, including Egypt and Mesopotamia, and of Greece and Crete during the Bronze Age. Special emphasis on the problems of state formation and on the co-existence and collapse of Bronze Age societies.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CLA 172A – Early Greek Art & Architecture (4 units)**

*Course Description:* Examination of the origin and development of the major monuments of Greek art and architecture from the 8th century to the mid-5th century B.C.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* AHI 172A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**CLA 172B – Later Greek Art & Architecture (4 units)**

*Course Description:* Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-5th century to the 1st century B.C.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* AHI 172B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**CLA 173 – Roman Art & Architecture (4 units)**

*Course Description:* Art and architecture of Rome and the Roman Empire, from the founding of Rome through the 4th century C.E.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* AHI 173.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**CLA 174 – Greek Religion & Society (4 units)**

*Course Description:* Cults, festivals, and rituals of Greek religious practice and their relationship to Greek social and political institutions, and to Greek private life. Includes discussion of major sanctuaries at Olympia, Delphi, Athens, and others.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**CLA 175 – Architecture & Urbanism in Mediterranean Antiquity (4 units)**

*Course Description:* Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Cross Listing:* AHI 175.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**CLA 176 – Roman Religions (4 units)**

*Course Description:* Roman religion from republic to empire. Gods, rituals, and festivals at Rome; sacrifice, sacred places, magic. Gender roles, social status, national identity. Influences from other cultures, especially Egypt and the eastern Mediterranean.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **CLA 180 – Ancient Mediterranean Technologies (4 units)**

*Course Description:* Practical recreation of and experimentation with ancient technologies. Projects may include pottery and glazing, papyrus and ink making, textile arts, woodworking, pneumatic devices, automata, medicinal processes.

*Prerequisite(s):* A lower division Classics (CLA) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion/Laboratory 2 hour(s).

*Repeat Credit:* May be repeated for credit when topics differ.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## **CLA 190 – Senior Seminar (4 units)**

*Course Description:* Advanced interdisciplinary study of a problem in the ancient Mediterranean world using the techniques of history, archaeology, art history and philology.

*Prerequisite(s):* Completion of one upper division course in Latin (LAT), Greek (GRK) or Hebrew (HEB) or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **CLA 194HA – Special Study for Honors Students (3 units)**

*Course Description:* Directed reading, research and writing culminating in the completion of a senior honors thesis under the direction of faculty advisor.

*Prerequisite(s):* Admission to the Honors Program; consent of faculty member supervising honors thesis.

*Learning Activities:* Discussion 1 hour(s), Independent Study, Term Paper.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **CLA 194HB – Special Study for Honors Students (3 units)**

*Course Description:* Directed reading, research, and writing culminating in the completion of a senior honors thesis under the direction of faculty advisor.

*Prerequisite(s):* Admission to the Honors Program and consent of faculty member supervising honors thesis.

*Learning Activities:* Discussion 1 hour(s), Independent Study, Term Paper.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **CLA 197TC – Community Tutoring in Classical Languages (1-5 units)**

*Course Description:* Supervised instruction of Greek or Latin in nearby schools by qualified students in department.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated 5 unit(s).

*Grade Mode:* Pass/No Pass only.

## **CLA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CLA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CLA 200A – Approaches to the Classical Past (4 units)**

*Course Description:* Survey of major areas of classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture.

*Prerequisite(s):* Graduate student status or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CLA 200B – Approaches to the Classics Past (4 units)**

*Course Description:* Research project on major area of Classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture.

*Prerequisite(s):* CLA 200A; graduate student status or consent of instructor.

*Learning Activities:* Independent Study 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

## **CLA 201 – Introduction to Classical Philology (4 units)**

*Course Description:* Survey of major contemporary areas of classical scholarship with special attention devoted to current problems in literary and textual criticism.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CLA 202 – Homer (4 units)**

*Course Description:* Readings in the Iliad and Odyssey: the origins and transmission of the poems.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CLA 203 – Vergil (4 units)**

*Course Description:* Reading of selected books of the Bucolics, Georgics, and Aeneid. Emphasis will be placed on the study of Vergilean poetic language.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CLA 204 – Greek & Roman Comedy (4 units)**

*Course Description:* Historical and critical problems in Aristophanes or New Comedy.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**CLA 205 – Latin Lyric & Elegy (4 units)**

*Course Description:* Critical examination of the works of Catullus, Horace, or Propertius.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**CLA 206 – Greek Historiography (4 units)**

*Course Description:* Development of historical writing in Greece.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**CLA 207 – Greek Drama (4 units)**

*Course Description:* Literary and philological analysis of the plays of Euripides, Sophocles, or Aeschylus.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**CLA 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* .

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLA 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Clinical Research (CLH)**

School of Medicine

**CLH 200 – Introduction to Translational Research (1 unit)**

*Course Description:* Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG mentored research project.

*Prerequisite(s):* Consent of instructor; one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 201 – Strategies for Grant Writing (2 units)**

*Course Description:* Practical skills and strategies to create successful grant proposals in NIH style/format. Generating ideas, identifying and accessing research resources, grant components, specific aims, background and significance, preliminary studies, budgets, and bios. Matriculation through UC system, and resubmissions. (Former MDS 461CR.)

*Prerequisite(s):* Consent of instructor; completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training program.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 202 – Introduction to Clinical Research (3 units)**

*Course Description:* Anatomy and physiology of conducting clinical epidemiologic research. Familiarity with three basic study designs: cross-sectional, case-control, and cohort. Discussion of principles of measurements in clinical epidemiological studies, basic methods for analyzing data, and ethical issues involved in conducting research.

*Prerequisite(s):* Consent of instructor; completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, MRCTP program, Clinical Research Certificate or other SOM/CTSC training programs.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**CLH 203 – Methods in Clinical Research (3 units)**

*Course Description:* Overview of major approaches to clinical research, including health services research techniques, informatics, GCRC, and preclinical methodologies to enhance clinical projects. Overview of UC Davis clinical research support infrastructure. Methodologies applicable to clinical research and its multi-disciplinary perspective.

*Prerequisite(s):* Consent of instructor; completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM training programs.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s), Independent Study 10 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 204 – The Ethics of Research (1 unit)**

*Course Description:* Acquire information about ethical responsibilities; Explore major questions in ethics; Apply ethical principles, concepts and values; Gain an appreciation of the role of trust in scientific research. Recommend three quarters of CLH204. Must enroll in Fall to continue through Spring.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Priority given to those with acceptance into the Clinical Research Graduate Group, K12, T32 or other SOM/CTSC training program.

*Repeat Credit:* May be repeated 3 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 207 – Team Science (1 unit)**

*Course Description:* Today's scientific challenges necessitate cross-disciplinary engagement and high collaboration levels. Offers guidance on how best to engage in team science to pursue complex questions, work effectively with team members, and produce high impact research that meets society's needs.

*Prerequisite(s):* Participation in CTSC Research Education and Training Programs, or consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to 25 students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 208 – Introduction to Grant Writing, I (2 units)**

*Course Description:* First in a two-quarter series. Scholars are encouraged to enroll in both classes. The two-course sequence provides training in practical aspects of competitive grant writing. The focus is NIH, but information will apply to other funding agencies.

*Learning Activities:* Lecture/Discussion 2 hour(s), Extensive Writing.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 209 – Introduction to Grant Writing, II (2 units)**

*Course Description:* Second in a two-quarter series. Two-course sequence provides training in practical aspects of competitive grant writing.

*Prerequisite(s):* CLH 208; consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to students who have completed CLH 208.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 210Y – Principles & Methods of Comparative Effectiveness Research (4 units)**

*Course Description:* Provides an introduction to Comparative Effectiveness Research (CER) and methods for conducting CER.

*Prerequisite(s):* Consent of instructor; familiarity with research methodology; course in introductory statistics.

*Learning Activities:* Web Virtual Lecture 4 hour(s), Discussion 2 hour(s), Project 6 hour(s).

*Grade Mode:* Letter.

**CLH 211 – Critical Assessment of the Biomedical Literature (1 unit)**

*Course Description:* Exposure to topical issues and controversies in the design of interdisciplinary translational research, with an emphasis on critical assessment of the biomedical and health sciences literature. Extends students' knowledge of study design through practical application.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 3 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 212 – Introduction to Stem Cell Biology (3 units)**

*Course Description:* Introduction to Stem Cell Biology. Each week will focus on different aspects of stem cells, including general concepts, stem cells in lower organisms, embryonic stem cells and cellular reprogramming.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students with a fundamental knowledge of cell biology.

*Grade Mode:* Letter.

**CLH 214A – Biodesign I (2 units)**

*Course Description:* Focuses on the principles of needs identification and invention of biomedical technologies. Two part course provides a basic understanding of the elements of the innovation process and how to translate these principles into biomedical device design.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Prior approval by instructor required; student must commit to taking both courses; Biodesign I and Biodesign II.

*Grade Mode:* Letter.

**CLH 214B – Biodesign II (2 units)**

*Course Description:* Focuses on the implementation of biomedical technologies and translational process. Two part course provides a basic understanding of the elements of the innovation process and how to translate these principles into biomedical device design.

*Prerequisite(s):* CLH 214A; consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Prior approval by instructor required; student must commit to taking both courses; Biodesign I and Biodesign II.

*Grade Mode:* Letter.

**CLH 215 – Clinical Trials in Medicine (2 units)**

*Course Description:* Importance, design, and execution of clinical trials.

*Prerequisite(s):* CLH 244 C or better; SPH 205AY C or better; or equivalent; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* S/U only.

**CLH 220 – Basics of Stem & Progenitor Cells (1 unit)**

*Course Description:* Lecture designed for graduate students who have experience in cell culture techniques. Designed to give a broad overview of the field and current cells of interest to the greater research community.

*Prerequisite(s):* MCP 200L; MCP 200; consent of instructor; graduate standing.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 222 – Ethical Issues in Stem Cell Biology (1 unit)**

*Course Description:* Critical presentation and analysis of recent articles in stem cell biology and small group discussions of the ethical issues surrounding this area of research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 225 – Stem Cell Biology & current Good Manufacturing Practice (2 units)**

*Course Description:* Introduction to human stem cell biology; development of cellular therapeutics based on human stem cells for the treatment of currently incurable diseases; introduction to current Good Manufacturing Practice (cGMP), and theoretical & practical exploration of cGMP to manufacture such cellular therapies.

*Prerequisite(s):* Must have foundational knowledge of biology and chemistry; graduate students preferred, other students upon instructor's consent.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Graduate students preferred, other students upon instructor's consent.

*Grade Mode:* Letter.

## **CLH 230 – Congestive Heart Failure, Mechanism of Disease (3 units)**

*Course Description:* Underlying mechanisms of cardiomyopathy and heart failure. Presentation of fundamental knowledge of and recent basic research on heart failure. Student team projects: investigation and presentation of a research topic and bench research project to advance research in the same area.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project.

*Grade Mode:* Letter.

## **CLH 231 – Current Techniques in Clinical Research (2 units)**

*Course Description:* Current techniques used in clinical research such as electrophysiology, cardiovascular surgery, cardiac catheterization and echocardiography, team science, and patient management. Lectures are presented by experts on each technique, with an emphasis on use in translational research.

*Prerequisite(s):* CLH 250; and consent of instructor; graduate standing.

*Learning Activities:* Lecture 1 hour(s), Clinical Activity 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CLH 233 – Molecular Mechanisms of Disease: Cancer (3 units)**

*Course Description:* Cutting edge of research on underlying mechanisms of cancer development, progression and prevention; clinical trials/drug development, signaling pathways and molecular mechanisms of cancer development, recent basic research on cancer stem cells, genetics and epigenetic events and animal models used.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project 3 hour(s).

*Enrollment Restriction(s):* Restricted to students pursuing the designated emphasis in Translational Research; graduate standing.

*Grade Mode:* Letter.

## **CLH 240 – Predoctoral Clinical Research Training Program Research Integration (1 unit)**

*Course Description:* Alternating sessions: journal club, seminar/discussion, and research integration sessions.

*Prerequisite(s):* Consent of instructor; enrollment in the Predoctoral Clinical Research Training Program in the CTSC, School of Medicine.

*Learning Activities:* Seminar 0.50 hour(s), Discussion 0.50 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CLH 244 – Introduction to Medical Statistics (4 units)**

*Course Description:* Introduction to statistical methods and software in clinical, laboratory and population medicine. Graphical and tabular presentation of data, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Only 1 unit of credit for students who have completed STA 100 or MPM 402.

*Cross Listing:* SPH 244.

*Grade Mode:* Letter.

## **CLH 245 – Biostatistics for Biomedical Science (4 units)**

*Course Description:* Analysis of data and design of experiments for laboratory data.

*Prerequisite(s):* CLH 244 or SPH 244; consent of instructor, or equivalent course.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* SPH 245.

*Grade Mode:* Letter.

## **CLH 246 – Biostatistics for Clinical Research (4 units)**

*Course Description:* Emphasizes critical biostatistics for clinical research and targets biomedical audience. Students will develop understanding for basic planning and analysis of clinical studies and learn to develop collaborations with biostatisticians.

*Prerequisite(s):* CLH 245 or SPH 245.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* SPH 246.

*Grade Mode:* Letter.

## **CLH 247 – Statistical Analysis for Laboratory Data (4 units)**

*Course Description:* Statistical methods for experimental design and analysis of laboratory data including gene expression arrays, RNA-Seq, and mass spec.

*Prerequisite(s):* CLH 245 or SPH 245.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* SPH 247.

*Grade Mode:* Letter.

## **CLH 250 – Integrating Medicine Into Basic Science (3 units)**

*Course Description:* Immersive experience consisting of didactic lectures, reading assignments, group discussions, and clinical rotations to acculturate students to the human medical environment; integrate medical principles, physiology and pathophysiology into basic research; and introduce high-impact clinical studies related to medicine and health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Clinical Activity.

*Enrollment Restriction(s):* Graduate standing; priority given to students pursuing Designated Emphasis in Translational Research or CTSC TL1 training program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CLH 290A – Hot Topics in Clinical Research (1 unit)**

*Course Description:* Seminars presented by guest lecturers on subjects of their own research activities.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CLH 290B – Hot Topics in Stem Cell Biology (1 unit)**

*Course Description:* Seminars presented by guest lecturers on subjects of their own research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 290C – Literature in Stem Cell Biology (1 unit)**

*Course Description:* Critical presentation and analysis of recent journal articles in stem cell biology by students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 290D – Literature in Translational Research (1 unit)**

*Course Description:* Critical presentation and analysis of recent journal articles in translational research by students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 298 – Group Study in Clinical Research (1-5 units)**

*Course Description:* Special topics in Clinical Research appropriate for group study at the graduate level.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the Mentored Clinical Research Training Program.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CLH 299 – Clinical Research (1-5 units)**

*Course Description:* Independent research and special topics in clinical research appropriate for graduate level.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the Mentored Clinical Research Training Program.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Cognitive Science (CGS)

College of Letters & Science

**CGS 001 – Introduction to Cognitive Science (4 units)**

*Course Description:* Introduction to the interdisciplinary cognitive scientific approach to the study of mind, drawing concepts and methods from psychology, philosophy, linguistics, artificial intelligence, and other disciplines.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Cognitive Science majors only.

*Cross Listing:* PHI 010.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**CGS 098 – Directed Group Study (0.5-5 units)**

*Course Description:* Directed group study in cognitive science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**CGS 099 – Special Study for Lower Division Students (1-5 units)**

*Course Description:* Special study for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**CGS 107 – Neuroeconomics/Reinforcement Learning & Decision Making (4 units)**

*Course Description:* Theoretical and empirical approaches to neuroeconomics (neuroscience of decision making) from psychology, neuroscience, economics, and computer science. Neuroscience of judgment and decision making, behavioral economics, and reinforcement learning.

*Prerequisite(s):* (PSC 100 or PSC 100Y or PSC 135 or ECN 100A or ARE 100A or NPB 162 or NPB 163); (STA 013 or STA 013Y or STA 100 or PSC 103A); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* ECN 107, PSC 133.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL).

**CGS 138 – Consciousness & Cognition (4 units)**

*Course Description:* Current theoretical and empirical evidence in the study of cognition and consciousness. Theories of consciousness, psychological and neural basis of conscious and unconscious processes such as attention, intentionality, and dreams.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (PSC 100 or PSC 100Y or PSC 135).

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* PSC 138.

*Grade Mode:* Letter.

**CGS 192 – Fieldwork in Cognitive Science (1-5 units)**

*Course Description:* Supervised internship off and on campus, in community and institutional settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Fieldwork 3-15 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**CGS 194HA – Special Study for Honors Students (3 units)**

*Course Description:* Directed research. Supervised reading, research and writing leading to submission of a Senior Honors thesis under the direction of faculty sponsor.

*Prerequisite(s):* Consent of instructor. Senior standing in Cognitive Science; qualifications for admission into college honors program.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Letter.

**CGS 194HB – Special Study for Honors Students (3 units)**

*Course Description:* Directed research. Supervised reading, research and writing leading to submission of a Senior Honors thesis under the direction of faculty sponsor.

*Prerequisite(s):* Consent of instructor. Senior standing in Cognitive Science; qualifications for admission into college honors program.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Letter.

**CGS 198 – Directed Group Study (0.5-5 units)**

*Course Description:* Directed group study in cognitive science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-15 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**CGS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## College of Letters & Science (LTS)

College of Letters & Science

**LTS 001 – First Year Engagement: Student Success in Letters & Science (1 unit)**

This version has ended; see updated course, below.

*Course Description:* Introduction to university life. Topics include transition to academic and campus life; academic expectations and the skills to meet them; campus resources; social and professional development; assistance in choice of major, and academic planning.

*Learning Activities:* Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Open only to students who have completed fewer than 45 quarter units.

*Grade Mode:* Pass/No Pass only.

**LTS 001 – First Year Engagement: Student Success in Letters & Science (2 units)**

*Course Description:* Introduction to university life. Topics include transition to academic and campus life; academic expectations and the skills to meet them; campus resources; social and professional development; assistance in choice of major, and academic planning.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Open only to students who have completed fewer than 45 quarter units.

*Credit Limitation(s):* May be repeated for credit when topic differs. Each quarter the course syllabi is different and following are some of the varying topics: Fall • Academic Success strategies • Introduction to Campus Life & Resources • Time Management Winter • Career and Professional Development • Intro to ICC & Professional development tools • Learning difference between choosing major & identifying your passion • Learning and understanding professional etiquette (written, verbal, social). • Speaker Series Spring • Practicum on the following: 1. Group projects 2. Resume building 3. Group dynamics 4. Speech Exercises 5. Formal Etiquette.

*Grade Mode:* Pass/No Pass only.

This course version is effective from, and including: Fall Quarter 2023.

**LTS 002 – Aggie Explorers: Major Exploration (1 unit)**

*Course Description:* Overview of majors offered in College of Letters & Science. Exploration of majors through self-assessments and other tools. Guest lecturers include faculty and academic advisors from across Letters and Science. Receive personalized academic planning to help guide student's undergraduate path. Designed for students who have not yet declared a major or are exploring their options.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**LTS 098 – Directed Group Study (1-4 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**LTS 101 – First Year Transfer Engagement: Student Success in Letters & Science (1 unit)**

*Course Description:* Integration of transfer students into university life. Comprehensive foundation for a successful career at UC Davis. Transition from community college to the university, quarter vs. semester systems, academic expectations of faculty and developing skills to meet them, overview of campus resources, evaluating and applying information, social and professional development, and academic planning.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to new transfer students.

*Grade Mode:* Pass/No Pass only.

**LTS 198 – Directed Group Study (1-4 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## Communication (CMN)

College of Letters & Science

**CMN 001 – Introduction to Public Speaking (4 units)**

*Course Description:* Practice in the preparation and delivery of speeches based on principles and strategies of informing and persuading audiences drawn from the social sciences and humanities.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

**CMN 003 – Interpersonal Communication Competence (4 units)**

*Course Description:* Communication competence in professional settings. Managing face-to-face and virtual teams. Leadership, conflict management and negotiation skills. Communication in diverse organizations. Leveraging communication networks. Effective interviewing.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 003V – Interpersonal Communication Competence (4 units)**

*Course Description:* Communication competence in professional settings. Managing face-to-face and virtual teams. Leadership, conflict management and negotiation skills. Communication in diverse organizations. Leveraging communication networks. Effective interviewing.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 003Y – Interpersonal Communication Competence (4 units)**

*Course Description:* Communication competence in professional settings. Managing face-to-face and virtual teams. Leadership, conflict management and negotiation skills. Communication in diverse organizations. Leveraging communication networks. Effective interviewing.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 005 – Global English & Communication (4 units)**

*Course Description:* English as a global language and its uses in intercultural communication. Cultural, historical, and political dimensions of varieties of English spoken around the world. Experiential grounding in strategies for increasing interpretive and verbal communicative competence for a globalized world.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Cross Listing:* LIN 005.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC).

## **CMN 010V – Introduction to Communication (4 units)**

*Course Description:* Basic principles of communication and communication processes; models of communication; foundations of empirical research in communication; contexts of communication and communication research, including interpersonal, intercultural, news, entertainment, mediated, and others.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CMN 010Y.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 010Y – Introduction to Communication (4 units)**

*Course Description:* Basic principles of communication and communication processes; models of communication; foundations of empirical research in communication; contexts of communication and communication research including interpersonal, intercultural, news, entertainment, mediated, and others.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CMN 010V.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 012Y – Data Visualization in the Social Sciences (4 units)**

*Course Description:* Introduction to quantitative data across the social sciences (Communications, Political Science, Psychology, Sociology, and other disciplines). Transforming data, describing data, producing graphs, visual reasoning, and interpretations.

*Learning Activities:* Lecture 2 hour(s), Laboratory 1.50 hour(s), Web Virtual Lecture 1.50 hour(s).

*Cross Listing:* SOC 012Y, POL 012Y, PSC 012Y.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL); Visual Literacy (VL).

## **CMN 076 – Video Games & Virtual Environments (4 units)**

*Course Description:* Impact of video games on players and society. Topics include motivations for playing games; cognitive, emotional, and behavioral effects, including violence and addiction; interpersonal and group processes in online games; virtual communities; and video games for education.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL).

## **CMN 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CMN 101 – Communication Theories (4 units)**

*Course Description:* Forms, functions, development, and testing of communication theory, with emphasis on social scientific approaches. Survey and comparison of significant micro and macro theories and models of face-to-face and mediated communication. Application of theories to real-world problems.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CMN 101Y.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 101Y – Communication Theories (4 units)**

*Course Description:* Forms, functions, development, and testing of communication theory, with emphasis on social scientific approaches. Survey and comparison of significant micro and macro theories and models of face-to-face and mediated communication. Application of theories to real-world problems.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CMN 101.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 102 – Empirical Methods in Communication (4 units)**

*Course Description:* Social scientific research methods employed in Communication. Topics include research design, measurement, sampling, questionnaire construction, survey research, experimental design, content analysis and qualitative field methods.

*Prerequisite(s):* STA 013 or STA 013Y; or equivalent of STA 013.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 110 – Communication Networks (4 units)**

*Course Description:* Theoretical approaches to communication networks, practical applications of network studies, and network analysis tools. Friendship, political discussion, social support, organizational, social media, and disease transmission networks are examined. Impact of emerging technologies on network creation, maintenance, and expansion.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 111 – Gender Differences in Communication (4 units)**

*Course Description:* Examination of communication differences between men and women as sources of male/female stereotypes, misunderstandings, dilemmas, and difficulties (real and imagined). Treatment of genders as cultures. Topics include male/female differences in discursive practices and patterns, language attitudes, and relationship dynamics.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Credit Limitation(s):* Not open for credit to students who have taken CMN 103.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **CMN 112 – Theories of Persuasion (4 units)**

*Course Description:* Theories and models of persuasion that account for the effects of source, channel and audience factors on message recipients. Examination of message strategies for altering attitudes and gaining compliance. Contexts of application include interpersonal relationships, advertising, politics, and health.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Credit Limitation(s):* Not open for credit to students who have taken CMN 152.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 114 – Communication & Cognition (4 units)**

*Course Description:* Relationship between communication and cognition in interpersonal and mediated contexts. Discourse comprehension and production, impact of language attitudes on social judgments, the effects of information processing on decision making.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Credit Limitation(s):* Not open for credit to students who have completed CMN 138.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 120 – Interpersonal Communication (4 units)**

*Course Description:* Theories and principles of interpersonal communication related to perception, verbal and nonverbal channels, mutual understanding, and relationship development. Communication processes in face-to-face and technologically-mediated encounters. Consideration of different relationship contexts, including friendships, dating and family relationships, and the workplace.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Credit Limitation(s):* Not open for credit to students who have taken CMN 134.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 121 – Language Use in Conversation (4 units)**

*Course Description:* Examination of how people use language in social interaction, how they exchange meaning during conversation, and how their use of language plays a central role in turn-taking, speech acts, attitude formation, figurative speech, politeness, and other aspects of conversation.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Credit Limitation(s):* Not open for credit to students who have taken CMN 105.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 122 – Nonverbal Communication (4 units)**

*Course Description:* Examination of the interaction between nonverbal communication and verbal communication channels in influencing outcomes in interpersonal relationships. Underlying functions served by nonverbal communication are considered.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Credit Limitation(s):* Not open for credit to students who have completed CMN 135.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 123 – Intercultural Communication (4 units)**

*Course Description:* Major concepts and theories of intercultural communication. Topics include cultural similarities and differences in verbal and nonverbal communication; dimensions of cultural variations, barriers to intercultural communication, and intercultural communication competence.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have taken CMN 137.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **CMN 124 – Family Communication (4 units)**

*Course Description:* Theories and research on family communication. Communication in courtship, marriage, and relational dissolution. Processes and outcomes of parent-child, sibling, family roles, and inter-generational communication. Interaction patterns associated with marital/family satisfaction, maintenance, divorce, and dysfunction. Cultural influences on family communication.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 130 – Group Communication (4 units)**

*Course Description:* Communication processes in the development and maintenance of effective groups and teams in organizations. Examination of both face-to-face and computer-mediated group interaction. Topics include group development, power, norms, cohesion, decision making, problem solving, creativity, conflict management, working remotely, and leadership.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 131 – Strategic Communication in Public Relations (4 units)**

*Course Description:* Principles, evolution, and professional practice of public relations. Planning and execution of effective, ethical communication strategies and campaigns. Distribution of messages through traditional and new media, including social media. Cultivation of relationships between organizations and their publics. Crisis communication management.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**CMN 132 – Social Media for Public Relations (4 units)**

*Course Description:* Uses of social media technologies in contemporary public relations practice. Social and behavioral theories of social media processes and effects. Strategies and tools for authoring content that builds relationships and creates conversations with key publics.

*Prerequisite(s):* CMN 131.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 136 – Organizational Communication (4 units)**

*Course Description:* Organizational communication theory and practice is examined with an emphasis on the use of effective communication strategies for achieving organizational goals.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 139 – Advanced Organizational Communication (4 units)**

*Course Description:* Communication processes within and among social organizations. Examines formal organizations as information processing systems. Topics include general systems theory, input-output analysis, structural-functionalism, cybernetics, organizational network analysis, organization environments, organizations as cultures, organizational learning, information technologies, and communication diagnostic/auditing strategies.

*Prerequisite(s):* CMN 136.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**CMN 140 – Introduction to Mass Communication (4 units)**

*Course Description:* History of mass media and media research traditions. Organization and economics of the media industry. Media policy, law, regulation and ethics. Impact of the media on individuals and society. Traditional, new and emerging communication technologies.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 141 – Media Effects: Theory & Research (4 units)**

*Course Description:* Social scientific studies of the effects of mass media messages on audience members' actions, attitudes, beliefs, and emotions. Topics include the cognitive processing of media messages, television violence, political socialization, cultivation of beliefs, agenda-setting, and the impact of new technologies.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 142 – Newsmaking (4 units)**

*Course Description:* The making of news. How journalists construct news and how consumers and newsmakers use it. Effects of news, technology's challenges to journalism, and the relationship of news to other institutions.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH).

**CMN 143 – Analysis of Media Messages (4 units)**

*Course Description:* Examination of alternative approaches to the analysis, interpretation, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**CMN 144 – Media Entertainment (4 units)**

*Course Description:* Effects and appeal of media entertainment, emphasizing emotional reactions. Topics include key concepts of entertainment research such as mood management, and the respective features and emotional/social-psychological effects of genres such as comedy, mystery, thriller, sports, music, horror, and erotica.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**CMN 145 – Political Communication (4 units)**

*Course Description:* Relationships among the mass media, citizens, and politics, production of political news, campaign strategies, and citizens' attitudes and behaviors. Frameworks for mediated politics, the news, and elite discourse and campaign messages.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**CMN 146 – Communication Campaigns (4 units)**

*Course Description:* Strategic uses of media and interpersonal communication channels in health, environmental advocacy, and political campaigns. Emphasis on general principles relevant to most campaign types, including public information, social marketing, and media advocacy campaigns.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 147 – Children, Adolescents, & the Media (4 units)**

*Course Description:* Research on the adaptive and maladaptive effects of media (e.g., television, movies, video games, social media) on the social, emotional, cognitive, and physical development of youth, considering the protective role of parents, teachers, ethics, and policy.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to Communication majors only on Pass 1.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**CMN 148 – Contemporary Trends In Media (4 units)**

*Course Description:* Global trends in media, including media and globalization, impacts of the new media economy, media and security, and effects of ownership on media content and culture.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); World Cultures (WC).

**CMN 149 – Race & Media (4 units)**

*Course Description:* Examines how race and ethnicity as social categories are shaped by mass media. Focuses on the impact of race and ethnicity role portrayals in content and style of news, television and cinema.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

**CMN 150V – Computational Social Science (4 units)**

*Course Description:* Nontechnical survey of modern computational research methods. Web scraping, artificial intelligence, visualizing social networks, and computer simulations. Hands-on use of diverse software applications. Professors from all ten UC campuses contribute.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

**CMN 151 – Simulating Communication Processes (4 units)**

*Course Description:* Simulations of communication and sociality using agent-based models. Focus on strategic behavior, cooperation, coordination, self-organization, information diffusion, and other communication phenomena. No programming skills assumed.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

**CMN 152V – Social Science with Online Data (4 units)**

*Course Description:* Survey of web-driven social science and its methods. Focus on web scraping and social media API's. Covers wrangling and analysis of data from social networks, online experiments, and other digital traces. Python programming skills helpful, but not assumed.

*Prerequisite(s):* Programming experience helpful, but not required.

*Learning Activities:* Extensive Problem Solving, Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL).

**CMN 161 – Health Communication (4 units)**

*Course Description:* Health communication theories and research. Health literacy, social support and coping, doctor-patient interaction, health communication campaigns, media influences on health, and applications of new technologies in health promotion.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**CMN 165 – Media & Health (4 units)**

*Course Description:* Content and effects of health messages in the media. Topics include health news reporting; portrayals of disease, disability, death and health-related behaviors; promotion of drugs and other health products; and tobacco and alcohol advertising.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**CMN 170 – Digital Technology & Social Change (4 units)**

*Course Description:* Conceptual understanding of how digital communication technologies transform our lives through social media, mobile connectivity, globalization, and big data. Contexts include education, health, entrepreneurship, democracy, and poverty.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CMN 170V.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 170V – Digital Technology & Social Change (4 units)**

*Course Description:* Conceptual understanding of how digital technologies transform our lives, through social media, mobile connectivity, globalization, big data, and artificial intelligence. Context includes education, health, entrepreneurship, democracy, among others.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CMN 170.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 172 – Interpersonal Technologies (4 units)**

*Course Description:* Theories and research findings on how people use technologies for interpersonal and relational purposes, including impression formation, self-presentation, deception, anonymity, friendship maintenance, online dating, and emotional expression.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 174 – Social Media (4 units)**

*Course Description:* Application of communication theories to the study and design of social media. Examination of social media in contexts such as political activism and collaboration. Topics include online credibility, participatory culture, viral media and privacy.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **CMN 176 – Video Games Theory & Research (4 units)**

*Course Description:* Communication theory and research on the uses and effects of video games. Research methods available for investigating game use and the impact of games on behavior. Application of those methods in a research project.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 176V – Video Games Theory & Research (4 units)**

*Course Description:* Communication theory and research on the uses and effects of video games. Research methods available for investigating game use and the impact of games on behavior. Application of those methods in a research project.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 178 – Persuasive Technologies (4 units)**

*Course Description:* Designing and testing ethical, technology-based communication interventions in the domains of health, marketing, education, and environment. Social media, mobile apps, wearable devices, recommendation systems, serious games, and augmented reality.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 180 – Current Topics in Communication (4 units)**

*Course Description:* Group study of a special topic in communication.

*Prerequisite(s):* (CMN 101 or CMN 101Y); CMN 102; or a research methods course equivalent to CMN 102.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Communication majors only.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 189A – Proseminar in Social Interaction (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in the specialty of social interaction. Potential topics include relationship initiation, maintenance, and deterioration; communication failure; nonverbal communication; conversational management; semantics and pragmatics of languages; and family/marital communication.

*Prerequisite(s):* (CMN 101 or CMN 101Y); CMN 102; CMN 136; and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to Communication majors only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 189B – Proseminar in Mass Communication (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in the specialty of mass communication. Potential topics include, agenda-setting, the cultivation of beliefs, television violence, media portrayals of underprivileged groups, mediated political discourse, interactive technologies, and international/global communications.

*Prerequisite(s):* (CMN 101 or CMN 101Y); CMN 102; CMN 140; and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to Communication majors only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 189C – Proseminar in Health Communication (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in health communication. Potential topics include health communication design and evaluation, media advocacy, physician-patient interaction, uses of communication technologies in health settings, and health-related advertising.

*Prerequisite(s):* (CMN 101 or CMN 101Y); CMN 102; (CMN 161 or CMN 165); and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to Communication majors only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 189D – Proseminar in Organizational Communication (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in the specialty of organizational communication. Potential topics include organizational networks, organizational conflict and its resolution, mediation, bargaining and negotiation, superior-subordinate interaction, leadership styles, and inter-organizational communication.

*Prerequisite(s):* (CMN 101 or CMN 101Y); CMN 102; CMN 136; and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to Communication majors only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 189E – Proseminar in Information & Communication Technologies (4 units)**

*Course Description:* Reading, discussion, research and writing on a selected topic in information and communication technologies. Potential topics include the role played by digital technologies in social change, serious games for change, and virtual and offline worlds.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **CMN 192 – Internship in Communication (1-12 units)**

*Course Description:* Supervised work experience requiring the application of communication principles and strategies or the evaluation of communication practices in a professional setting. Relevant experiences include public relations, advertising, sales, human resources, health promotion, political campaigns, journalism, and broadcasting.

*Prerequisite(s):* Consent of instructor. Communication majors who have completed 20 units of upper division communication courses.

*Learning Activities:* Internship 3-36 hour(s).

*Enrollment Restriction(s):* Open to Communication majors only.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **CMN 194H – Senior Honors Thesis (4 units)**

*Course Description:* Directed reading, research, and writing culminating in the preparation of honors thesis under direction of faculty advisor.

*Prerequisite(s):* Senior standing and approval by Honors Committee.

*Learning Activities:* Seminar 1 hour(s), Project 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CMN 197T – Tutoring in Communication (2-4 units)**

*Course Description:* Tutoring in undergraduate Communication courses, including leadership of discussion groups affiliated with departmental courses.

*Prerequisite(s):* Upper division standing with major in Communication and consent of Department Chairperson.

*Learning Activities:* Seminar 1-2 hour(s), Laboratory 1-2 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

## **CMN 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CMN 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CMN 201 – Theoretical Perspectives on Communication (4 units)**

*Course Description:* Social scientific study of Communication.

Research on interpersonal, organizational, mass, political, and health communication; communication technologies (e.g., video games, social media, persuasive technologies); and communication network analysis.

*Prerequisite(s):* Consent of instructor. Graduate standing in Communication.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to Communication graduate students only.

*Grade Mode:* Letter.

## **CMN 202 – Communication Theory Construction (4 units)**

*Course Description:* Alternative meta-theoretical perspectives for theory generation in communication inquiry. Processes of construct explication, operationalization and theory construction. Emphasis on the critique of extant communication theories and the development of theory construction skills.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **CMN 203 – Scientific Methods for Communication (4 units)**

*Course Description:* Social scientific research methods commonly employed in Communication. Topics include research design measurement sampling questionnaire construction survey research experimental design evaluation research content analysis and qualitative field methods.

*Prerequisite(s):* CMN 201; CMN 202; PSC 204A; PSC 204B; or equivalents.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CMN 204 – Biological Foundations of Communication (4 units)**

*Course Description:* Communibiological, evolutionary, neuroscience, and neurophysiological perspectives on communication. Methodologies for examining human physiological responses to messages, such as heart rate, skin conductance, electromyography, and cortical activity.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CMN 210 – Experimental Methods & Analysis in Communication (4 units)**

*Course Description:* Experimental designs in communication. Topics include: causation; threats to validity; conceptualization, operationalization, and measurement; hypothesis testing; ethics; data analysis software focusing on the analysis of variance and planned contrasts; and the practical and effective implementation and writing of experiments.

*Prerequisite(s):* Consent of instructor. Graduate standing; one course in inferential statistics.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **CMN 211 – Survey Research Methods in Communication (4 units)**

*Course Description:* Methods for designing personal interview, phone, mail, and web-based surveys in communication. Topics include: sampling strategies, sources of error and bias in survey designs, questionnaire construction, cognitive interviewing, interviewer behavior, and analysis of complex survey data using standard software packages.

*Prerequisite(s):* Consent of instructor. Graduate standing; one course in inferential statistics.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **CMN 212 – Web Science Research Methods (4 units)**

*Course Description:* Applications of data science to web-based communication research. Design, implementation, analysis, and reporting of studies using online data. Use of Python to scrape, organize, analyze, and visualize web data.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **CMN 213 – Simulation Methods in Communication Research (4 units)**

*Course Description:* Simulation methods for modeling human communication. Single and multiple agent approaches to developing process theories of cooperation, coordination, strategic behavior, information and innovation diffusion, and other aspects of sociality.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **CMN 214 – Analysis of Communication Networks (4 units)**

*Course Description:* Theoretical and analytic issues pertaining to network perspectives on communicating and organizing. Consideration of structural and dynamic features of communication networks. Introduction to network analysis software and various analysis techniques.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CMN 220 – Persuasion Theories & Message Design (4 units)**

*Course Description:* Major social scientific theories and perspectives on attitude change and persuasion. Application of persuasion theories and principles to persuasive message design in applied contexts.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **CMN 221 – Communication & Cognition (4 units)**

*Course Description:* Explores the cognitive structures and processes that enable the production, comprehension and interpretation of messages in face-to-face and mediated communication contexts. Explores the communication outcomes associated with these processes.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **CMN 222 – Risk Communication (4 units)**

*Course Description:* Theories and models of individual risk information processing. Media depictions of threats and risk-related information and their potential effects on audiences. Implications for the design and implementation of messages concerning threat and risk.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **CMN 230 – Social Interaction Theory & Research (4 units)**

*Course Description:* Survey of theories and research on social interaction and interpersonal communication. Covers communication codes, individual differences in communication, communication and relationship development, family communication, conflict, cognitive and emotional processes underlying social interaction, social influence, intercultural communication, and nonverbal behavior.

*Prerequisite(s):* Graduate standing; consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**CMN 231 – Tactics of Interpersonal Influence (4 units)**

*Course Description:* Achievement of interpersonal goals in social interaction. Topics include message production; tactics, strategies and planning; anticipating potential obstacles; resisting and thwarting goals; plan recognition; and goal detection. Examined goals include compliance gaining, attitude change, ingratiation, information seeking, comforting, and deception.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**CMN 232 – Health Communication (4 units)**

*Course Description:* Health communication theories and research traditions. Topics include consumer health information seeking; physician-patient interaction; information, social marketing, "edutainment" and media advocacy campaigns; social networks and coping; media influences on health; and new communication technologies in health promotion and healthcare delivery.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Cross Listing:* SPH 232.

*Grade Mode:* Letter.

**CMN 233 – Persuasive Technologies for Health (4 units)**

*Course Description:* Theorizing, designing and evaluating ethical technology-based health communication interventions. Uses of social media, mobile communication apps, wearable devices, computer-generated tailored messages, educational games, and computational approaches in health promotion and healthcare delivery.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* SPH 233.

*Grade Mode:* Letter.

**CMN 234 – Intercultural Communication (4 units)**

*Course Description:* Theories and research on intercultural communication. Topics include national, racial, and ethnic similarities and differences in communication practices; cultural beliefs and values; identity and conflict; and technological influences on intercultural communication. Methodological issues in intercultural communication research are also examined.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

**CMN 235 – Health Communication Campaigns (4 units)**

*Course Description:* Principles of health communication campaign planning, implementation and evaluation. Strategies for changing health behaviors, shaping policy, and improving healthcare organizations' relations with stakeholders.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Cross Listing:* SPH 235.

*Grade Mode:* Letter.

**CMN 243 – Media & Health (4 units)**

*Course Description:* Survey of research on media and health. Topics include health news coverage; depictions of health, illness and disability in entertainment; health campaigns; advertising of health products and services; and the influence of gaming and other new media on health behaviors.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

**CMN 244 – Organizational Communication (4 units)**

*Course Description:* Theory and research on communication processes in organizations.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**CMN 250 – Mediated Communication Theory & Research (4 units)**

*Course Description:* Survey of major theories on the intended and unintended effects of mediated communication. Topics include media's effects on learning, political behavior, interpersonal violence, sexual socialization, consumer behavior, race relations, gender socialization, and cultural processes.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**CMN 251 – Digital Technology & Social Change (4 units)**

*Course Description:* Conceptual, theoretical, and international consideration of how digital communication technologies transform social organization and development. Topics include social media, big data, political revolutions, e-democracy, digital divide, e-education, e-health, entrepreneurship, public policies, poverty reduction, technological innovations, microfinance, and entertainment.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open to students who have taken CMN 251Y.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**CMN 251Y – Digital Technology & Social Change (4 units)**

*Course Description:* Discussion and research on how digital technologies transform our lives through social media, mobility, big data, global connectivity, and artificial intelligence; changing business, health, democracy, globalization, families, dating, and education.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Discussion 2 hour(s).

*Credit Limitation(s):* Not open to students who have taken CMN 251.

*Grade Mode:* Letter.

**CMN 252 – Computer-Mediated Communication (4 units)**

*Course Description:* Effects of computer-mediated communication on the ways in which people express themselves, form impressions about strangers, develop and maintain relationships, collaborate on group work, and expand social network, especially in comparison to face-to-face communication.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**CMN 253 – Children, Adolescents, & the Media (4 units)**

*Course Description:* Theory and research on the uses and effects of traditional and new media on children and adolescents, emphasizing social, emotional, cognitive, and physical development. Methodological approaches and ethical issues in studies of underage populations. Parent and family mediation of effects.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CMN 254 – Communication Campaigns (4 units)**

*Course Description:* Strategic uses of media and interpersonal channels to promote social change through social marketing, information, and media advocacy campaigns. Focus on theory-based interventions in a variety of applied contexts.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**CMN 255 – Social Media (4 units)**

*Course Description:* Theoretical, conceptual and analytic issues pertaining to social media research. Topics include motivation, participation, virality, and social-technical capital. Examination of social media in various contexts. Introduction to online behavioral data collection and analysis methods.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CMN 256 – Communication Perspective on Video Games (4 units)**

*Course Description:* Review of theory and research on the uses and effects of video games and virtual environments developed for entertainment and education. Study of the research methods available for documenting and measuring game use and effects on behavior.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CMN 259 – Cognitive Approaches to Media (4 units)**

*Course Description:* Interdisciplinary examination of cognitive approaches to mediated communication. Application of studies on mediated message processing, cognitive and emotional information processing, psychophysiology, and neuroscience to mass communication. Review of media research and methods on attention, memory, motivation, and limited capacity.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

**CMN 260 – Political Communication (4 units)**

*Course Description:* Theories and research on the connections between media, politics, and citizens in the digital age. Critical framework for understanding the nature of mediated politics by assessing inter-relationships between production of news, political elites' campaign strategies, and behaviors of citizens.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CMN 270 – Diffusion of Innovations (4 units)**

*Course Description:* Communication processes by which information and innovations spread through social systems. Models of diffusion, including spatial, network, time dependent, semantic and cognitive frameworks. Impact of communication technologies on diffusion.

*Practical application of diffusion models in a variety of contexts.*

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CMN 275Y – Computational Social Science (4 units)**

*Course Description:* Survey of modern computational research methods. Big data, social network analysis, machine learning, Agent-based computer simulations. Online lectures are taught by faculty from all 10 UC campuses. Local face-to-face discussion section.

*Learning Activities:* Web Virtual Lecture 1.50 hour(s), Discussion 2 hour(s), Term Paper.

*Credit Limitation(s):* Only 2 units of credit to students who have taken CMN 150V.

*Grade Mode:* Letter.

**CMN 280 – Special Topics in Social Interaction (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in the specialty of social interaction.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**CMN 281 – Special Topics in Mediated Communication (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in the specialty of mediated communication.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**CMN 282 – Special Topics in Health Communication (4 units)**

*Course Description:* Reading, discussion, research and writing on a focused topic in health communication.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**CMN 283 – Special Topics in Organizational Communication (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in the specialty of organizational communication.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when topics differ.

*Grade Mode:* Letter.

## **CMN 284 – Special Topics in Political Communication (4 units)**

*Course Description:* Reading, discussion, research, and writing on a selected topic in the specialty of political communication.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 4 time(s) when topic differs.

*Grade Mode:* Letter.

## **CMN 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CMN 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CMN 299R – Thesis/Dissertation Research & Writing (1-12 units)**

*Course Description:* Students in the Department of Communication graduate programs conduct dissertation research and writing under the supervision of a faculty member.

*Prerequisite(s):* Consent of instructor. Graduate standing in Communication.

*Learning Activities:* Independent Study 3-36 hour(s).

*Repeat Credit:* May be repeated 21 time(s) as across campus, students use 299 courses to reach the 12-unit requirement for full time student status; in saying students may repeat 21 times, we assume students complete their doctoral programs within seven years (five is the norm); the value 21 is based on the calculation 3 quarters x 7 years.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CMN 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Community & Regional Development (CRD)**

College of Agricultural & Environmental Sciences

## **CRD 001 – The Community (4 units)**

*Course Description:* Basic concepts of community analysis and planned social change. The dynamics of community change through case studies of communities including peasant, urban ghetto, suburban mainline, and California farm workers.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **CRD 020 – Food Systems (4 units)**

*Course Description:* Social aspects of agri-food systems. Social science perspectives applied to food and agricultural sustainability in relation to ecology, knowledge, technology, power, governance, labor, social difference, and social movements. Social and environmental effects of commodity chains in comparative global context.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **CRD 092 – Internship (1-12 units)**

*Course Description:* Supervised internship, off and on campus, in community and institutional settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **CRD 098 – Directed Group Study for Undergraduates (1-5 units)**

*Course Description:* Directed group study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

## **CRD 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CRD 118 – Technology & Society (4 units)**

*Course Description:* Impact of technology on labor relations, employment, industrial development and international relations. Internal relations of technology development and deployment.

*Prerequisite(s):* CRD 001 or CRD 002 or SOC 001 or ANT 002.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Extensive Writing, Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **CRD 140 – Dynamics of Regional Development (4 units)**

*Course Description:* Industrial cluster formation and institutions.

Technology, labor relations and interfirm linkages in global value chains. California and other regions are used as case studies.

*Prerequisite(s):* CRD 001 or CRD 002 or SOC 001 or ANT 002.

*Learning Activities:* Lecture 4 hour(s), Extensive Writing, Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CRD 141 – Organization of Economic Space (4 units)**

*Course Description:* Globalization and technological restructuring of economic activity focusing on new spatial patterns of production and circulation and their implications for workers, communities and societies, both in the U.S. and around the globe.

*Prerequisite(s):* CRD 001 or CRD 002 or SOC 001 or ANT 002.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **CRD 142 – Rural Change in the Industrialized World (4 units)**

*Course Description:* Geography of rural environment with emphasis on rural restructuring. Demographics, community, economy, governance, agriculture, and environmental conservation in rural areas of industrialized world. Case studies from and comparisons drawn between North America, Europe, Australia, New Zealand, and Japan.

*Prerequisite(s):* SOC 001 or CRD 001 or CRD 002 or ANT 002.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Extensive Writing, Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **CRD 147 – Community Youth Development (4 units)**

*Course Description:* Community influences on youth well-being, youth as agents of community change, and policies to support healthy communities for young people. Special emphasis on disparities in youth well-being related to race, class, immigration status, gender, sexual-orientation.

*Learning Activities:* Lecture/Discussion 4 hour(s), Project, Extensive Writing/Discussion, Term Paper hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **CRD 149 – Community Development Perspectives on Environmental Justice (4 units)**

*Course Description:* Environmental justice social movements; inequitable distribution of pollution on low-income communities of color; histories, policies, and innovations associated environmental justice movements in the United States and around the world.

*Learning Activities:* Lecture/Discussion 4 hour(s), Extensive Writing/Discussion, Project, Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **CRD 150 – Quantitative Methods in Community Research (5 units)**

*Course Description:* Introduction to statistical analysis of social data relevant to community research, planning and assessment, emphasizing data sources and acquisition, descriptive and inferential analysis techniques, and data interpretation and presentation. Emphasis on spatial data and methods, focusing on the sources, processing, analysis, and presentation of spatial data in a community assessment context.

*Prerequisite(s):* SOC 046B or STA 013 or STA 013Y or STA 032; consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL).

## **CRD 151 – Community Field Research: Theory & Analysis (5 units)**

*Course Description:* Design and analysis of community research considering the relationship between theory and practice. Community research methods, including elite interviewing, ethnographic approaches, and statistical methods, descriptive statistics and OLS regression. Requires design and completion of field research project.

*Prerequisite(s):* CRD 001; (STA 013 or STA 013Y or SOC 046B); any upper division Community Regional Development (CRD) course recommended.

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL); Writing Experience (WE).

## **CRD 152 – Community Development (4 units)**

*Course Description:* Principles and strategies of community organizing and development. Social change from the grassroots organizing perspective to the formalized public participation process involved in general plan revisions. Practical experience in conducting charrettes, visioning and community needs assessments.

*Prerequisite(s):* CRD 001 or CRD 151 or SOC 002 or ANT 002 or ASA 100 or CHI 132 or AAS 101.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CRD 153A – International Community Development: Asia (4 units)**

*Course Description:* Examination and analysis of community development efforts in a range of Asian countries and the impact of global forces in different settings. Includes classroom lectures, workshops, field trips, and collaborative action research projects. Taught abroad.

*Prerequisite(s):* Consent of instructor. 2.000 GPA; good academic standing.

*Learning Activities:* Project 3 hour(s), Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* For summer and quarter abroad versions, limited to 30 students; for the Seminar Abroad version, limited to 15 students; this allows for the small group learning methodology as well as the active collaboration with in-country university students; available for undergraduate and graduate students; applications through UC Davis Study Aboard accepted on a first-come, first-reserved basis for qualified applicants.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **CRD 153B – International Community Development: Europe (4 units)**

*Course Description:* Examination and analysis of community development efforts in Europe and the impact of global forces in different settings. Alternative strategies with emphasis on self-reliance and locally controlled development. Based in Freiburg, Germany, including field trips to France and Switzerland; taught abroad.

*Prerequisite(s):* ANT 002 or IAD 010 or CRD 001 or CRD 002 or SOC 001 or SOC 002 or POL 001.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **CRD 153C – International Community Development: Africa (4 units)**

*Course Description:* Examination and analysis of community development efforts in Africa and the impact of global forces in urban and rural settings. Focus on strategies that promote self-reliance and locally controlled development. Based in South Africa; includes field trips.

*Prerequisite(s):* CRD 001 or CRD 002 or ANT 002 or IAD 010 or SOC 001 or SOC 002 or POL 001.

*Learning Activities:* Lecture 2 hour(s), Fieldwork 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **CRD 154 – Social Theory & Community Change (4 units)**

*Course Description:* Comparative overview of the dominant social science paradigms for the study of community development and change. Among the paradigms discussed are functionalism, conflict theory/Marxism, structuralism, community capitals, social exchange, post-positivism, feminist theories and social constructivism.

*Prerequisite(s):* CRD 001 or SOC 001 or ANT 002; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CRD 156 – Community Economic Development (5 units)**

*Course Description:* How government and community organizations help firms grow and create jobs through local economic development corporations, small business centers, revolving loan funds, incubators, and other programs. Techniques to analyze community economic potential and identification of appropriate intervention tools. Group project.

*Prerequisite(s):* CRD 152 or PLS 021 or PLS 021V or ECS 015; and consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **CRD 157 – Politics & Community Development (4 units)**

*Course Description:* Analyzes political, economic and sociocultural forces shaping the form and function of local communities in the U.S. Considers theories of the state, the community and social change and case studies of actual community development in comparative historical perspective.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CRD 158 – Community Governance (4 units)**

*Course Description:* Governing institutions and political processes at the local level. Local government organization, community autonomy, leadership, political change, policy development, and select policy issues including public finance. Topics change depending on student interest. Field research on coalition building or policy issues in select communities.

*Prerequisite(s):* CRD 001 or SOC 001 or POL 001.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CRD 162 – People, Work & Technology (5 units)**

*Course Description:* Analysis of the relationship between work, technology, and the human experience. Theories of the causes and consequences of labor process, changes under capitalism and globalization, impacts of race/ethnicity, class, gender, and citizenship status on work in the United States and globally; responses of workers, communities, and policy-makers to workplace changes.

*Prerequisite(s):* CRD 001 or SOC 001 or ANT 001 or ANT 001Y; upper division standing recommended.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **CRD 164 – Theories of Organizations & Their Role in Community Change (5 units)**

*Course Description:* Planned change within and through community organizations. Private voluntary organizations, local community associations, and local government. Relationship between community organizations and social capital. Collaborative original data gathering and professional report writing.

*Prerequisite(s):* (STA 013 or STA 013Y or SOC 046B); (CRD 001 or CRD 002 or SOC 001 or ANT 002).

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **CRD 171 – Housing & Social Policy (4 units)**

*Course Description:* Social impact, economics, and politics of housing in the United States. Special attention given to federal, state, and local policy and program strategies to produce and preserve affordable housing and inclusive neighborhoods.

*Learning Activities:* Lecture 4 hour(s), Term Paper.

*Grade Mode:* Letter.

## **CRD 172 – Social Inequality: Issues & Innovations (4 units)**

*Course Description:* Focus on the dimensions, causes, and means of alleviating social inequality in the U.S. Examination and analysis of major theories and forms (class, race/ethnicity, gender, and citizenship status) of inequality. Policy-based and grassroots approaches to change.

*Prerequisite(s):* CRD 001 or CRD 002 or SOC 001 or ANT 002; upper division standing recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s), Extensive Writing, Term Paper, Project.

*Grade Mode:* Letter.

## **CRD 176 – Comparative Ethnicity (4 units)**

*Course Description:* Role of ethnicity in shaping social systems and interaction. Analytical approaches to and issues arising from the study of ethnicity, through utilization of data from a range of different societies.

*Prerequisite(s):* CRD 001 or CRD 002 or SOC 001 or ANT 002; upper division standing recommended.

*Learning Activities:* Lecture 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **CRD 180 – Transnational Community Development (4 units)**

*Course Description:* The effects of grassroots, non-state, non-corporate actors from abroad on local, national and international development. Socioeconomic, political, and cultural implications of transnational actions undertaken by international non-governmental organizations, individual migrants, and migrant grassroots civic organizations.

*Prerequisite(s):* CRD 001 or ANT 002 or SOC 001.

*Learning Activities:* Lecture/Discussion 4 hour(s), Extensive Writing, Project, Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **CRD 192 – Internship (1-12 units)**

*Course Description:* Supervised internship, off and on campus, in community and institutional settings.

*Prerequisite(s):* Consent of instructor. Completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **CRD 194HA – Special Study for Honors Students (4 units)**

*Course Description:* Community & Regional Development Honors is a program of direct reading, research and writing culminating in the preparation of a Senior Honors Thesis under the direction of a faculty advisor.

*Prerequisite(s):* Consent of instructor. Completion of 135 units at the time of enrollment; GPA 3.500 in the major; GPA 3.300 in overall standing; completion of at least four upper division courses; agreement of a faculty member to serve as thesis advisor.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s), Project, Term Paper.

*Grade Mode:* Letter.

## **CRD 194HB – Special Study for Honors Student (4 units)**

*Course Description:* Community & Regional Development Honors is a program of direct reading, research and writing culminating in the preparation of a Senior Honors Thesis under the direction of a faculty advisor.

*Prerequisite(s):* Consent of instructor. Completion of 135 units at the time of enrollment; GPA 3.500 in the major; GPA 3.300 in overall standing; completion of at least four upper division courses; agreement of a faculty member to serve as thesis advisor.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s), Project, Term Paper.

*Grade Mode:* Letter.

## **CRD 197T – Tutoring in Community & Regional Development (1-5 units)**

*Course Description:* Assisting instructor in one of the Community & Regional Development's regular courses by tutoring individual students or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary activities.

*Prerequisite(s):* Consent of instructor. Upper division standing; completion of course to be tutored.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

## **CRD 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CRD 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **CRD 200 – Planning for Health (4 units)**

*Course Description:* Focused on the intersection of city planning and public health. The health of an individual or community is determined not only by the health care they receive, but also by the natural, social, physical, economic, and political environment. Covers topics such as food access, air quality, water quality, waste and energy infrastructure, community engagement, and the planning process. Provides an overview of available public spatially explicit data.

*Learning Activities:* Lecture/Discussion 2 hour(s), Extensive Writing, Project 1 hour(s).

*Grade Mode:* Letter.

## **CRD 230 – Spatial Methods in Community Research (4 units)**

*Course Description:* Spatial analysis of social data relevant to community research, with focus on neighborhoods as units of analysis. Clustering, segregation, geodemographic modelling, spatial regression, multilevel models, spatial data management, accessibility.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **CRD 240 – Community Development Theory (4 units)**

*Course Description:* Introduction to theories of community development and different concepts of community, poverty, and development. Emphasis on building theory, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* GEO 240.

*Grade Mode:* Letter.

## **CRD 241 – The Economics of Community Development (4 units)**

*Course Description:* Economic theories and methods of planning for communities. Human resources, community services and infrastructure, industrialization and technological change, and regional growth. The community's role in the greater economy.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Cross Listing:* GEO 241.

*Grade Mode:* Letter.

## **CRD 242 – Community Development Organizations (4 units)**

*Course Description:* Theory and praxis of organizations with social change agendas at the community level. Emphasis on non-profit organizations and philanthropic foundations.

*Prerequisite(s):* CRD 240; and consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Limited to 15 students.

*Grade Mode:* Letter.

## **CRD 242S – Community Development Organizations (International) (4 units)**

*Course Description:* Theory and praxis of organizations with social change agendas at the community level. Emphasis on local governance, non-profit organizations and philanthropic foundations at an international level. May be taught abroad.

*Prerequisite(s):* CRD 240.

*Learning Activities:* Fieldwork 10 hour(s), Lecture 5 hour(s), Workshop 5 hour(s).

*Enrollment Restriction(s):* Limited to 10 students.

*Grade Mode:* Letter.

## **CRD 243 – Critical Environmental Justice Studies (4 units)**

*Course Description:* Application of social science theories of race, ethnicity, class, gender, and power to understand the production and contestation of environmental inequities.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **CRD 244 – Political Ecology of Community Development (4 units)**

*Course Description:* Community development from the perspective of geographical political ecology. Social and environmental outcomes of the dynamic relationship between communities and land-based resources, and between social groups. Cases of community conservation and development in developing and industrialized countries.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* GEO 254.

*Grade Mode:* Letter.

## **CRD 245 – The Political Economy of Urban & Regional Development (4 units)**

*Course Description:* How global, political and economic restructuring and national and state policies are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and decline; regional development in California.

*Prerequisite(s):* CRD 157; CRD 244; or equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* GEO 245.

*Grade Mode:* Letter.

## **CRD 246 – The Political Economy of Transnational Migration (4 units)**

*Course Description:* Theoretical perspectives and empirical research on social, cultural, political, and economic processes of transnational migration to the U.S. Discussion of conventional theories will precede contemporary comparative perspectives on class, race, ethnicity, citizenship, and the ethnic economy.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* GEO 246.

*Grade Mode:* Letter.

## **CRD 247 – Transformation of Work (4 units)**

*Course Description:* Exploration of the ways that the experience, organization, and systems of work are being reconfigured in the late-20th century. The impacts of economic restructuring on local communities and workers.

*Prerequisite(s):* Graduate standing in history or social science degree program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **CRD 248 – Social Policy, Welfare Theories & Communities (4 units)**

*Course Description:* Theories and comparative histories of modern welfare states and social policy in relation to legal/normative, organizational, and administrative aspects. Analysis of specific social issues within the U.S./California context.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Credit Limitation(s):* Not open for credit to students having completed CRD 248A and CRD 248B.

*Cross Listing:* GEO 248.

*Grade Mode:* Letter.

## **CRD 248A – Social Policy, Welfare Theories & Communities I (2 units)**

*Course Description:* Theories and comparative histories of modern welfare states. Theories of welfare & social policy in relation to normative, organizational, and administrative aspects of welfare & social policy.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **CRD 248B – Social Policy, Welfare Theories & Communities II (2 units)**

*Course Description:* Analysis of a specific set of social issues within the U.S./California context. Issues may include poverty, hunger, housing, health, family, disability, economic opportunity, affirmative action orientations, gender, old age, or special social groups.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in CRD 248A.

*Grade Mode:* Letter.

## **CRD 249 – Media Innovation & Community Development (4 units)**

*Course Description:* Role of innovative media in communities and social change. Studies historical, practical and theoretical issues involving media in community organizing, social justice movements, democracy initiatives, and economic justice.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students.

*Grade Mode:* Letter.

## **CRD 250 – Professional Skills for Community Development (4 units)**

*Course Description:* Help develop the practical skills needed to work professionally in organizations that are involved in community development. Provides an overview of community development planning, project management, and consultation skills.

*Prerequisite(s):* CRD 240.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project 2 hour(s), Fieldwork, Extensive Writing/Discussion.

*Enrollment Restriction(s):* Priority enrollment for Masters & Ph.D. students in Community & Regional Development.

*Grade Mode:* Letter.

## **CRD 251 – Critical Social Science of the Environment (4 units)**

*Course Description:* Relationships between forces of society and the environment through careful examination of the interactions between politics, economics, and global dynamics. Schools of thought concerning society, gender, environmental dynamics, and political economic arrangements across local and global spheres.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## **CRD 260 – Thesis Seminar (2 units)**

*Course Description:* Workshop to help finalize thesis proposals and complete thesis.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **CRD 290 – Community Development Seminar (1 unit)**

*Course Description:* Speaker series on key topics in community development.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students in the CDGG masters program; open to other programs by consent of the instructor.

*Repeat Credit:* May be repeated as CDGG MS students must take four quarters to satisfy the MS degree requirements; may take course as many times as student chooses.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CRD 292 – Graduate Internship (1-12 units)**

*Course Description:* Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated and student may register in more than one internship section per term.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CRD 293 – Community Development Graduate Proseminar (1 unit)**

*Course Description:* Introduction to graduate training in Community Development. Seminar designed to introduce students entering graduate work in the Community Development Graduate Group to its ongoing activities.

*Prerequisite(s):* Enrollment in Community Development graduate group.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to first year Community Development graduate students only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CRD 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **CRD 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Comparative Literature (COM)**

**College of Letters & Science**

## **COM 001 – Major Works of the Ancient World (4 units)**

*Course Description:* Introduction, through class discussion and frequent written assignments, to some of the major works of the ancient world (up to 5th century CE) such as The Odyssey, the Bible, Augustine's Confessions, and works by Plato and Confucius. Examined genres include religious texts, the epic, philosophy, drama, poetry.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 002 – Major Works of the Medieval & Early Modern World (4 units)**

*Course Description:* Introduction, through class discussion and frequent written assignments, to some of the major works of the medieval and early modern worlds (6th century to the mid-17th century) such as Dante's Comedy, 1001 Nights, The Tale of Genji, and Elizabethan/Jacobean plays. Examined genres include framed narratives, courtly literature, and early modern drama.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 003 – Major Works of the Modern World (4 units)**

*Course Description:* Introduction, through class discussion and frequent written assignments, to some of the major works of the modern world (mid-17th to the mid-20th centuries) such as those by Dostoevsky, Tolstoy, Flaubert, Woolf, Lu Xun, Borges and Yeats. Examined genres include realist fiction, modernist fiction, and modernist poetry.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 004 – Major Works of the Contemporary World (4 units)**

*Course Description:* Comparative study of selected major Western and non-Western texts composed in the period from 1945 to the present. Intensive focus on writing about these texts, with frequent papers written about these works.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 005 – Fairy Tales, Fables, & Parables (4 units)**

*Course Description:* Introduction to fairy tales, fables, and parables as recurrent forms in literature, with such readings as tales from Aesop & Grimm, Chaucer & Shakespeare, Kafka & Borges, Buddhist & Taoist parables, the Arabian Nights, and African American folklore.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 006 – Myths & Legends (4 units)**

*Course Description:* Introduction to the comparative study of myths and legends, with readings selected from Near Eastern, Teutonic, Celtic, Indian, Japanese, Chinese, African and Native American literary sources.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 007 – Literature of Fantasy & the Supernatural (4 units)**

*Course Description:* Role of fantasy and the supernatural in literature: tales of magic, hallucination, ghosts, and metamorphosis, including diverse authors such as Shakespeare, P'u Sung-Ling, Kafka, Kawabata, Fuentes, and Morrison.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 008 – Utopias & Their Transformations (4 units)**

*Course Description:* Consideration, in literary works from different ages, of visionary and rational perceptions of a lost paradise, Golden Age, or Atlantis-and of the inhuman nightmares that can result from perversions of the utopian dream of perfection.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 009 – The Short Story & Novella (4 units)**

*Course Description:* Introduction to shorter forms of prose fiction by major authors of different countries, with special emphasis on the modern period.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 010A – Master Authors in World Literature:**

### **Gilgamesh, Ramayana, Beowulf, Nibelungenlied (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Gilgamesh, Ramayana, Beowulf, Nibelungenlied.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

## **COM 010B – Master Authors in World Literature:**

### **Metamorphoses, Decameron, Arabian Nights, Canterbury Tales (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Metamorphoses, Decameron, Arabian Nights, Canterbury Tales.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

## **COM 010C – Master Authors in World Literature:**

### **Chanson de Roland, El Cid, Igor's Campaign, Morte D'Arthur (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Chanson de Roland, El Cid, Igor's Campaign, Morte D'Arthur.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010D – Master Authors in World Literature: Sakuntala, Tristan & Isolde, Aucassin & Nicolette, Gawain (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Sakuntala, Tristan and Isolde, Aucassin and Nicolette, Gawain and the Green Knight.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010E – Master Authors in World Literature: Swift, Rabelais, La Celestina, Simplicissimus (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Swift, Rabelais, La Celestina, Simplicissimus.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010F – Master Authors in World Literature: Cervantes, Saikaku, Fielding, Voltaire (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Cervantes, Saikaku, Fielding, Voltaire.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010G – Master Authors in World Literature: Machiavelli, Shakespeare, Calderón, Racine, Schiller (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Machiavelli, Shakespeare, Lope de Vega/Calderón, Molière/Racine, Lessing/Schiller.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010H – Master Authors in World Literature: Goethe, Byron, Stendhal, Pushkin, Lermontov (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Goethe, Byron, Stendhal, Pushkin, Lermontov.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010I – Master Authors in World Literature: Hoffmann, Gogol, Poe, Hawthorne, Maupassant, Chekhov, Melville (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Hoffmann, Gogol, Poe, Hawthorne, Maupassant, Chekhov, Melville.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010J – Master Authors in World Literature: Flaubert, Twain, Turgenev, Galdós, Ibsen (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Flaubert, Twain, Turgenev, Galdós, Ibsen.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010K – Master Authors in World Literature: Balzac, Dostoevski/Tolstoi, Hardy, Shaw, Strindberg (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Balzac, Dostoevski/Tolstoi, Hardy, Shaw, Strindberg.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010L – Master Authors in World Literature: Unamuno, Svevo, Conrad, Gide, Kafka, Faulkner (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Unamuno, Svevo, Conrad, Gide, Kafka, Faulkner.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

### **COM 010M – Master Authors in World Literature: Yeats, Woolf, Céline, Tanizaki, Brecht, Pirandello (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Rilke/Yeats, Joyce/Woolf, Mann/Céline, Bulgakov/Tanizaki, O'Neill/Brecht, Lorca/Pirandello.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

## **COM 010N – Master Authors in World Literature: Camus, Márquez, Borges, Bellow, Beckett, Genet (2 units)**

*Course Description:* Designed primarily to acquaint the non-literature major with a cross-section of writings by the world's most important authors; readings in English translation. Content alternates among the following segments: Camus/Sartre, García Márquez/Grass, Borges/Sarraute, Bellow/Nabokov, Beckett/Pinter, Genet/Dürrenmatt.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

## **COM 011 – Travel & the Modern World (4 units)**

*Course Description:* Examination of travel as a quintessential human activity and experience of global modernity and cross-cultural encounters from the 18th to the 21st century with an emphasis on German-speaking culture. Travelogues, literature, art, memoirs, and films in English translation.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Cross Listing:* GER 011.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **COM 012 – Introduction to Women Writers (4 units)**

*Course Description:* Survey of fiction, drama, and poetry by women writers from all continents. Concerns of women compared in light of their varied social and cultural traditions. Literary analysis of voice, imagery, narrative strategies and diction.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 013 – Dramatic Literature (3 units)**

*Course Description:* Introduction, through careful reading of selected plays, to some of the major forms of Western drama, from the earliest tragedies of ancient Greece to the contemporary American theater.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 014 – Introduction to Poetry (3 units)**

*Course Description:* Comparative study of poetry in a variety of lyric and other poetic forms from different historical periods and different linguistic, national, and cultural traditions.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 020 – Humans & the Natural World (4 units)**

*Course Description:* Changing relationship between humans and the natural environment in ancient and modern authors as Virgil, Li Po, Basho, Darwin, and Thoreau.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 022 – Literature of the Abnormal Psyche (4 units)**

*Course Description:* Representations of the human psyche in literature and other media (film, visual arts, music) spanning cultures and historical contexts. Depictions of abnormal psychological states, including madness, obsession, and self-fragmentation. Textual interpretation informed by psychological theories. Rhetorical persuasion and nuanced argumentation.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 024 – Animals in Literature (4 units)**

*Course Description:* Study of literary texts from various periods and cultures whose theme is the representation of animals.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 025 – Ethnic Minority Writers in World Literature (4 units)**

*Course Description:* Consideration of a broad range of writers who speak from an ethnic perspective different from the nominally or politically dominant culture of their respective countries and who explore the challenges faced by characters significantly affected by their ethnic minority status.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 053A – Literature of East Asia (4 units)**

*Course Description:* Introduction to representative masterpieces of East Asia with readings from such works as The Story of the Stone, The Peach Blossom Fan, T'ang and Sung poetry, classical Japanese poetry, drama, and travel diaries, and The Tale of Genji.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**COM 053B – Literature of South Asia (4 units)**

*Course Description:* Introduction to representative masterpieces of South Asia with readings from such works as the Mahabharata and Ramayana, The Cloud Messenger, Shakuntala, The Little Clay Cart, and the stories and poems of both ancient and modern India and Southeast Asia.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**COM 053C – Literatures of the Islamic World (4 units)**

*Course Description:* Introduction to classical Islamic culture through translations of literature primarily from Arabic and Persian, as well as other languages. Topics include the concept of the self, society and power, spirituality, the natural world, the cosmos, and the supernatural.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**COM 090X – Lower Division Seminar (1-2 units)**

*Course Description:* Examination of a special topic in a small group setting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-4 hour(s).

*Grade Mode:* Letter.

**COM 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to lower division students.

*Grade Mode:* Pass/No Pass only.

**COM 098F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for lower division students.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Passed/Not Passed Only.

**COM 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**COM 100 – World Cinema (4 units)**

*Course Description:* Comparative, cross-cultural study of a topic, theme, or movement in world cinema beyond the boundary of a single national tradition. Topics may include "postsocialist cinemas in East Europe and Asia," "cinema and globalization," and "popular Asian cinemas."

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR), upper division standing, or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**COM 110 – Hong Kong Cinema (4 units)**

*Course Description:* Hong Kong cinema, its history, industry, styles, genres, directors, and stars. Special attention to its polyglot, multicultural, transnational, colonial, and postcolonial environment.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR), upper division standing, or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**COM 112 – Japanese Cinema (4 units)**

*Course Description:* Introduction to Japanese cinema from early silent films to the present. Explores important directors, genres, stars, themes and techniques in relation to specific historical and cultural contexts. Lectures and readings in English. Films in Japanese with English subtitles.

*Prerequisite(s):* Consent of instructor, or upper-division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**COM 120 – Writing Nature: 1750 to the Present (4 units)**

*Course Description:* Study of representations, descriptions, and discussions of humankind's problematical relationship with the non-human world in texts written in a variety of European and American traditions between 1750 and the present.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 135 – Women Writers (4 units)**

*Course Description:* Exploration of women's differing views of self and society as revealed in major works by female authors of various times and cultures. Readings, principally of fiction, will include such writers as Lady Murasaki, Mme de Lafayette, and Charlotte Bronte.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 138 – Gender & Interpretation in the Renaissance (4 units)**

*Course Description:* Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; "high" and "low" culture and its relation to literary practices.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* ITA 141.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 139 – Shakespeare & the Classical World (4 units)**

*Course Description:* Shakespeare's representations of the classical world in the light of selected ancient texts and Renaissance conceptions of Antiquity, with special attention to the depiction of politics and history.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 140 – Thematic & Structural Study of Literature (4 units)**

*Course Description:* Interpretation of selected works illustrating the historical evolution of themes, as well as of formal and structural elements.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**COM 141 – Introduction to Critical Theoretical Approaches to Literature & Culture (4 units)**

*Course Description:* Introduction to critical theory and its use for interpreting literary texts, film, and media forms in global culture.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* CRI 101.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 142 – Critical Reading & Analysis (4 units)**

*Course Description:* Close reading of selected texts; scrutiny of very limited amount of material, with attention to the problems of texts in translation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**COM 144 – The Grotesque (4 units)**

*Course Description:* Study of the "grotesque" in selected texts from the Renaissance to the 20th century, with attention to the "grotesque" as a means of social, cultural, and political commentary, as well as of aesthetic innovation.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 145 – Representations of the City (4 units)**

*Course Description:* Exploration of the representation of the city in major translated literary texts from a variety of literary traditions and periods. Emphasis on the diversity of urban experience in literature. Topics include public and private space, memory, and gender.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 146 – Myth in Literature (4 units)**

*Course Description:* Comparative study of different versions of one or more central myths, with attention to their cultural settings, artistic and literary forms of representation, as well as to their psychological dimensions.

*Prerequisite(s):* COM 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 147 – Modern Jewish Writers (4 units)**

*Course Description:* Problems of the modern Jewish experience from the perspective of the writer's construction of the self in relation to the future and to the non-Jew. Draws upon Russian, German, Yiddish, and American traditions.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 148 – Mystical Literatures of South Asia & the Middle East (4 units)**

*Course Description:* Exploration of the comparative mystical literatures of major religious traditions, with a focus on those produced in South Asia and the Middle East, although including other traditions.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 151 – Colonial & Postcolonial Experience in Literature (4 units)**

*Course Description:* Literary introduction to the cultural issues of colonialism and postcolonialism through reading, discussing and writing on narratives which articulate diverse points of view.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 152 – Literature of the Americas (4 units)**

*Course Description:* Study of the various stylistic, historical, social and cultural factors that contribute to a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 152S – Literature of the Americas (Taught in Latin America) (4 units)**

*Course Description:* Various stylistic, historical, social, and cultural factors that contribute to a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. May be taught abroad.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 6 hour(s), Term Paper, Fieldwork 6 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **COM 153 – The Forms of Asian Literature (4 units)**

*Course Description:* Introduction to distinctive Asian literary forms, such as haiku, noh, the Chinese novel and tale, through reading of major works. Comparison with Western genres and study of native and Western critical traditions.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 154 – African Literature (4 units)**

*Course Description:* Colonial and post-colonial sub-Saharan African literature and the African oral traditions from which it emerged. Genres and themes of African literature from the 19th century to the present.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* AAS 153.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 155 – Classical Literatures of the Islamic World 600-1900 (4 units)**

*Course Description:* Major texts from Arabic, Persian, Ottoman Turkish and Urdu literature with attention to historical and cross-cultural context. Includes epic, romance, various genres of lyric poetry, fairy tales, historical and religious stories, mystical and philosophical narratives, and essays.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **COM 156 – The Ramayana (4 units)**

*Course Description:* Exploration of the Indian epic, Ramayana, through the lens of literature, performance, and visual art. Emphasis on the text's diversity and its contemporary global relevance. Topics include Ramayanas in Southeast Asia, and in various South Asian diaspora communities.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* RST 158.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 157 – War & Peace in Literature (4 units)**

*Course Description:* Through study of a few major works from Western and non-Western literature, illuminates the way in which literature from antiquity to the present has dealt with the antinomy peace/war through the ages.

*Prerequisite(s):* COM 001 or COM 002 or COM 003; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 158 – The Detective Story as Literature (4 units)**

*Course Description:* Study of the origins, literary and social background, development and implications of the literature of detection in a comparative context.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 159 – Women in Literature (4 units)**

*Course Description:* Portrayals of women in literature, comparing selected heroines who represent a particular theme, period, or genre. Texts range around the globe and from ancient to modern works, such as Lysistrata, Emma, Hedda Gabler, The Makioka Sisters, and Top Girls.

*Prerequisite(s):* COM 001, COM 002, COM 003, or COM 004 or the equivalent recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 160A – The Modern Novel (4 units)**

*Course Description:* The changing image of man and his world as seen in novels by such writers as Joyce, Proust, and Mann.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 160B – The Modern Drama (4 units)**

*Course Description:* Readings in representative authors such as Ibsen, Strindberg, Chekhov, Pirandello and Brecht.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 161A – Tragedy (4 units)**

*Course Description:* Persistent and changing aspects of the tragic vision in literature from ancient times to the present.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 161B – Comedy (4 units)**

*Course Description:* Comic attitudes towards life in literary works of different ages.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 162 – Writing Love & War in South Asia (4 units)**

*Course Description:* Comparative study of the themes and motifs of love and war in the literature of South Asia. Includes a discussion of Sanskrit epics, classical erotic court poetry, medieval heroic poetry, mystical compositions and colonial and post-colonial fiction.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**COM 163 – Biography & Autobiography (4 units)**

*Course Description:* Portrayals of a human life in biographies and/or autobiographies of different countries and ages.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 164A – The European Middle Ages (4 units)**

*Course Description:* Medieval literary genres as the foundation for modern literary forms. Topics and themes as love, God, vision, nature, history and politics, and sign theory.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 164B – The Renaissance (4 units)**

*Course Description:* Literature, new science, gender, politics, and exploration in European Renaissance. Readings in Petrarch, Machiavelli, Montaigne, Tasso, Ariosto, Stampa, Shakespeare, Labé and Aphra Behn.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 164C – Baroque & Neoclassicism (4 units)**

*Course Description:* Readings in major authors such as Calderón, Corneille, Pascal, Racine, Milton, and Grimmelshausen, with consideration of the tension between the expansive energies of the "baroque" and the restraints of dogma and reason.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 164D – The Enlightenment (4 units)**

*Course Description:* Enlightenment writers such as Swift, Voltaire, Sterne, Rousseau, Wollstonecraft, and Kant. Emphasis on the revolutionary impact of 18th-century philosophical ideas and literary forms on modern political, social, and aesthetic culture.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 165 – Caribbean Literatures (4 units)**

*Course Description:* Comparative approach to the multi-lingual, multi-cultural literatures of the Caribbean. Works from English, French, and Spanish speaking regions with special attention to problems of identity, diaspora and resistance, class, gender, race.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open to students who have completed COM 165S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 165S – Caribbean Literatures (4 units)**

*Course Description:* Comparative approach to the multi-lingual, multi-cultural literatures of the Caribbean. Works from English, French, and Spanish speaking regions with special attention to problems of identity, diaspora and resistance, class, gender, race. May be taught abroad at the University of Havana, Cuba.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing in the student's discipline of origin.

*Credit Limitation(s):* Not open to students who have completed COM 165.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 166 – Literatures of the Modern Middle East (4 units)**

*Course Description:* Major translated works in modern Middle Eastern and North African Literature, including Arabic, Hebrew, Persian, and Turkish. Social and historical formation, with topics such as conflict and coexistence, journeys, and displaced people, gender and family.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 166A – The Epic (4 units)**

*Course Description:* Study of various forms of epic poetry in both the oral and literary traditions.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated in different subject area.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 166B – The Novel (4 units)**

*Course Description:* The novel as global genre: picaresque, epistolary, Bildungsroman, historical novel, contemporary forms.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 167 – Comparative Study of Major Authors (4 units)**

*Course Description:* Pivotal works of artists in the Western mainstream, such as Dante, Shakespeare, Cervantes, Goethe, Tolstoi, Proust, and Joyce.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 168A – Romanticism (4 units)**

*Course Description:* Introduction to the Romantic movement with emphasis upon Romantic concepts of the self, irony, love, the imagination and artistic creativity, and the relationship of the individual to nature and society.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 168B – Realism & Naturalism (4 units)**

*Course Description:* Novels and plays by Dickens, Zola, Flaubert, Dreiser, Ibsen, and Strindberg investigate marriage & adultery, the city & its perils, the hardships of industrialization, the war between the sexes, the New Woman, and other 19th-century themes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 169 – The Avant-Garde (4 units)**

*Course Description:* Studies in movements such as surrealism, expressionism and the absurd.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**COM 170 – The Contemporary Novel (4 units)**

*Course Description:* Study of important novels from different parts of the world, including Asia, Africa, Latin America, Europe, and the United States, in the period from the Second World War to the present.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 171 – Partition Literature: South Asia (4 units)**

*Course Description:* An exploration of novels, short stories, plays, and films in translation and in English, produced about the Partition of India in 1947.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 172 – A Story for a Life: The Arabian Nights (4 units)**

*Course Description:* In-depth exploration of The Arabian Nights, the best-known work of pre-modern Arabic literature and a major work of world literature. Analysis of the work in its historical context and in comparison to other frame tales in world literature.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* ARB 140, MSA 121C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 173 – Sakuntala: The Story of a Ring (4 units)**

*Course Description:* A comparative examination of the Indian story of Sakuntala in multiple genres, languages, and media from the c. 400 BCE to the contemporary century.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**COM 175 – Shahnameh: The Persian Book of Kings (4 units)**

*Course Description:* In-depth analysis of the Persian Book of Kings (Shahnameh) by Abu al-Qasim Ferdowsi (d. 1020 CE) in its historical context with a comparative perspective on the role of this work in Persian and world literature.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* MSA 121A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**COM 180 – Selected Topics in Comparative Literature (4 units)**

*Course Description:* Study of a selected topic or topics appropriate to student and faculty interests and areas of specialization of the instructor.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR); at least one course in literature.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 180S – Selected Topics in Comparative Literature (Taught Abroad) (4 units)**

*Course Description:* Study of selected topics appropriate to student and faculty interests and areas of specialization of the instructor. May be taught abroad.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR); at least one course in literature or consent of instructor.

*Learning Activities:* Lecture/Discussion 6 hour(s), Extensive Writing, Fieldwork 6 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **COM 192 – Internship in Comparative Literature (1-12 units)**

*Course Description:* Internships in fields where students can practice their skills.

*Prerequisite(s):* Consent of instructor. Completion of 84 units.

*Learning Activities:* Internship 1-12 hour(s).

*Enrollment Restriction(s):* Restricted to Comparative Literature majors.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **COM 194H – Special Study for Honors Students (1-5 units)**

*Course Description:* Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a comparative topic.

*Prerequisite(s):* Consent of instructor. Open only to majors of senior standing who qualify for Honors Program.

*Learning Activities:* Independent Study 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **COM 195 – Senior Seminar in Comparative Literature (4 units)**

*Course Description:* Advanced study of selected topics and texts in Comparative Literature, with explicit emphasis on the theoretical and interpretive approaches that define Comparative Literature as a discipline and distinguish it from other literary disciplines. Required for the major.

*Prerequisite(s):* Senior standing as a Comparative Literature major or minor or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open only to Comparative Literature majors or minors in or consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **COM 197T – Tutoring in Comparative Literature (1-5 units)**

*Course Description:* Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with current courses offered by Comparative Literature.

*Prerequisite(s):* Consent of instructor. Upper division standing with declared major in Comparative Literature.

*Learning Activities:* Discussion 2-4 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

## **COM 198 – Directed Group Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **COM 198F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for upper division students.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Passed/No Passed Only.

## **COM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **COM 199FA – Student Facilitated Course Development (1-4 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 098F/198F.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Passed/Not Passed only.

## **COM 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* STU FAC. Under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* COM 199FA; (UWP 001 or UWP 001V or UWP 001Y); consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Passed/Not Passed only.

## **COM 210 – Topics & Themes in Comparative Literature (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of specific topics and themes in literary works from various periods, societies, and cultures, in light of these works' historical and sociocultural contexts.

*Prerequisite(s):* Graduate standing in Comparative Literature, English, or a foreign-language literature, or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**COM 214 – Approaches to Lyric Poetry (4 units)**

*Course Description:* Analysis and interpretation of poetic texts in different historical periods and national literatures, with consideration of major theoretical developments in the understanding of poetic discourse.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**COM 215 – Forms of the Spiritual Quest (4 units)**

*Course Description:* An exploration, culminating in a research paper, of changing forms of the quest for transcendence in different cultures, mainly in major works of Western literature, but also in other traditions and from the perspectives of other disciplines.

*Prerequisite(s):* Graduate standing or consent of instructor; knowledge of at least one foreign language.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**COM 220 – Literary Genres (4 units)**

*Course Description:* Comparative literature of major works in a particular genre from various linguistic, national, and cultural traditions, with particular attention to historical developments within the genre and to genre theory.

*Prerequisite(s):* Graduate standing in Comparative Literature, English, or a foreign-language literature or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**COM 238 – Gender & Interpretation (4 units)**

*Course Description:* Study of how literary texts from different periods, societies, and cultures represent gender roles and gender hierarchy, building on recent work on gender in anthropology, literature, psychology, and women's studies.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**COM 250A – Research in Primary Literature (4 units)**

*Course Description:* Individually guided research in the primary literature of concentration, under the supervision of a faculty member culminating in a conference paper. Required of M.A. and Ph.D. candidates.

*Learning Activities:* Project.

*Grade Mode:* Letter.

**COM 250B – Research in Second Literature (4 units)**

*Course Description:* Individually guided research in the secondary literature of concentration, under the supervision of a faculty member, culminating in a paper. Required of Ph.D. candidates.

*Learning Activities:* Project.

*Grade Mode:* Letter.

**COM 250C – Research in Third Literature or Special Topic (4 units)**

*Course Description:* Individually guided research, under the supervision of a faculty member, in the third literature of concentration or on a special topic culminating in a paper. Required of Ph.D. candidates.

*Learning Activities:* Conference 1 hour(s), Term Paper, Independent Study 8 hour(s).

*Grade Mode:* Letter.

**COM 250D – Dissertation Prospectus (4 units)**

*Course Description:* Individually guided writing of the dissertation prospectus under supervision of a faculty member. Must be taken prior to completion of the qualifying exam. Required of Ph.D. candidates.

*Learning Activities:* Independent Study.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**COM 255 – Proseminar: Comparative Literature: Past, Present, Future (4 units)**

*Course Description:* History, theory, and methodology of comparative literature. Issues of national literature, world literature, and comparative literature. Relation of comparative literature to other disciplines and diverse expressions. Discussion of current problems in teaching and research in comparative literature. Required of M.A. and Ph.D. candidates.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**COM 260 – Contexts of the 19th-Century Novel (4 units)**

*Course Description:* Development in 19th-century history, culture, and society in relation to major trends in the 19th-century novel.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**COM 297 – Directed Independent Study in Primary, Secondary, or Third Literature (4 units)**

*Course Description:* Directed Independent Study in Primary, Secondary, or Third Literature culminating in term paper. Only for languages with no graduate course offerings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Conference 1 hour(s), Term Paper, Independent Study 8 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated when no seminars are available and topic differs.

*Grade Mode:* Letter.

**COM 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**COM 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**COM 299D – Special Study for the Doctoral Dissertation (1-12 units)**

*Course Description:* Special study for the doctoral dissertation.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **COM 390 – Teaching Comparative Literature in College (4 units)**

*Course Description:* Discussion of the theory and practice of teaching composition at the college level in a department of comparative literature in relation to the major cultural and social developments and with specific application to the introductory COM 001, COM 002, COM 003, COM 004.

*Prerequisite(s):* Appointment as a Comparative Literature Associate Instructor or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **COM 392 – Teaching Internship in Comparative Literature (2 units)**

*Course Description:* Regular consultations between the student instructor teaching Comparative Literature courses and a supervisor. Specifically designed for first-time TAs in COM 005, COM 006, COM 007, and COM 010. Instruction in the teaching of writing in a literature course, grading of papers, leading discussions.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **COM 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Computer Science Engineering (ECS)**

College of Engineering

## **ECS 012 – Introduction to Media Computation (4 units)**

*Course Description:* Introduction to key computational ideas necessary to understand and produce digital media. Fundamentals of programming are covered as well as analysis of how media are represented and transmitted in digital form. Aimed primarily at non-computer science students.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students that have taken ECS 010 or ECS 030 or ENG 006.

*Cross Listing:* CTS 012.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Visual Literacy (VL).

## **ECS 017 – Data, Logic, & Computing (4 units)**

*Course Description:* Display, processing, and representation of information and data on a computer. Understanding and analyzing the digital representations of numbers, images, and sounds. Basic computer operations and their logic. Introduction to discrete mathematics in computer science, including propositional logic, proofs by induction, recursions, and counting. Introduction to algorithms. Uses of computers and their influence on society.

*Prerequisite(s):* MAT 016A (can be concurrent) or MAT 017A (can be concurrent) or MAT 021A (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed course ECS 020 or MAT108.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECS 020 – Discrete Mathematics For Computer Science (4 units)**

*Course Description:* Discrete mathematics of particular utility to computer science. Proofs by induction. Propositional and first-order logic. Sets, functions, and relations. Big-O and related notations. Recursion and solutions of recurrence relations. Combinatorics. Probability on finite probability spaces. Graph theory.

*Prerequisite(s):* MAT 016A C- or better or MAT 017A C- or better or MAT 021A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Cognitive Science Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECS 032A – Introduction to Programming (4 units)**

*Course Description:* Introduction to programming and problem solving in Python. Aimed primarily at non-major students.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to undergraduate students only.

*Credit Limitation(s):* No credit to students who have completed ECS 030, ECS 032B, ECS 032C, ECS 036A, ECS 036B, ECS 036C, ECS 040 or ECS 060.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 032B – Introduction to Data Structures (4 units)**

*Course Description:* Design and analysis of data structures using Python; trees, heaps, searching, sorting, and graphs.

*Prerequisite(s):* ECS 010 C- or better or ECS 030 C- or better or ECS 032A C- or better or ECS 036A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No credit to students who have completed ECS 036B, ECS 036C, ECS 040 or ECS 060.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 032C – Implementation of Data Structures in C (4 units)**

*Course Description:* Programming in the C language. Use of basic UNIX tools. Writing good programs of increased complexity and efficiency. Implementation of data structures in C.

*Prerequisite(s):* ECS 032B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No credit to students who have completed ECS 036B, ECS 036C, ECS 040 or ECS 060.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 034 – Software Development in UNIX & C++ (4 units)**

*Course Description:* UNIX Operating system tools and programming environment. Methods for debugging and verification. Principles object-oriented programming in C++.

*Prerequisite(s):* ECS 032C C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No credit to students who have completed ECS 036B, ECS 036C, ECS 040 or ECS 060.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 036A – Programming & Problem Solving (4 units)**

*Course Description:* Computers and computer programming for students with some prior experience, algorithm design, and debugging. Good programming style. Use of basic UNIX tools.

*Prerequisite(s):* ECS 032A C- or better or ECS 010 C- or better; or must satisfy computer science placement exam; prior experience with basic programming concepts (variable, loops, conditional statements) required.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science, Computer Science & Engineering, and Computer Engineering majors only; Pass Two restricted to Computer Science, Computer Science & Engineering, Computer Engineering, Cognitive Science, Applied Physics, Statistics, and Psychology majors only.

*Credit Limitation(s):* Only 2 units of credit to students who have completed ECS 032A; no credit to students who have completed ECS 032B, ECS 032C, ECS 034, ECS 040 or ECS 060.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 036B – Software Development & Object-Oriented Programming in C++ (4 units)**

*Course Description:* Object-oriented programming in C++. Basic data structures and their use. Writing good programs of increased complexity and efficiency. Methods for debugging and verification.

*Prerequisite(s):* ECS 030 C- or better or ECS 036A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science, Computer Science & Engineering, Computer Engineering, Cognitive Science, and Applied Physics majors only.

*Credit Limitation(s):* No credit to students who have completed ECS 032B, ECS 032C, ECS 034, ECS 040 or ECS 060.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 036C – Data Structures, Algorithms, & Programming (4 units)**

*Course Description:* Design and analysis of data structures for a variety of applications; trees, heaps, searching, sorting, hashing, and graphs. Extensive programming.

*Prerequisite(s):* (ECS 040 C- or better or ECS 036B C- or better); ECS 020 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science, Computer Science & Engineering, Computer Engineering, Cognitive Science, and Applied Physics majors only.

*Credit Limitation(s):* No credit to students who have completed ECS 032B, ECS 032C, ECS 034, ECS 040 or ECS 060.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 050 – Computer Organization & Machine-Dependent Programming (4 units)**

*Course Description:* Comparative study of different hardware architectures via programming in the assembly languages of various machines. Role of system software in producing an abstract machine. Introduction to I/O devices and programming.

*Prerequisite(s):* ECS 040 C- or better or ECS 034 C- or better or ECS 036B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science and Computer Science & Engineering majors only.

*Credit Limitation(s):* 1 unit of credit if taken EEC 070.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089A – Special Topics in Computer Science: Computer Science Theory (1-5 units)**

*Course Description:* Special topics in Computer Science Theory.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089B – Special Topics in Computer Science: Architecture (1-5 units)**

*Course Description:* Special topics in Architecture.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089C – Special Topics in Computer Science: Programming Languages & Compilers (1-5 units)**

*Course Description:* Special topics in Programming Languages & Compilers.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089D – Special Topics in Computer Science: Operating Systems (1-5 units)**

*Course Description:* Special topics in Operating Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089E – Special Topics in Computer Science: Software Engineering (1-5 units)**

*Course Description:* Special topics in Software Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089F – Special Topics in Computer Science: Databases (1-5 units)**

*Course Description:* Special topics in Databases.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089G – Special Topics in Computer Science: Artificial Intelligence (1-5 units)**

*Course Description:* Special topics in Artificial Intelligence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089H – Special Topics in Computer Science: Computer Graphics (1-5 units)**

*Course Description:* Special topics in Computer Graphics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089I – Special Topics in Computer Science: Networks (1-5 units)**

*Course Description:* Special topics in Networks.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089J – Special Topics in Computer Science: Computer-Aided Design (1-5 units)**

*Course Description:* Special topics in Computer-Aided Design.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089K – Special Topics in Computer Science: Scientific Computing (1-5 units)**

*Course Description:* Special topics in Scientific Computing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 089L – Special Topics in Computer Science: Computer Science (1-5 units)**

*Course Description:* Special topics in Computer Science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 092 – Internship in Computer Science (1-5 units)**

*Course Description:* Supervised work experience in computer science.

*Prerequisite(s):* Lower division standing; project approval prior to period of internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **ECS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **ECS 098F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ECS 099 – Special Study for Lower Division Students (1-5 units)**

*Course Description:* Special study for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **ECS 111 – Applied Machine Learning for Non-Majors (4 units)**

*Course Description:* Machine learning methods and their application. Theory, design and evaluation of supervised/unsupervised machine learning algorithms. Practical use of machine learning methods and their challenges.

*Prerequisite(s):* (ECS 032B or ECS 036C); (MAT 135A or STA 035C).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Data Science majors; Pass Two restricted to undergraduates.

*Credit Limitation(s):* No credit if student has taken ECS 171; not intended for Computer Science and Computer Science Engineering Majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 113 – Computer Security for Non-Majors (4 units)**

*Course Description:* Principles, mechanisms, implementation, and sound practices of computer security and data protection. Cryptography, authentication and access control. Internet security. Malicious software. Common vulnerabilities. Practical security in everyday life. Not intended for Computer Science or Computer Science & Engineering majors.

*Prerequisite(s):* ECS 010 or ECS 030 or ECS 032A or ECS 036A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No credit allowed to students who have completed ECS 153 or ECS 155.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 115 – Computer Networks for Non-Majors (4 units)**

*Course Description:* Overview of computer networks, World Wide Web, email, local & wide-area computer networks, TCP/IP protocol suite, network protocols for data transmission, introduction to network programming.

*Prerequisite(s):* ECS 032B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not intended for Computer Science or Computer Science & Engineering majors.

*Credit Limitation(s):* No credit for students who have completed any of ECS 152A, ECS 152B, ECS 152C, EEC 173A, or EEC 173B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering

## **ECS 116 – Databases for Non-Majors (4 units)**

*Course Description:* Overview of Database Systems, Conceptual Modeling and Design, E/R diagrams, Relational Model, Relational Algebra, SQL, File and Index Structures, Query Evaluation, Transaction Concepts, Concurrency and Recovery, and NoSQL Databases.

*Prerequisite(s):* ECS 032B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not intended for Computer Science or Computer Science & Engineering majors.

*Credit Limitation(s):* Not open for credit for students who have completed ECS 165A or ECS 165B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 117 – Algorithms for Data Science (4 units)**

*Course Description:* Algorithms for searching, pattern matching, combinatorial problems, clustering, and time series analysis with practical emphasis.

*Prerequisite(s):* ECS 017 or ECS 020; ECS 032B or ECS 036C.

*Learning Activities:* Lecture 3 hour(s); Discussion 1 hour(s).

*Credit Limitation(s):* No credit if ECS 122A has been taken.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 120 – Theory of Computation (4 units)**

*Course Description:* Fundamental ideas in the theory of computation, including formal languages, computability and complexity. Reducibility among computational problems.

*Prerequisite(s):* (ECS 020 or MAT 108); (ECS 32B or ECS 36C recommended).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science and Computer Science Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ECS 122A – Algorithm Design & Analysis (4 units)**

*Course Description:* Complexity of algorithms, bounds on complexity, analysis methods. Searching, sorting, pattern matching, graph algorithms. Algorithm design techniques: divide-conquer, greedy, dynamic programming. Approximation methods. NP-complete problems.

*Prerequisite(s):* ECS 020; (ECS 060 or ECS 032B or ECS 036C).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 122B – Algorithm Design & Analysis (4 units)**

*Course Description:* Theory and practice of hard problems, and problems with complex algorithm solutions. NP-completeness, approximation algorithms, randomized algorithms, dynamic programming and branch and bound. Theoretical analysis, implementation and practical evaluations. Examples from parallel, string, graph, and geometric algorithms.

*Prerequisite(s):* ECS 122A; (ECS 060 or ECS 034 or ECS 036C).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**ECS 124 – Theory & Practice of Bioinformatics (4 units)**

*Course Description:* Fundamental biological, mathematical and algorithmic models underlying bioinformatics and systems biology; sequence analysis, database search, genome annotation, clustering and classification, functional gene networks, regulatory network inference, phylogenetic trees, applications of common bioinformatics tools in molecular biology and genetics.

*Prerequisite(s):* (ECS 010 or ECS 032A or ECS 030 or ECS 036A or ENG 006); (STA 012 or STA 013 or STA 013Y or STA 032 or STA 100 or STA 131A or MAT 135A or BIM 105); (BIS 002A or MCB 010).

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science, Computer Science Engineering, and Biotechnology majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 127 – Cryptography (4 units)**

*Course Description:* Introduction to the theory and practice of cryptographic techniques used in computer security. Encryption (secret-key and public-key), message authentication, digital signatures, entity authentication, key distribution, and other cryptographic protocols. The social context of cryptography.

*Prerequisite(s):* (ECS 020 or MAT 108); (ECS 010 or ECS 032A or ECS 030 or ECS 036A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**ECS 129 – Computational Structural Bioinformatics (4 units)**

*Course Description:* Fundamental biological, chemical and algorithmic models underlying computational structural biology; protein structure and nucleic acids structure; comparison of protein structures; protein structure prediction; molecular simulations; databases and online services in computational structural biology.

*Prerequisite(s):* (BIS 002A or MCB 010); (ECS 010 or ECS 032A or ECS 036A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science, Computer Science Engineering, and Biotechnology majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 130 – Scientific Computation (4 units)**

*Course Description:* Matrix-vector approach using MATLAB for floating-point arithmetic, error analysis, data interpolation, least squares data fitting, quadrature, zeros, optimization and matrix eigenvalues and singular values. Parallel computing for matrix operations and essential matrix factorizations.

*Prerequisite(s):* (ECS 030 or ENG 006 or ECS 032A or ECS 010 or ECS 036A); (MAT 022A or MAT 027A or MAT 067).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 132 – Probability & Statistical Modeling for Computer Science (4 units)**

*Course Description:* Univariate and multivariate distributions. Estimation and model building. Markov/Hidden Markov models. Applications to data mining, networks, security, software engineering and bioinformatics.

*Prerequisite(s):* (ECS 040 or ECS 034 or ECS 036B); ECS 020; MAT 021C; (MAT 022A or MAT 027A or MAT 067).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**ECS 140A – Programming Languages (4 units)**

*Course Description:* Syntactic definition of programming languages. Introduction to programming language features including variables, data types, data abstraction, object-orientedness, scoping, parameter disciplines, exception handling. Non-imperative programming languages. Comparative study of several high-level programming languages.

*Prerequisite(s):* ECS 050; ECS 020; (ECS 034 or 036C); ECS 150 is recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science and Computer Science Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 140B – Programming Languages (4 units)**

*Course Description:* Continuation of programming language principles. Further study of programming language paradigms such as functional and logic; additional programming language paradigms such as concurrent (parallel); key implementation issues for those paradigms; and programming language semantics.

*Prerequisite(s):* ECS 140A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 142 – Compilers (4 units)**

*Course Description:* Principles and techniques of lexical analysis, parsing, semantic analysis, code generation, and code optimization.

Implementation of compilers.

*Prerequisite(s):* ECS 140A; ECS 120; ECS 122A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 145 – Scripting Languages & Their Applications (4 units)**

*Course Description:* Goals and philosophy of scripting languages, with Python and R as prime examples. Applications include networking, data analysis and display, and graphical user interfaces (GUIs).

*Prerequisite(s):* ECS 034 or ECS 036C or ECS 060; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 150 – Operating Systems & System Programming (4 units)**

*Course Description:* Basic concepts of operating systems and system programming. Processes and interprocess communication/synchronization; virtual memory, program loading and linking; file and I/O subsystems; utility programs. Study of a real operating system.

*Prerequisite(s):* (ECS 034 or ECS 036C or ECS 060); (ECS 154A or EEC 170).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science Engineering and Computer Engineering majors only; Pass Two open to Computer Science majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 152A – Computer Networks (4 units)**

*Course Description:* Overview of computer networks, TCP/IP protocol suite, computer-networking applications and protocols, transport-layer protocols, network architectures, Internet Protocol (IP), routing, link-layer protocols, local area and wireless networks, medium access control, physical aspects of data transmission, and network-performance analysis.

*Prerequisite(s):* (ECS 060 or ECS 032B or ECS 036C); (ECS 132 or EEC 161 or MAT 135A or STA 131A or STA 120 or STA 032).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Credit Limitation(s):* Only 2 units of credit for students who have taken ECS 157.

*Cross Listing:* EEC 173A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 152B – Computer Networks (4 units)**

*Course Description:* TCP/IP protocol suite, computer networking applications, client-server and peer-to-peer architectures, application-layer protocols, transport-layer protocols, transport-layer interfaces, sockets, network programming, remote procedure calls, and network management.

*Prerequisite(s):* ECS 150; (ECS 152A or EEC 173A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 152C – Advanced Topics in Computer Networks (4 units)**

*Course Description:* Advanced topics in computer networks, wireless networks, multimedia networking, traffic analysis and modeling, network design and management, network simulation and performance analysis, and design projects in communication networks.

*Prerequisite(s):* EEC 173A or ECS 152A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* EEC 173B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 153 – Computer Security (4 units)**

*Course Description:* Principles, mechanisms, and implementation of computer security and data protection. Policy, encryption and authentication, access control, and integrity models and mechanisms; network security; secure systems; programming and vulnerabilities analysis. Study of an existing operating system.

*Prerequisite(s):* ECS 150; (ECS 152A or EEC 173A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Credit Limitation(s):* Not open for credit to students who have completed ECS 155.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 154A – Computer Architecture (4 units)**

*Course Description:* Introduction to digital design. Interfacing of devices for I/O, memory and memory management. Input/output programming, via wait loops, hardware interrupts and calls to operating system services. Hardware support for operating systems software.

*Prerequisite(s):* ECS 050 or EEC 070.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One and Pass Two open to Computer Science and Computer Science Engineering majors only.

*Credit Limitation(s):* Only 1 unit of credit allowed for students who have taken EEC 170.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 154B – Computer Architecture (4 units)**

*Course Description:* Hardwired and microprogrammed CPU design. Memory hierarchies. Uniprocessor performance analysis under varying program mixes. Introduction to pipelining and multiprocessors.

*Prerequisite(s):* ECS 154A or EEC 170 or EEC 180A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Credit Limitation(s):* Not open for credit to students who have taken ECS 201A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 158 – Programming on Parallel Architectures (4 units)**

*Course Description:* Techniques for software development using the shared-memory and message-passing paradigms, on parallel architectures and networks of workstations. Locks, barriers, and other techniques for synchronization. Introduction to parallel algorithms.

*Prerequisite(s):* ECS 150; ECS 154B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 160 – Software Engineering (4 units)**

*Course Description:* Requirements, specification, design, implementation, testing, and verification of large software systems. Study and use of software engineering methodologies.

*Prerequisite(s):* ECS 140A; extensive programming experience recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 161 – Modern Programming Tools (4 units)**

*Course Description:* Concepts and practice of collaborative software development using modern software tools.

*Prerequisite(s):* (ECS 040 or ECS 032B or ECS 036B).

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 162 – Web Programming (4 units)**

*Course Description:* Technical aspects of building websites, including both server-side and client-side software development.

*Prerequisite(s):* ECS 030 or ECS 034 or ECS 036B; or equivalent programming experience in C and the Unix environment.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **ECS 163 – Information Interfaces (4 units)**

*Course Description:* Art and science of information visualization and interfaces for information systems. Design principles of human-computer interaction. Visual display and navigation of nonspatial and higher dimensional data. Implementations, performance issues, tradeoffs, and evaluation of interactive information systems.

*Prerequisite(s):* ECS 060 or ECS 032B or ECS 036C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **ECS 164 – Human-Computer Interaction (4 units)**

*Course Description:* Introduction to concepts and practice of modern human-computer interaction design.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to computer science and computer science & engineering students only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 165A – Database Systems (4 units)**

*Course Description:* Database modeling and design (E/R model, relational model), relational algebra, query languages (SQL), file and index structures, query processing, transaction management.

*Prerequisite(s):* ECS 060 or ECS 032B or ECS 036C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 165B – Database Systems (4 units)**

*Course Description:* Data modeling (object-relational, graph-based, spatiotemporal models). Querying semistructured data (XML). Database theory (normalization, integration, provenance). Database programming (stored procedures, embedded SQL, web programming). Advanced topics (data warehousing, parallel data processing).

*Prerequisite(s):* ECS 165A; (ECS 060 or ECS 034 or ECS 036C).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 170 – Introduction to Artificial Intelligence (4 units)**

*Course Description:* Design and implementation of intelligent computer systems. Knowledge representation and organization. Memory and inference. Problem solving. Natural language processing.

*Prerequisite(s):* ECS 060 or ECS 032B or ECS 036C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science & Engineering Majors only; Pass Two open to undergraduate students only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 171 – Machine Learning (4 units)**

*Course Description:* Introduction to machine learning. Supervised & unsupervised learning, including classification, dimensionality reduction, regression & clustering using modern machine learning methods. Applications of machine learning to other fields.

*Prerequisite(s):* (ECS 032B or ECS 036C); (STA 032 or STA 131A or ECS 132); (MAT 022A or MAT 027A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science & Engineering Majors only; Pass Two open to undergraduate students only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 172 – Recommender Systems (4 units)**

*Course Description:* Collaborative filtering and content-based methods for building recommender systems. Statistical, matrix factorization, textual analysis, and nearest-neighbor approaches. Case studies.

*Prerequisite(s):* (ECS 032B or ECS 036B or ECS 040); (ECS 132 or STA 130A or STA 131A or ECN 140); (MAT 022A or MAT 027A or MAT 067).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science and Computer Science & Engineering students only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 173 – Image Processing & Analysis (4 units)**

*Course Description:* Techniques for automated extraction of high-level information from images generated by cameras, three-dimensional surface sensors, and medical devices. Typical applications include detection of objects in various types of images and describing populations of biological specimens appearing in medical imagery.

*Prerequisite(s):* (MAT 067 C- or better or MAT 027A C- or better or MAT 022A C- or better); (ECS 060 or ECS 032B or ECS 036C).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 174 – Computer Vision (4 units)**

*Course Description:* Computer vision is the study of enabling machines to "see" the visual world; e.g., understand images and videos. Explores several fundamental topics in the area, including feature detection, grouping and segmentation, and recognition.

*Prerequisite(s):* (ECS 060 or ECS 032B or ECS 036C); recommended (STA 032 or STA 131A or MAT 135A or EEC 161 or ECS 132); (MAT 022A or MAT 27A or MAT 067).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science and Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 175 – Computer Graphics (4 units)**

*Course Description:* Principles of computer graphics, with a focus on interactive systems. Current graphics hardware, elementary operations in two-and three-dimensional space, geometric transformations, camera models and interaction, graphics system design, standard graphics APIs, individual projects.

*Prerequisite(s):* (ECS 060 or ECS 034 or ECS 036C); (MAT 022A or MAT 027A or MAT 067).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 177 – Scientific Visualization (4 units)**

*Course Description:* Computer graphics techniques for generating images of various types of measured or computer-simulated data. Typical applications for these graphics techniques include study of air flows around car bodies, medical data, and molecular structures.

*Prerequisite(s):* ECS 175.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ECS 178 – Geometric Modeling (4 units)**

*Course Description:* Interactive graphics techniques for defining and manipulating geometrical shapes used in computer animation, car body design, aircraft design, and architectural design.

*Prerequisite(s):* ECS 175.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ECS 188 – Ethics in an Age of Technology (4 units)**

*Course Description:* Foundations of ethics. Views of technology.

Technology and human values. Costs and benefits of technology.

Character of technological change. Social context of work in computer science and engineering.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science Engineering Majors only; Pass Two open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

**ECS 189A – Special Topics in Computer Science: Computer Science Theory (1-5 units)**

*Course Description:* Special topic in Computer Science Theory.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 189B – Special Topics in Computer Science: Architecture (1-5 units)**

*Course Description:* Special topic in Architecture.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189C – Special Topics in Computer Science: Programming Languages & Compilers (1-5 units)**

*Course Description:* Special topic in Programming Languages & Compilers.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189D – Special Topics in Computer Science: Operating Systems (1-5 units)**

*Course Description:* Special topic in Operating Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189E – Special Topics in Computer Science: Software Engineering (1-5 units)**

*Course Description:* Special topic in software engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189F – Special Topics in Computer Science: Databases (1-5 units)**

*Course Description:* Special topic Databases.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189G – Special Topics in Computer Science: Artificial Intelligence (1-5 units)**

*Course Description:* Special topic in Artificial Intelligence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to undergraduate students only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189H – Special Topics in Computer Science: Computer Graphics (1-5 units)**

*Course Description:* Special topic in Computer Graphics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189I – Special Topics in Computer Science: Networks (1-5 units)**

*Course Description:* Special topic in Networks.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189J – Special Topics in Computer Science: Computer-Aided Design (1-5 units)**

*Course Description:* Special topic in Computer-Aided Design.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189K – Special Topics in Computer Science: Scientific Computing (1-5 units)**

*Course Description:* Special topic in Scientific Computing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189L – Special Topics in Computer Science: Computer Science (1-5 units)**

*Course Description:* Special topic in Computer Science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189M – Special Topics in Computer Security: Computer Security (1-5 units)**

*Course Description:* Special topics in Computer Security.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ECS 189N – Special Topics in Bioinformatics & Computational Biology (1-5 units)**

*Course Description:* Special topics in Bioinformatics & Computational Biology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECS 190C – Research Group Conferences in Computer Science (1 unit)**

*Course Description:* Research group conferences.

*Prerequisite(s):* Consent of instructor. Upper division standing in Computer Science or Computer Science and Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ECS 190X – Senior Seminar (2 units)**

*Course Description:* Examination of a special topic in a small group setting.

*Prerequisite(s):* Senior standing.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**ECS 191 – Software Design Project (4 units)**

*Course Description:* Student teams plan, implement, and evaluate large-scale projects involving computer and computational systems. Project proposed and supervised by a faculty member.

*Prerequisite(s):* ECS 160.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science and Computer Science Engineering Majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 192 – Internship in Computer Science (1-5 units)**

*Course Description:* Supervised work experience in computer science.

*Prerequisite(s):* Completion of a minimum of 84 units; project approval prior to period of internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ECS 193A – Capstone Project (3 units)**

*Course Description:* Responding to real-life client design challenges, student teams plan, implement, and evaluate large-scale projects involving computer and computational systems. Project supervised by a faculty member. Must take ECS 193A & ECS 193B to receive credit.

*Prerequisite(s):* ECS 160 (can be concurrent); upper division standing in Computer Science or Computer Science Engineering; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science Engineering majors; Pass Two restricted to Computer Science Engineering and Computer Science majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 193B – Capstone Project (3 units)**

*Course Description:* Responding to real-life client design challenges, student teams plan, implement, and evaluate large-scale projects involving computer and computational systems. Project supervised by a faculty member. Must take ECS 193A & ECS 193B to receive credit.

*Prerequisite(s):* ECS 193A IP or better.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Science Engineering majors; Pass Two restricted to Computer Science Engineering and Computer Science majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ECS 197T – Tutoring in Computer Science (1-3 units)**

*Course Description:* Tutoring in computer science courses, especially introductory courses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Discussion/Laboratory 3-6 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Pass/No Pass only.

**ECS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ECS 198F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for upper division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ECS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ECS 199FA – Student Facilitated Course Development (1-4 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 098F/198F.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ECS 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* STU FAC. Under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* ECS 199FA; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ECS 201A – Advanced Computer Architecture (4 units)**

*Course Description:* Modern research topics and methods in computer architecture. Design implications of memory latency and bandwidth limitations. Performance enhancement via within-processor and between-processor parallelism.

*Prerequisite(s):* ECS 154A or EEC 170.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Ph.D. students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Credit Limitation(s):* One unit of credit if student has previously taken ECS 154B after Fall 2019.

*Grade Mode:* Letter.

**ECS 201B – High-Performance Uniprocessing (4 units)**

*Course Description:* Maximizing uniprocessor performance. Barriers to high performance; solutions to the problems; historical and current processor designs.

*Prerequisite(s):* ECS 201A.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Credit Limitation(s):* Not open for credit to students who have completed ECS 250B.

*Grade Mode:* Letter.

**ECS 201C – Parallel Architectures (4 units)**

*Course Description:* Evolution of parallel architectures from special-purpose machines to commodity servers. Emphasis on recent machines and applications that drive them.

*Prerequisite(s):* ECS 201A.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One open to Ph.D. students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Credit Limitation(s):* Not open for credit to students who have completed ECS 250C.

*Grade Mode:* Letter.

**ECS 203 – Novel Computing Technologies (4 units)**

*Course Description:* Novel computing technologies that could revolutionize computer architecture. Quantum computing technologies, including algorithms, devices, and fault tolerance. A survey of other unconventional technologies including nanoscale electronics, MEMS devices, biological devices, and nanotechnology.

*Prerequisite(s):* ECS 201A.

*Learning Activities:* Lecture 3 hour(s), Project 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 220 – Theory of Computation (4 units)**

*Course Description:* Time and space complexity classes. Reductions, completeness, and the role of randomness. Logic and undecidability.

*Prerequisite(s):* ECS 120; ECS 122A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Ph.D. students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Grade Mode:* Letter.

**ECS 221 – Computational Methods in Systems & Synthetic Biology (4 units)**

*Course Description:* Computational methods related to systems and synthetic biology. An overview of machine learning techniques related to the analysis of biological data, biological networks. Predictive modeling and simulation of biological systems. Topics on biological circuit construction.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 222A – Design & Analysis of Algorithms (4 units)**

*Course Description:* Techniques for designing efficient algorithms, analyzing their complexity and applying these algorithms to a broad range of applications. Methods for recognizing and dealing with difficult problems.

*Prerequisite(s):* ECS 122A; STA 031A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to PhD students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Grade Mode:* Letter.

**ECS 222B – Advanced Design & Analysis of Algorithms (4 units)**

*Course Description:* Advanced topics in complexity theory. Problem classification. The classes P, NP, P-space, co-NP. Matching and network flow algorithms. Matrix multiplication. Approximation algorithms.

*Prerequisite(s):* ECS 222A.

*Learning Activities:* Lecture 3 hour(s), Project 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 223 – Parallel Algorithms (4 units)**

*Course Description:* Models of parallel computer systems including PRAMs, loosely coupled systems and interconnection networks. Parallel algorithms for classical problems and general techniques for their design and analysis. Proving lower bounds on parallel computation in several settings.

*Prerequisite(s):* ECS 222A.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Project 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 224 – String Algorithms & Applications in Computational Biology (4 units)**

*Course Description:* Algorithms that operate on strings. Pattern matching, sets of patterns, regular expression pattern matching, suffix trees and applications, inexact similarity, parametric sequence alignment, applications to DNA sequencing and protein database searching.

*Prerequisite(s):* ECS 122A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 225 – Graph Theory (4 units)**

*Course Description:* Fundamental concepts. Planar graphs: Kuratowski's theorem. Packings and coverings. Menger's theorem, representation of cuts, Hamilton graphs, rigid graphs, chordal graphs, graph coloring, graph isomorphism, applications and some algorithms.

*Prerequisite(s):* graduate standing in electrical engineering or computer science or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 226 – Computational Geometry (4 units)**

*Course Description:* Mathematics of unstructured data. Algorithms for data structures such as Voronoi diagrams, oct-trees, and arrangements. Applications in computer graphics, concentrating on problems in three-dimensions.

*Prerequisite(s):* ECS 175; ECS 222A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 227 – Modern Cryptography (4 units)**

*Course Description:* Modern cryptography as a discipline emphasizing formal definitions and proofs of security. One-way functions, pseudo-randomness, encryption, digital signatures, zero-knowledge, secure protocols.

*Prerequisite(s):* ECS 220 or ECS 222A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 228 – Cryptography for E-Commerce (4 units)**

*Course Description:* Cryptographic primitives and protocols of importance to e-commerce, present and future, including content distribution mechanisms, payment mechanisms, pricing mechanisms, anonymity and privacy mechanisms, fair exchange mechanisms.

*Prerequisite(s):* ECS 222A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 229 – Advanced Computational Structural Bioinformatics (4 units)**

*Course Description:* Algorithmic problems in structural biology; protein structure classification; protein structure prediction (including comparative modeling and ab initio protein structure prediction); molecular simulations (molecular dynamics and Monte Carlo simulations).

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 230 – Applied Numerical Linear Algebra (4 units)**

*Course Description:* Numerical linear algebra (NLA) with emphasis on applications in engineered systems; matrix factorizations; perturbation and rounding error analyses of fundamental NLA algorithms.

*Prerequisite(s):* ECS 130 or EAD 209 or MAT 167.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Ph.D. students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Grade Mode:* Letter.

**ECS 231 – Large-Scale Scientific Computation (4 units)**

*Course Description:* Algorithms and techniques for large-scale scientific computation, including basics for high performance computing, iterative methods, discrete approximation, fast Fourier transform, Poisson solvers, particle methods, spectral graph partition and its applications.

*Prerequisite(s):* ECS 130.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 232 – Theory of Molecular Computation (4 units)**

*Course Description:* Theory of chemical reaction networks, molecular circuits, DNA self-assembly, DNA sequence design and thermodynamic energy models, and connections to the field of distributed computing.

*Prerequisite(s):* ECS 120 or ECS 220 recommended; probability course recommended, for example ECS 132 or MAT 135A or STA 012 or STA 131A or MAT 131A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One restricted to graduate students in Computer Science; Pass Two restricted to graduate students.

*Grade Mode:* Letter.

**ECS 234 – Computational Functional Genomics (4 units)**

*Course Description:* Bioinformatics methods for analysis and inference of functional relationships among genes using large-scale genomic data, including methods for integration of gene expression, promoter sequence, TF-DNA binding and other data, and approaches in modeling of biological networks.

*Prerequisite(s):* ECS 124; graduate standing in Computer Science or Life Sciences.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 235A – Computer & Information Security (4 units)**

*Course Description:* Modern topics in computer security, including: protection, access control, operating systems security, network security, applied cryptography, cryptographic protocols, secure programming practices, safe languages, mobile code, malware, privacy and anonymity, and case studies from real-world systems.

*Prerequisite(s):* ECS 150; ECS 152A recommended.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Credit Limitation(s):* Not open for credit to students who have taken ECS 235.

*Grade Mode:* Letter.

## ECS 235B – Foundations of Computer & Information Security (4 units)

*Course Description:* Theoretical foundations of methods used to protect data in computer and communication systems. Access control matrix and undecidability of security; policies; Bell-LaPadula, Biba, Chinese Wall models; non-interference and non-deducibility; information flow and the confinement problem.

*Prerequisite(s):* ECS 235A; ECS 120 and ECS 150 recommended.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Credit Limitation(s):* Not open for credit to students who have taken ECS 235.

*Grade Mode:* Letter.

## ECS 236 – Computer Security: Intrusion Detection Based Approach (4 units)

*Course Description:* Concepts of intrusion detection, anomaly detection based on machine learning, signature-based detection using pattern matching, automated response to attacks using artificial intelligence planning, tracing intruders based on principal component analysis, security policy languages.

*Prerequisite(s):* ECS 150; ECS 153 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

## ECS 240 – Programming Languages (4 units)

*Course Description:* Advanced topics in programming languages, including formal syntax and semantics, the relation between formal semantics and verification, an introduction to the lambda calculus. Additional topics will include language design principles, alternative programming languages, in-depth semantic theory and models of language implementation.

*Prerequisite(s):* ECS 140A; ECS 142.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Ph.D. students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Grade Mode:* Letter.

## ECS 242 – Translation of Programming Languages (4 units)

*Course Description:* Lexical analysis, parsing, storage management, symbol table design, semantic analysis and code generation. LR, LALR grammars. Compilercompilers.

*Prerequisite(s):* ECS 240.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

## ECS 243 – Code Generation & Optimization (4 units)

*Course Description:* Compiler optimizations for performance, code size and power reduction. Topics include control- and data-flow analysis, redundancy elimination, loop and cache optimizations, register allocation, local and global instruction scheduling, and modulo scheduling.

*Prerequisite(s):* ECS 201A or EEC 270.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

## ECS 244 – Principles of Concurrent Programming (4 units)

*Course Description:* Fundamental concepts and applications of concurrent programs; concurrent program verification and derivation; synchronization mechanisms in programming languages; distributed programming techniques; case studies of languages.

*Prerequisite(s):* ECS 020; ECS 150.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

## ECS 247 – Concurrent Programming Languages (4 units)

*Course Description:* Language design parameters. Models of parallel machines. Load balancing. Scalability. Portability. Efficiency measures. Design and implementation techniques for several classes of concurrent programming languages (such as object-oriented, functional, logic, and constraint programming languages).

*Prerequisite(s):* ECS 140A; ECS 150.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

## ECS 251 – Operating Systems (4 units)

*Course Description:* Models, design, implementation, performance evaluation in operating systems. Algorithms, internal architectures for single processor OS and distributed systems. Concurrency control, recovery, security. OS kernel-level programming. Special topics embedded systems, real-time system, device driver, NPU (Network Processor Unit).

*Prerequisite(s):* ECS 150.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

## ECS 252 – Computer Networks (4 units)

*Course Description:* Internet protocol based computer networks applications, transport, network layer protocols. High speed LAN technologies: Ethernet, Asynchronous Transfer Mode (ATM). Delay models in data networks: analysis of multiaccess techniques in polling, ring, random access networks. Multimedia applications requirements and design.

*Prerequisite(s):* ECS 152B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 253 – Network Theory & Applications (4 units)**

*Course Description:* Develops the mathematical theory underlying growth, structure and function of networks with applications to physical, social, biological and engineered systems. Topics include network growth, resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures.

*Prerequisite(s):* MAT 022A; MAT 022B; (STA 013 or STA 013Y or STA 120); experience with computer software, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* MAE 253.

*Grade Mode:* Letter.

**ECS 255 – Resource Management in Wireless Communication Networks (4 units)**

*Course Description:* Advanced research issues in wireless communication networks, including multi-user diversity and cross-layer optimization, basic network information theory, MIMO systems and the impact on networks, and dynamics spectrum management.

*Prerequisite(s):* ECS 252A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 256 – Probability Models for Computer Science (4 units)**

*Course Description:* Probabilistic and statistical models useful in computer/data science. Applications to networks, bioinformatics, database management, machine learning, software engineering and image processing.

*Prerequisite(s):* A calculus-based course in probability, such as ECS132, STA 131A, or EEC 161; programming skills and familiarity with matrix algebra.

*Learning Activities:* Lecture 3 hour(s), Project, Extensive Problem Solving.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Credit Limitation(s):* Not open for credit to students who have completed ECS 256A.

*Grade Mode:* Letter.

**ECS 257 – Mobile & Wireless Networks (4 units)**

*Course Description:* Fundamental techniques in design of second generation wireless networks: cellular network and protocols, medium access techniques, handoff control, signaling and mobility management, wireless data works, Internet mobility and Personal Communication Services (PCS). Third generation wideband systems, novel technologies, adhoc networks.

*Prerequisite(s):* ECS 252.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 259 – Optical Networks (4 units)**

*Course Description:* Optical networks. Enabling technologies. Multiplexing techniques. WDM. Broadcast networks. Wavelength-routed networks. Network architectures. Protocols. Network algorithms. Device-network interface. Optimization problems.

*Prerequisite(s):* ECS 252.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 260 – Software Engineering (4 units)**

*Course Description:* Advanced techniques for domain-specific software reuse.

*Prerequisite(s):* ECS 142; ECS 160 recommended.

*Learning Activities:* Lecture 3 hour(s), Project 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Ph.D. students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Grade Mode:* Letter.

**ECS 261 – Program Verification (4 units)**

*Course Description:* Methods of proving correctness of programs with respect to formal specifications, with attention to those suited for employing automated deduction. Logic background, symbolic execution, techniques suited to iterative programming, methods from denotational semantics, termination, dynamic logic and proofs of concurrent programs.

*Prerequisite(s):* PHI 112; or MAT 125 or familiarity with first-order logic; knowledge of an integrative and functional programming language.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 262 – Formal Specification (3 units)**

*Course Description:* Formal specification of modules, and its relationship to topdown programming development and verification. Abstract data types, together with methods for specifying them. Implementations and proofs of implementation. Using specifications to reason about programs. Parameterized types. Constructing good formal specifications.

*Prerequisite(s):* ECS 261.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 265 – Distributed Database Systems (4 units)**

*Course Description:* Concepts of distributed database systems and architectures, distributed database design, distributed query processing and optimization, transaction management and concurrency control, heterogeneous and multidatabase systems.

*Prerequisite(s):* ECS 165A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 266 – Spatial Databases (4 units)**

*Course Description:* Concepts, models, and architectures for spatial databases, spatial access methods, query processing, spatio-temporal data management, moving objects, spatial data mining.

*Prerequisite(s):* ECS 165A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 267 – Wide-Area Distributed Information Systems (4 units)**

*Course Description:* Wide-area distributed information systems, data broadcast, multicast, publish/subscribe, service differentiation, information retrieval, Web caching.

*Prerequisite(s):* ECS 152B or ECS 165A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 268 – Scientific Data & Workflow Management (4 units)**

*Course Description:* Scientific data integration, metadata, knowledge representation, ontologies, scientific workflow design and management.

*Prerequisite(s):* ECS 165A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 269 – Visual Recognition (4 units)**

*Course Description:* Graduate seminar course on computer vision with an emphasis on object recognition, activity recognition, and scene understanding.

*Prerequisite(s):* ECS 171 or ECS 174; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 270 – Artificial Intelligence (3 units)**

*Course Description:* Concepts and techniques underlying the design and implementation of models of human performance on intelligent tasks. Representation of high-level knowledge structures. Models of memory and inference. Natural language and story understanding. Common sense planning and problem solving.

*Prerequisite(s):* ECS 140A; ECS 172 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Ph.D. students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Grade Mode:* Letter.

**ECS 271 – Machine Learning & Discovery (4 units)**

*Course Description:* Artificial intelligence techniques for knowledge acquisition by computers. Fundamental problems in machine learning and discovery. Systems that learn from examples, analogies, and solved problems. Systems that discover numerical laws and qualitative relationships. Projects centering on implementation and evaluation.

*Prerequisite(s):* ECS 170.

*Learning Activities:* Lecture 3 hour(s), Project 1 hour(s).

*Enrollment Restriction(s):* Pass One open to PhD students in Computer Science only and Pass Two open to graduate students in Computer Science only.

*Grade Mode:* Letter.

**ECS 272 – Information Visualization (4 units)**

*Course Description:* Advanced topics in information visualization: perceptually effective display methods, color design and selection, interaction models and techniques, focus-context techniques, distortion methods, large graph visualization techniques, visual data mining methods, and evaluation methods.

*Prerequisite(s):* ECS 163 or ECS 175 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 273 – Visual Analytics (4 units)**

*Course Description:* Analytical reasoning using visual means, data and visual transformations, exploratory visualization, explanatory visualization, interactive intelligent systems, qualitative and quantitative evaluation.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One restricted to graduate students in Computer Science only; Pass Two restricted to graduate students only.

*Grade Mode:* Letter.

**ECS 274 – Automated Deduction (4 units)**

*Course Description:* Techniques of mechanical theorem proving. Methods based on resolution and termrewriting. Decision procedures. Induction. Applications to program verification, question/answering and plan generation. Study existing mechanical theorem provers.

*Prerequisite(s):* PHI 112; or MAT 125 or familiarity with first order logic.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 275A – Advanced Computer Graphics (4 units)**

*Course Description:* Advanced topics in computer graphics. Hidden surface models, rendering of various surface types, subdivision methods, shading techniques, anti-aliasing, modeling techniques.

*Prerequisite(s):* ECS 175 or ECS 177 or ECS 178.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 275B – Advanced Computer Graphics (4 units)**

*Course Description:* Advanced topics in computer graphics and geometric modeling. Topics taken from advanced research papers in computer graphics, image synthesis, visualization and geometric modeling. Discussion of current research in the field.

*Prerequisite(s):* ECS 175 or ECS 177 or ECS 178.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 276 – Advanced Volume Visualization (4 units)**

*Course Description:* Applications, available tools and techniques, the challenges confronting the field of volume visualization, and some of the advanced topics in the field. Primary emphasis on advanced software and hardware techniques to achieve interactive visualization.

*Prerequisite(s):* ECS 177.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 277 – Advanced Visualization (4 units)**

*Course Description:* Visualization of 3D data, including scalar fields, vector fields, and medical data.

*Prerequisite(s):* ECS 177.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 278 – Computer-Aided Geometric Design (4 units)**

*Course Description:* Mathematical techniques for the definition and manipulation of curves and surfaces. Bezier curves and surfaces, B-spline curves and surfaces, subdivision surfaces, wavelets. Integration into various computer graphics rendering models, visualization systems and computer-aided design systems.

*Prerequisite(s):* ECS 175.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 279 – Computer Animation (4 units)**

*Course Description:* Surveys current research and fundamental techniques that lie behind character animation tools. Emphasis on improving expressive aspects of movement and how physics, motion capture data, the arts and psychology literature, and interactive techniques can be used towards this goal.

*Prerequisite(s):* ECS 175; or ECS 275.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 280 – Virtual Reality Technology (4 units)**

*Course Description:* Fundamentals and principles of Virtual Reality (VR) technology. Potential and limits for its useful application. Developing a complete virtual reality application.

*Prerequisite(s):* ECS 175.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Letter.

**ECS 289A – Special Topics in Computer Science: Computer Science Theory (1-5 units)**

*Course Description:* Special topic in Computer Science Theory.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECS 289B – Special Topics in Computer Science: Architecture (1-5 units)**

*Course Description:* Special topic in Architecture.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECS 289C – Special Topics in Computer Science: Programming Languages & Compilers (1-5 units)**

*Course Description:* Special topic in Programming Languages & Compilers.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECS 289D – Special Topics in Computer Science: Operating Systems (1-5 units)**

*Course Description:* Special topic in Operating Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECS 289E – Special Topics in Computer Science: Software Engineering (1-5 units)**

*Course Description:* Special topic in Software Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289F – Special Topics in Computer Science: Databases (1-5 units)**

*Course Description:* Special topic in Databases.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289G – Special Topics in Computer Science: Artificial Intelligence (1-5 units)**

*Course Description:* Special topic in Artificial Intelligence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289H – Special Topics in Computer Science: Computer Graphics (1-5 units)**

*Course Description:* Special topic in Computer Graphics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289I – Special Topics in Computer Science: Networks (1-5 units)**

*Course Description:* Special topic in Networks.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289J – Special Topics in Computer Science: Computer-Aided Design (1-5 units)**

*Course Description:* Special topic in Computer-Aided Design.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289K – Special Topics in Computer Science: Scientific Computing (1-5 units)**

*Course Description:* Special topic in Scientific Computing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289L – Special Topics in Computer Science: Computer Science (1-5 units)**

*Course Description:* Special topic in Computer Science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289M – Special Topics in Computer Science: Security (1-5 units)**

*Course Description:* Special topic in Security.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 289N – Special Topics in Bioinformatics & Computational Biology (1-5 units)**

*Course Description:* Special topic in Bioinformatics & Computational Biology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **ECS 290 – Seminar in Computer Science (1 unit)**

*Course Description:* Participating seminar; discussion and presentation of current research and development in computer science.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ECS 290C – Graduate Research Group Conference (1 unit)**

*Course Description:* Research problems, progress and techniques in computer science.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ECS 293A – Research in Computer Science (1 unit)**

*Course Description:* Study of research topics in computer science, Ph.D. level research methodologies (experimental, applied and theoretical). Study skills necessary to successfully find/solve significant research problems. Finding and successful interacting with a research advisor. Ethical issues in research/collaborative work.

*Prerequisite(s):* Graduate standing in computer science.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECS 293B – Research in Computer Science (1 unit)**

*Course Description:* Study of Ph.D. level research methodologies (experimental, applied and theoretical), presenting research results for the computer science community. Study skills necessary to successfully find/solve significant research problems.

*Prerequisite(s):* Graduate standing in computer science; ECS 293A recommended.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECS 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECS 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Open to all Graduate Students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECS 390 – The Teaching of Computer Science (1 unit)**

*Course Description:* Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.

*Prerequisite(s):* Meet qualifications for teaching assistant and/or associate-in in Computer Science.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Open to Graduate Students in Computer Science only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Consumer Sciences (CNS)****College of Agricultural & Environmental Sciences****CNS 092 – Internship in Consumer Science (1-12 units)**

*Course Description:* Internship on and off campus in a consumer science related area.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**CNS 100 – Consumer Behavior (3 units)**

*Course Description:* Provides a set of behavioral concepts and theories useful in understanding consumer behavior on the part of the individual, business, and social organizations. Conceptual models to help guide and understand consumer research will be presented.

*Prerequisite(s):* Preparation in areas of psychology or sociology and economics recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**CNS 192 – Internship in Consumer Science (1-12 units)**

*Course Description:* Internship on and off campus in a consumer science related area.

*Prerequisite(s):* Consent of instructor. Completion of a minimum of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**CNS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* .

*Grade Mode:* Pass/No Pass only.

**CNS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**CNS 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CNS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Critical Theory (CRI)****College of Letters & Science****CRI 101 – Introduction to Critical Theoretical Approaches to Literature & Culture (4 units)**

*Course Description:* Introduction to critical theory and its use for interpreting literary texts, film, and media forms in our present global culture.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* COM 141.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**CRI 200A – Approaches to Critical Theory (4 units)**

*Course Description:* Critical overview of modern theoretical texts (e.g., semiotics, hermeneutics, deconstruction, social and cultural critique, feminist theory, psychoanalysis).

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to Graduate students.

*Grade Mode:* Letter.

**CRI 200B – Problems in Critical Theory (4 units)**

*Course Description:* Focused study of a particular critical theoretical approach, school or perspective. Topics may include but are not limited to: critical approaches to the study of literature, culture, film, historiography, visual culture, the body, and aesthetics.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to Graduate students.

*Repeat Credit:* May be repeated when topic differs and with consent of instructor.

*Grade Mode:* Letter.

**CRI 200C – History of Critical Theory (4 units)**

*Course Description:* Critical analysis and discussion of pre-20th century theories of literary and cultural criticism. Topics may include but are not limited to: ancient and early modern philosophy; nature and culture in the Renaissance; theories of Mimesis from antiquity to the Renaissance.

*Prerequisite(s):* Graduate student standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to Graduate students.

*Repeat Credit:* May be repeated when topic differs and with consent of instructor.

*Grade Mode:* Letter.

**CRI 201 – Critical Theory Special Topics (4 units)**

*Course Description:* Application of theoretical principles to one specific research topic. May be repeated for credit with consent of instructor when topic differs.

*Prerequisite(s):* Graduate student standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**CRI 202 – Visual Culture (4 units)**

*Course Description:* Analysis of image production in the contemporary world (photography, film, television, advertising, etc.) and their effects on individual subjectivities and collective social identities.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate student standing.

*Grade Mode:* Letter.

**CRI 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate student standing.

*Grade Mode:* Letter.

**CRI 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor. Graduate student standing.

*Learning Activities:* Variable 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Cultural Studies (CST)****Graduate Studies****CST 200A – Histories of Cultural Studies (4 units)**

*Course Description:* Histories and traditions of cultural studies internationally; multiple legacies of cultural studies as a field of inquiry in various geographical contexts; foregrounds important critical perspectives resulting from social and intellectual movements worldwide.

*Prerequisite(s):* Graduate standing or consent of instructor required. Undergraduate coursework in the humanities or social sciences recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**CST 200B – Theories of Cultural Studies (4 units)**

*Course Description:* Definitions of "critical" scholarship and examination of various contexts in which cultural studies theory has emerged worldwide. Both mainstream and alternative theoretical traditions, such as those developed by people of color and by other minoritized groups.

*Prerequisite(s):* CST 200A; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**CST 200C – Practices of Cultural Studies (4 units)**

*Course Description:* Methodological and practical applications of cultural studies research. Critical analyses of ethnography, textual analysis, social change, community development, and identity formation. Emphasis given to students' unique versions of cultural studies practices.

*Prerequisite(s):* CST 200A; CST 200B; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**CST 204 – History & Theory of Sexualities (4 units)**

*Course Description:* Studies of sexuality in feminist, literary, historical, and cultural studies research, specifically examining the emergence of "sexuality" as a field of research and the relationship of sexuality studies to cultural forms, subjectivity, and social relations generally.

*Prerequisite(s):* CST 200A (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**CST 206 – Studies in Race Theory (4 units)**

*Course Description:* Theoretical framework for the critical study of race, drawing on contemporary cultural studies and postcolonial scholarship in order to understand the social production of "race" as a category for organizing social groups and determining group processes.

*Prerequisite(s):* CST 200A (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **CST 208 – Studies in Nationalism, Transnationalism, & Late Capitalism (4 units)**

*Course Description:* Contemporary theories of nation, nationalism, postcolonialism, and transnationalism. Specific attention to the relationship between cultural production and the formation of ideas about nation and nationalism, including examination of both "legitimizing" and resistant discourses.

*Prerequisite(s):* CST 200A (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **CST 210 – Memory, Culture, & Human Rights (4 units)**

*Course Description:* Explores the multiple convergences among memory, culture, and human rights. Discusses diverse approaches to how societal actors in different historical, cultural, and national settings, construct meanings of past political violence, inter-group conflicts, and human rights struggles.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Cross Listing:* HMR 200B.

*Grade Mode:* Letter.

## **CST 212 – Studies in the Rhetorics of Culture (4 units)**

*Course Description:* Survey of critical and analytical approaches to the study of texts. Examination of multi-mediated objects to understand their cultural import by focusing on discursive production, dispersal, and reception processes, and related shifts in power relations.

*Prerequisite(s):* CST 200A (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **CST 214 – Studies in Political & Cultural Representations (4 units)**

*Course Description:* Framework for the analysis of political and popular cultural representations. Emphasis on concepts, theories, and methodologies illuminating dominant and vernacular cultural representation, appropriation, and innovation in transnational contexts.

*Prerequisite(s):* CST 200A (can be concurrent); consent of graduate advisor required.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 4 time(s) when topic differs.

*Grade Mode:* Letter.

## **CST 250 – Research Seminar (4 units)**

*Course Description:* Designed to facilitate student interaction and promote student research by guiding students through the production of a publishable essay. Essays submitted, distributed, and discussed by seminar participants.

*Prerequisite(s):* CST 200A; CST 200B; CST 200C; or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Letter.

## **CST 270A – Individually Guided Research in Cultural Studies (4 units)**

*Course Description:* Individually guided research, under the supervision of a faculty member, on a Cultural Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.

*Prerequisite(s):* CST 200C; CST 250; and consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Independent Study 2 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **CST 270B – Individually Guided Research in Cultural Studies (4 units)**

*Course Description:* Individually guided research, under the supervision of a faculty member, on a Cultural Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.

*Prerequisite(s):* CST 200C; CST 250; and consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Independent Study 2 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **CST 270C – Individually Guided Research in Cultural Studies (4 units)**

*Course Description:* Individually guided research, under the supervision of a faculty member, on a Cultural Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.

*Prerequisite(s):* CST 200C; CST 250; and consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Independent Study 2 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **CST 290 – Colloquium (1 unit)**

*Course Description:* Designed to provide cohort identity and faculty student exchange. Opportunity to present papers, hear guest lecturers, and see faculty presentations, gather for organizational and administrative news, exchange information, and make announcements.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CST 295 – Special Topics (4 units)**

*Course Description:* Special topics courses offered according to faculty and student interests and demands.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated with consent of advisor.

*Grade Mode:* Letter.

## **CST 298 – Group Research (1-5 units)**

*Course Description:* Group research.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **CST 299 – Directed Research (1-5 units)**

*Course Description:* Directed research.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**CST 299D – Dissertation Research (1-12 units)**

*Course Description:* Dissertation research.  
*Prerequisite(s):* Advancement to doctoral candidacy.  
*Learning Activities:* Independent Study 3-36 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

**CST 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.  
*Prerequisite(s):* Graduate standing.  
*Learning Activities:* Variable 3-12 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

**Dermatology (DER)**

School of Medicine

**DER 192 – Internship in Cutaneous Biology (1-4 units)**

*Course Description:* Approval of project prior to internship by preceptor.  
Supervised work experience involving research on the skin. Final report.  
*Prerequisite(s):* Upper division standing or consent of instructor.  
*Learning Activities:* Internship 8-20 hour(s).  
*Grade Mode:* Pass/No Pass only.

**DER 199 – Special Study in Cutaneous Biology (1-4 units)**

*Course Description:* Special study by individual arrangement of specialized topics in biology of skin. Work may be assigned readings, laboratory research or a combination.  
*Prerequisite(s):* Advanced undergraduate standing and/or consent of instructor.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.

**DER 299 – Research in Cutaneous Biology (1-12 units)**

*Course Description:* Independent research in cellular and biochemical mechanisms of cutaneous biology and pathology.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Laboratory 3-36 hour(s).  
*Grade Mode:* Satisfactory/Unsatisfactory only.

**DER 420 – Integumentary System (2 units)**

*Course Description:* Cell biology, pathology, and physical diagnosis of the skin. Recognition of normal variations, and common or important dermatoses. Patient demonstrations of select conditions.  
*Prerequisite(s):* Approval of School of Medicine Committee on Student Promotions.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Clinical Activity 0.25 hour(s).  
*Enrollment Restriction(s):* Restricted to Medical students only; student must have passed all SOM Year 1 courses.  
*Grade Mode:* Pass/Fail only.

**DER 460 – Dermatology Clinical Clerkship (3-9 units)**

*Course Description:* Observation and participation in dermatology clinics/practice and participation in Ward Rounds and Dermatology Clinics at UC Davis Medical Center, Kaiser, and private practitioner offices.  
*Prerequisite(s):* Completion of three years of medical school; or consent of instructor.  
*Learning Activities:* Clinical Activity 40 hour(s).  
*Enrollment Restriction(s):* Limited enrollment.  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Honors/Pass/Fail.

**DER 465 – Specialty Externship in Dermatology (3-16 units)**

*Course Description:* Externship provides in-depth exposure to one of a variety of sub-specialties in Dermatology.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Clinical Activity 30 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Honors/Pass/Fail.

**DER 466 – Away Acting Internship in Dermatology (3-18 units)**

*Course Description:* Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Clinical Activity 40 hour(s), Lecture 6 hour(s), Variable 3-18 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Honors/Pass/Fail.

**DER 470 – Introduction to Dermatopathology (3-9 units)**

*Course Description:* Integrated, multi-specialty approach to the microscopic diagnosis of inflammatory and neoplastic skin disorders.  
*Prerequisite(s):* Consent of instructor; previous rotation in a Dermatology Clerkship.  
*Learning Activities:* Clinical Activity 20 hour(s), Independent Study 20 hour(s), Lecture/Discussion 6 hour(s).  
*Enrollment Restriction(s):* Restricted to fourth-year medical student.  
*Grade Mode:* Honors/Pass/Fail.

**DER 475 – Telehealth in Dermatology (6 units)**

*Course Description:* Introduction to the application of telehealth in dermatology to provide diagnoses, consultation, treatment, and education. Participate in teledermatology clinics with remote sites throughout California, conduct telehealth project(s), and review the latest literature in telehealth application in improving healthcare access.  
*Learning Activities:* Clinical Activity 4 hour(s), Project 36 hour(s).  
*Enrollment Restriction(s):* Restricted to Medical students.  
*Repeat Credit:* May be repeated 6 unit(s) for additional time to complete telehealth project or to work on new telehealth projects.  
*Grade Mode:* Honors/Pass/Fail.

**DER 480 – Insights in Dermatology (1-3 units)**

*Course Description:* Clinical experience limited to observation of delivery of dermatologic care and attendance at some conferences.  
*Prerequisite(s):* Consent of instructor; first- and second- year medical students in good academic standing.  
*Learning Activities:* Clinical Activity 3-9 hour(s).  
*Grade Mode:* Honors/Pass/Fail.

## **DER 495 – Wound Healing: From Bench to Bedside (6 units)**

*Course Description:* An integrated, multi-specialty approach to clinical soft tissue wound healing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 12 hour(s), Laboratory 8 hour(s), Auto Tutorial 15 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to medical students only.

*Grade Mode:* Honors/Pass/Fail.

## **DER 498 – Special Topics in Clinical Dermatology (1-6 units)**

*Course Description:* Individually arranged study of special topics in clinical dermatology determined by student and instructor. Assigned readings and/or clinical examination of selected patients.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Independent Study 3-18 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **DER 499 – Research in Cutaneous Biology (1-12 units)**

*Course Description:* Research, either laboratory or clinical, on ongoing projects within the department under supervision of faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-36 hour(s).

*Grade Mode:* Honors/Pass/Fail.

# **Design (DES)**

**College of Letters & Science**

## **DES 001 – Introduction to Design (4 units)**

*Course Description:* Introduction to design discipline through readings, writing, visual problem solving, and critical analysis. Topics: design principles and elements, vocabulary, color theory, Gestalt principles, conceptualization strategies. Role of designer and products in contemporary culture including social responsibility and sustainability.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 014 – Design Drawing (4 units)**

*Course Description:* Drawing as a tool for design. Basic skills in objective observation and representation, including line, shape, tone, and space.

Drawing as a tool for formulating and working through design problems.

*Prerequisite(s):* DES 001 (can be concurrent); students who have prior unarticulated college level credit in design drawing are encouraged to submit a course equivalency review; this can include classes that have been granted Advanced Placement or International Baccalaureate credits; please see Design Department website for submission requirements and deadlines.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 015 – Form & Color (4 units)**

*Course Description:* Understanding color, form and composition as ways of communicating design concepts and content. Color theory, color mixing, interaction of color. Design principles and elements. Gestalt theory. Explores a variety of materials, media and presentation techniques.

*Prerequisite(s):* DES 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 016 – Graphic Design & Computer Technology (4 units)**

*Course Description:* Introduction to digital tools with emphasis on graphic design including theory, practice and technology. Includes principles of color, resolution, pixels, vectors, image enhancement, layout, visual organization, visual hierarchy, typography.

*Prerequisite(s):* DES 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 021 – Drafting & Perspective (4 units)**

*Course Description:* Introduction to mechanical drafting, including scaled drawing, orthogonal projection, isometric, axonometric and perspective. Includes basic rendering techniques.

*Prerequisite(s):* DES 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 040A – Energy, Materials, & Design Over Time (4 units)**

*Course Description:* Global history of design across time, viewed through the lens of the effects of the creation and discovery of new energy sources, processes, and materials on design.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* SAS 043.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **DES 040B – Ideologies of Design (4 units)**

*Course Description:* Introduction to the history and theory of design in particular relation to political, philosophical, cultural, economic, and environmental debates and objectives.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **DES 040C – Design for Aesthetics & Experience (4 units)**

This version has ended; see updated course, below.

*Course Description:* Global historical survey of design's engagement with changing notions of aesthetics and experience. Relates transformations in the theory, production, and reception of all aspects of design (objects, landscapes, architectures, etc.) to larger cultural, social, and political contexts.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

### **DES 040C – Design for Aesthetics & Experience (4 units)**

*Course Description:* Global historical survey of design's engagement with changing notions of aesthetics and experience. Relates transformations in the theory, production, and reception of all aspects of design (objects, landscapes, architectures, etc.) to larger cultural, social, and political contexts.

*Prerequisite(s):* DES 001.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## **DES 040D – Designed Geographies: Environment, Containment, Sanctuary (4 units)**

*Course Description:* Historical survey of the role of design in the production of geographic location. Role of design in the choreography or enforcement of bodies in geographic space. Global exploration of the design imagination in the creation of alternatives to built space in the present.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 1 hour(s), Independent Study.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **DES 050 – Introduction to Three-Dimensional Design (4 units)**

*Course Description:* Design concept development and detailing as it relates to the making of objects, structures and models using form, scale and materials. Product design and rapid prototyping methods using a range of techniques for advancing the design process.

*Prerequisite(s):* DES 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 051 – Computer-Assisted Drawing for Designers (4 units)**

*Course Description:* Computer-assisted drawing (CAD) and modeling using a mid-level, multi-use CAD program. Basic architectural drawing and modeling technique in both two-dimensional and three-dimensional CAD environments.

*Prerequisite(s):* DES 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken DES 150A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 070 – Introduction to Textile Design Structures (4 units)**

*Course Description:* Introduction to diverse methods for creating textile structures. Exploration of the creative potential of hand-constructed textiles, manipulation of fabric to create dimensional surfaces, and the basics of building and joining fabric structures.

*Prerequisite(s):* DES 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Credit Limitation(s):* Only 2 units of credit to students who have completed DES 023 or DES 024; not open for credit for students who have completed both DES 023 & DES 024.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 077 – Introduction to Structural Design for Fashion (4 units)**

*Course Description:* Study and practice of designing clothing for the human body. Emphasis on flat pattern development, structural joining sequences and the development of three-dimensional garments from two-dimensional drawings.

*Prerequisite(s):* DES 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Credit Limitation(s):* Not open for credit to students who have completed DES 077A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **DES 107 – Advanced Structural Design for Fashion (4 units)**

*Course Description:* Advanced study and practice of designing clothing for the human body through pattern development and structural joining. Emphasis on draping techniques and advanced conceptualization for fashion design.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; DES 077; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 111 – Coding for Designers (4 units)**

*Course Description:* Programming concepts/skills for design. Algorithm-based design and development flowcharts. Pseudo-code entry level programming. Principles of coding logic syntax structure. Analysis of history. Development iteration presentation of design projects.

*Prerequisite(s):* DES 001; DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Credit Limitation(s):* Not open for credit to students who completed DES 037.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**DES 112 – UI/UX Design: Principles & Practices (4 units)**

*Course Description:* Principles and practices of User Interface (UI) and User Experience (UX). Design for digital, interactive media. Iterative design processes, audience research.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DES 113 – Photography & Digital Imaging (4 units)**

*Course Description:* Digital imaging techniques using black/white and color. Critical analysis of photographs and the role of photography in society. Explore use and meaning of single, sequence and single composite images.

*Prerequisite(s):* DES 001; DES 015; DES 016.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Credit Limitation(s):* Not open for credit to students who have taken DES 031.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 115 – Letterforms & Typography (4 units)**

*Course Description:* Fundamentals of letterforms and typography. Characteristics of typefaces; formatting and composition of type. Principles of legibility, visual hierarchy, grid systems, and the integration of type and image.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Credit Limitation(s):* Not available for credit to students who have completed DES 022.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 116 – Visual Communication: Graphic Design Studio (4 units)**

*Course Description:* Multiple, conceptually-linked assignments focusing on the fundamental choices designers make in translating concepts into effective graphic form. Problem finding and analysis of audience needs. Design process from research and initial concepts to project prototypes. May be taught abroad.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; DES 115; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Credit Limitation(s):* Not open for credit to students who have completed DES 152 or DES 152A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 117 – Interactive Media I (4 units)**

*Course Description:* Practice of creating interactive visual media for network-based applications and principles of human computer interaction. Responsive design. User-centered research, information architecture, interface and interaction. Analysis of usability. Development and presentation of design production materials and completed interactive projects.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 126 – Design Ethnography (4 units)**

*Course Description:* Practical introduction to design ethnography through project-based work. Tools and methods, observation, interviews, fieldnotes, and synthesis of qualitative data. Exploration of participatory design. Examination of the ethical questions.

*Prerequisite(s):* DES 001; or consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DES 127A – Sustainable Design (4 units)**

*Course Description:* Principles, practice and materials of contemporary sustainable design in the context of environmental crisis. History of sustainable design in relation to the fields of product design, material science, energy, architecture, and transportation.

*Prerequisite(s):* DES 001.

*Learning Activities:* Discussion 1 hour(s), Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Design Majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 127B – Studio Practice in Sustainable Design (4 units)**

*Course Description:* Analysis and practice of sustainable design within studio context. Design project that incorporate the reuse of post consumer waste; standard materials vs. sustainable materials; Cradle to Cradle philosophy and practice. Field trips required.  
*Prerequisite(s):* DES 127A; DES 001; or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Priority to Design majors.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 128A – Biodesign Theory & Practice: Biodesign Challenge Part I (4 units)**

*Course Description:* Foundational principles of biodesign, with examples in textiles, fashion, graphics, lighting, products, and architecture. Team-based experience in biodesign intervention; first steps in a mini-entrepreneurial start-up experience.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Lecture/Discussion 3 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH).

## **DES 128B – Biodesign Experimentation & Prototyping: Biodesign Challenge Part II (4 units)**

*Course Description:* Team-based, experimentally grounded prototype design in a mini-entrepreneurial start-up context.  
*Prerequisite(s):* DES 128A C or better; consent of instructor.  
*Learning Activities:* Discussion/Laboratory 3 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE).

## **DES 131 – Global Fashion & Product Design (4 units)**

*Course Description:* Exploration of materials, embellishments, and structural techniques derived from historic and contemporary world cultures. Emphasis on unique qualities of individual expression applied to hand made textiles, fashion and textile products. May be taught abroad.  
*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Priority given to Design majors.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 132A – Textile Design: Woven Structures (4 units)**

*Course Description:* Foundation in handwoven textile structure and design, emphasizing yarn identification, basic drafting, basic weaves and their derivatives explored in context of original color effects and yarn combinations.  
*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Priority given to Design majors.  
*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 132B – Loom-Constructed Textile Design (4 units)**

*Course Description:* Intermediate level study of complex fabric structure with emphasis on pattern in relation to surface, dimension, and material.  
*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; DES 132A; or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Priority to Design majors.  
*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 134A – Introduction to Interior Design–Residential (4 units)**

*Course Description:* Introduction to the theory and practice of interior design with focus on residential spaces. Basic methods of design conceptualization, development, and presentation.  
*Prerequisite(s):* DES 001; (DES 021 or DES 051 or DES 150A); or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Priority to Design majors.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 134B – Introduction to Interior Design–Commercial & Technical Spaces (4 units)**

*Course Description:* Introduction to the theory and practice of interior design with focus on small commercial and technical spaces. Archetypal spaces, non-residential building systems, ADA accessibility, design programming and research methods.  
*Prerequisite(s):* DES 001; (DES 021 or DES 051 or DES 150A); or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Pass One priority given to Design majors.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 135A – Furniture Design & Detailing (4 units)**

*Course Description:* Development of designs for contemporary furniture. Consideration of behavioral and physical requirements, cultural and historic expression, and structural and aesthetic qualities. Process includes research, drawings, and construction of scale models. Required field trip.  
*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Priority given to Design majors.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 135B – Furniture Design & Prototyping (4 units)**

*Course Description:* Design and construction of full size prototype furniture based on preliminary work completed in DES 135A. Material technology, construction methods, and finishes discussed. Development of shop drawings and furniture construction. Required field trip.  
*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.  
*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).  
*Enrollment Restriction(s):* Priority given to Design majors.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 136A – Lighting Technology & Design (4 units)**

*Course Description:* Introduction to lighting design and technology. Understanding the role of lighting and vision in the development of functional and aesthetically pleasing environments.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Laboratory 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 136B – Designing with Light–Industrial Design (4 units)**

*Course Description:* Design and manipulation of light sources, luminaires, and lighting controls to enhance the functional and aesthetic impact of interior and exterior spaces. Industrial design projects explore lighting effects, light distribution characteristics, and luminaire design.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; DES 136A; or consent of instructor.

*Learning Activities:* Laboratory 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 137A – Daylighting & Interior Design (4 units)**

*Course Description:* Emphasis on understanding the effect of daylight on the perception of interior designs as well as on vision, luminous and thermal comfort, health and energy efficiency.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 137B – Daylighting Design Studio (4 units)**

*Course Description:* Introduction to daylighting through observation of its effects on interior designs using scale models of interior designs of choice and photographing them outdoors and in CLTC's Heliodon to understand year-round performance.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 138 – Materials & Methods in Interior Design (4 units)**

*Course Description:* Introduction to the finish materials used for interior design with special emphasis on sustainable and recycled products. Performance factors, relative costs and energy impacts, installation conditions and construction details, and design potential for a full range of interior materials.

*Prerequisite(s):* DES 001; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project 1 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**DES 141 – Cultural Studies of Fashion (4 units)**

*Course Description:* Cultural studies theories and methods used to explore an inclusive approach to design studies. Fashion in dress and other areas of design in society. Race, ethnicity, gender, sexuality, class, national identity, dis/ability, age/generation, and religion, and the intersectionalities among these subject positions in the transnational design, production, circulation, and consumption of fashion.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken TXC 007.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**DES 142A – World Textiles: Eastern Hemisphere (4 units)**

*Course Description:* Social contexts, meanings, aesthetics, stylistic developments, and methods significant in eastern hemisphere textiles. Emphasis on Japan, China, Indonesia, Oceania, Southern and Central Asia, Africa.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DES 142B – World Textiles: Western Hemisphere (4 units)**

*Course Description:* Social context, aesthetics, stylistic developments and methods significant in western hemisphere textiles. Emphasis on the Middle East, Europe, and the Americas up to contemporary times. Two required field trips.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DES 143 – History of Fashion (4 units)**

*Course Description:* History of fashion design from the earliest times to the present focusing on the ancient Middle East and Common Era North America and Europe. Emphasis on aesthetic, functional, social, economic, political and cultural aspects of clothing and personal adornment.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 144 – History of Interior Architecture (4 units)**

*Course Description:* Thematic survey of interior architecture. Emphasis on dwellings in their cultural settings and development of modern interior design theories. Interiors considered in relation to buildings' exteriors, sites, and uses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**DES 145 – History of Visual Communication (4 units)**

*Course Description:* Historical developments of visual communication, concentrating on the technological and aesthetic development of graphic design; origins and manifestations of current issues in visual communication; provide framework for analysis of current and future trends in visual communication.

*Prerequisite(s):* DES 001; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 146 – Mobilities (4 units)**

*Course Description:* Mobilization of social space through ships, trains, bicycles, cars, planes, and skate parks. Exploration of the impact of driverless vehicles and civilian space travel on the safety, enjoyability, sustainability, and accessibility of social space. Critical, historical, aesthetic and political understanding of how humans move.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**DES 148 – Trend Research & Forecasting in Design (4 units)**

*Course Description:* Short term and long term trends, micro and macro trends. Theories of adoption and diffusion of trends. Economic, political, technological and psychological indicators in trend forecasting. Future trends in design using cultural brailing, cross-cultural analysis methods and ethnographic research.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 149 – Information Design: Principles & Practice (4 units)**

*Course Description:* Design principles and visual strategies for effective information display; analysis of contemporary and historical examples of visual representations and visual narratives in science, humanities, and the arts; emergence of digital methods for interactive data presentation.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to students with upper division standing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 150 – Computer-Assisted Presentations for Interior Architecture (4 units)**

*Course Description:* Computer-assisted architectural presentation including the development of complex 3D models, techniques of photo-realistic rendering and computer simulation of movement through architectural and interior space.

*Prerequisite(s):* DES 051 or DES 150A.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Open to Design Majors only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 151 – Type in Motion (4 units)**

*Course Description:* Fundamentals of creating motion-based, screen-based typography. Consideration of narrative structures, movement assemblage, and other visual languages, synthesized within a nuanced understanding of typography within digital space. May be taught abroad.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor. DES 115 recommended.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 154 – Visual Communication: Message Campaign Design (4 units)**

*Course Description:* Principles and application of visual design strategies for projects that address a broad public audience. Emphasis on design for social awareness/interaction/benefit. Creation of public visual-media campaign.

*Prerequisite(s):* DES 115; DES 116; DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Credit Limitation(s):* Not open for credit to students who have completed DES 152B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 155A – Pattern, Form & Surface (4 units)**

*Course Description:* Experimental approaches to form-making through an examination of pattern, form, and surface in historical and contemporary contexts. Explorations of alternative design processes, methods, and materials that open up new possibilities for content creation and invention in design practice.

*Prerequisite(s):* DES 001; DES 115; (DES 014 or DES 021); DES 015; DES 016; (DES 031 or DES 113); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority given to Design majors.

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DES 156 – Graphitecture: Architecture in the Age of New Media (4 units)**

*Course Description:* New media and its impact on environmental design; analysis of contemporary projects at the intersection of architecture and new media; time-based strategies of representation; digital narrative.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 157A – Interactive Media II (4 units)**

*Course Description:* Technical practice for interactive media using the front-end stack (html, css, js). Conceptual framework, user experience, visual interface and interaction design. Research and written pre-production materials required.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; DES 111; DES 117; or consent of instructor.

*Learning Activities:* Studio 5 hour(s), Practice 1 hour(s).

*Enrollment Restriction(s):* Open to Design majors only.

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DES 157B – Interactive Media III (4 units)**

*Course Description:* Capstone interactive media course that furthers understanding of and experimentation with the front-end stack with libraries, databases, sensors and microcomputers.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; DES 021; DES 111; DES 112; DES 117; (DES 157 or DES 157A); or consent of instructor.

*Learning Activities:* Studio 5 hour(s), Practice 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Design majors only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 158 – Data & Large-Scale Installation (4 units)**

*Course Description:* Design of large-scale installations using data for engagement with sites, systems, phenomena, or situations that promote interaction between information, narrative, media, and space. Data literacy tools and methods in data acquisition, visualization, and analytics for designers. Data discoveries, formulating narratives, and building large-scale installations as critical design.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; (DES 111 or DES 135A or ART 005); or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One open to Design majors; enrollment restricted to upper division students.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 159 – Design for Understanding (4 units)**

*Course Description:* Principles of effective information display including aspects of language, structure, legibility, sequencing, and context. Analysis of historical examples of typographic, diagrammatic, and cartographic excellence. User-centered research. Development and presentation of iterative design prototypes. Design that informs, connects, and inspires.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; DES 115; DES 116; or consent of instructor. DES 117 recommended.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Pass One open to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 160 – Textile Surface Design: Patterns & Resists (4 units)**

*Course Description:* Use of traditional and contemporary processes to create images and patterns on fabric using a variety of dyes, including direct applications, bound and mechanical resists, and surface additives.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass one restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 161 – Textile Surface Design: Screen & Digital Printing (4 units)**

*Course Description:* Design of textiles and screen printing on fabrics; soft-product development; integration of hand-produced and digitally generated imagery on cloth.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 165 – Studio Practices in Industrial Design (4 units)**

*Course Description:* 3D studio methods for design, including: historic and contemporary developments in industrial design; innovation in material and fabrication technology; design based projects for everyday objects including soft goods, electronics, transportation.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; (DES 050 or DES 150), or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**DES 166 – Human Centered Design (4 units)**

*Course Description:* Human-centered approach to problem solving, ethnography, ideation, project framing, rapid prototypes, visual communication, and experiential learning. Creative approaches to graphic design, industrial design, fashion, business, and entrepreneurship.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DES 167 – Prototyping: From Objects to Systems (4 units)**

*Course Description:* Exploration of rapid prototyping techniques for objects, interactive experiences, services and organizations. Understanding of additive manufacturing, foam models, digital interfaces and business models.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **DES 168 – Interactive Objects (4 units)**

*Course Description:* Introduction to Physical Computing through a hands-on experience. Concepts, techniques and technologies required to conceptualize, design and prototype interactive devices by the merge of digital fabrication, computer programming, and electronics.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or Consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One open to Design majors only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Visual Literacy (VL).

## **DES 169 – Advanced Explorations in Textile Design (4 units)**

*Course Description:* Advanced exploration of textile design aimed at developing unique textiles for a specific end product such as a fashion collection, functional interior design, art textile or surface design competition.

*Prerequisite(s):* DES 001; DES 014 or DES 021; DES 015; DES 016; DES 160 or DES 161; or consent of instructor. DES 070 recommended.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor; topics and themes change yearly; criteria is: (1) space with first priority to students not previously taken the course and (2) course content must be sufficiently different from the previous time the student took the course.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **DES 170 – Experimental Fashion & Textile Design (4 units)**

*Course Description:* Experimental approaches to fashion and textile design. Emphasis on developing conceptual ideas and translating them into one-of-a-kind garments and soft products. Exploration of a variety of current topics including sustainability, pattern design, new technologies, and social activism.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 171 – Fashion Drawing: Technical & Illustration (4 units)**

*Course Description:* Exploration of fashion design processes for industry within the social and physical context. Emphasis on two-dimensional conceptualization of ideas, garment construction, and ideation processes utilizing commercial textiles. Field trip required.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor; DES 014 recommended.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 175 – Functional Apparel Design (4 units)**

*Course Description:* Application of hands-on & theoretical human-centered design processes and methods to functional apparel. Materials and methods for designing functional apparel for extreme environments and activities, performance and bodily function enhancement, health and wellbeing of users. Dynamics of the human body that interact with clothing during environmental and activity-based challenges.

*Prerequisite(s):* DES 001; DES 014; DES 015; and consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 177 – Computer-Assisted Fashion Design (4 units)**

*Course Description:* Advanced exploration of apparel design processes for industry and personal expression with emphasis on computer-assisted design applications. Field trip required.

*Prerequisite(s):* DES 077; DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 178 – Design & Wearable Technology (4 units)**

*Course Description:* Introduction to wearable technology and related technologies. Emphasis on designing, and fabricating prototypes of wearable technology for value-added designs and to improve quality of life.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; (DES 037 or DES 111); or consent of instructor.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 179 – Fashion Design: Signature Collection (4 units)**

*Course Description:* Advanced exploration of fashion design with an emphasis on professional portfolio development and presentation. Emphasis on conceptualizing, designing, and fabricating a cohesive line of wearable garments suitable for presenting in a public fashion show.

*Prerequisite(s):* DES 077; (DES 107 or DES 177); DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Credit Limitation(s):* Not open for credit to students who have taken more than 8 units of DES 191A.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 180A – Advanced Interior Design: Institutional Spaces (4 units)**

*Course Description:* Advanced interior design problems focused on complex institutional spaces. Introduction to building codes related to interior design. Integration of building systems with interior design solutions.

*Prerequisite(s):* DES 001; (DES 021 or DES 051 or DES 150A); or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 180B – Advanced Interior Architecture (4 units)**

*Course Description:* Advanced problems in interior architectural design emphasizing space planning for corporate and institutional environments. Field trips required.

*Prerequisite(s):* (DES 180A or DES 134B); DES 134A; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 185 – Exhibition Design (4 units)**

*Course Description:* Design of cultural and commercial exhibition environments, including exhibition development and object selection, spatial planning and architectural finishes, object placement and staging, interpretive strategies, exhibition and promotional graphics.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor; DES 051 or DES 150A recommended.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 186 – Environmental Graphic Design (4 units)**

*Course Description:* Design of informational and directional graphics for the built environment. Application and integration of typography, imagery and symbols into the architectural landscape. Development of universal wayfinding and graphic navigational systems to help people find their way.

*Prerequisite(s):* DES 001; (DES 014 or DES 021); DES 015; DES 016; or consent of instructor; DES 115 recommended.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 187 – Narrative Environments (4 units)**

*Course Description:* Design of storytelling environments and multi-sensory experiences for cultural, commercial, entertainment and public spaces. Interpretive planning and design for specific exhibit audiences. Manipulation of objects and the communication of complex ideas in the exhibition environment. May be taught abroad.

*Prerequisite(s):* (DES 185 or DES 186); (DES 014 or DES 021); DES 001; DES 015; DES 016; or consent of instructor.

*Learning Activities:* Studio 4 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Priority to Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DES 190 – Proseminar (1 unit)**

*Course Description:* Philosophies of design explored through discussion and presentation of research results.

*Prerequisite(s):* Design major or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

## **DES 191A – Workshops in Design (4-12 units)**

*Course Description:* Faculty initiated workshops featuring advanced studies and applications of original work in Design: Costume. Letter grading by contract. Field trips included.

*Prerequisite(s):* DES 014; DES 015; and consent of instructor; upper division standing.

*Learning Activities:* Seminar 1 hour(s), Studio 3 hour(s).

*Credit Limitation(s):* Credit limited to 12 units in one section or a combination of sections.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **DES 191B – Workshops in Design (4-12 units)**

*Course Description:* Faculty initiated workshops featuring advanced studies and applications of original work in Design: Environment. Letter grading by contract. Field trips included.

*Prerequisite(s):* DES 014; DES 015; and consent of instructor; upper division standing.

*Learning Activities:* Seminar 1 hour(s), Studio 3 hour(s).

*Credit Limitation(s):* Credit limited to 12 units in one section or a combination of sections.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **DES 191C – Workshops in Design (4-12 units)**

*Course Description:* Faculty initiated workshops featuring advanced studies and applications of original work in Design: Graphics. Letter grading by contract. Field trips included.

*Prerequisite(s):* DES 014; DES 015; and consent of instructor; upper division standing.

*Learning Activities:* Seminar 1 hour(s), Studio 3 hour(s).

*Credit Limitation(s):* Credit limited to 12 units in one section or a combination of sections.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **DES 191D – Workshops in Design (4-12 units)**

*Course Description:* Faculty initiated workshops featuring advanced studies and applications of original work in Design: Textiles. Letter grading by contract. Field trips included.

*Prerequisite(s):* DES 014; DES 015; and consent of instructor; upper division standing.

*Learning Activities:* Seminar 1 hour(s), Studio 3 hour(s).

*Credit Limitation(s):* Credit limited to 12 units in one section or a combination of sections.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DES 192 – Internship (1-12 units)**

*Course Description:* Supervised internship, off and on campus, in areas of design including graphics, fashion, information, museum, interaction, interiors, lighting, product and textiles.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**DES 194HA – Special Study for Honors Students (3 units)**

*Course Description:* Preparation and presentation of a culminating project.

Supervision of an instructor in one of the creative or scholarly areas of Design.

*Prerequisite(s):* Consent of instructor; qualification for Letters and Science Honors Program; senior standing; approval of Design Honors Program proposal by the Curriculum Committee and major advisor.

*Learning Activities:* Independent Study 9 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**DES 194HB – Special Study for Honors Students (3 units)**

*Course Description:* Preparation and presentation of a culminating project.

Supervision of an instructor in one of the creative or scholarly areas of Design.

*Prerequisite(s):* DES 194HA; and consent of instructor; qualification for Letters and Science Honors Program; senior standing.

*Learning Activities:* Independent Study 9 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**DES 197T – Tutoring in Design (1-5 units)**

*Course Description:* Leading of small discussion groups or studio meetings affiliated with one of the department's regular courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Discussion 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**DES 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**DES 198F – Student-Taught Course (1-4 units)**

*Course Description:* Student-facilitated (taught) course intended for upper division students.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**DES 199 – Special Study of Advanced Undergraduates (1-5 units)**

*Course Description:* Special study of advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**DES 199FA – Student Facilitated Course Development (1-4 units)**

*Course Description:* Planning and development for student led DES 198F under the supervision of a faculty member.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**DES 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* Student-facilitated course under the supervision of a faculty member, an undergraduate student teaching a course under 098F/198F.

*Prerequisite(s):* DES 199FA; and consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**DES 221 – Theory & Issues in Design (4 units)**

*Course Description:* Perspectives on theoretical and aesthetic issues related to the design professions such as methodology in historical and contemporary contexts, implications of technology on design theory and practice, and design relationships to environmental sustainability, recycling, and other social issues.

*Prerequisite(s):* Graduate standing in Design or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Independent Study.

*Grade Mode:* Letter.

**DES 222 – Research Methods & Critical Writing for Design (4 units)**

*Course Description:* Focused on research methods and critical writing related to design topics including case studies, original and secondary sources, critical reviews. Expectation of a paper meeting professional standards suitable for publication from each student at end of course.

*Prerequisite(s):* DES 221; graduate standing in Design or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Independent Study.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**DES 223 – Professional Practice & Ethics in Design (4 units)**

*Course Description:* Introduce students to issues of professional design practice: business ethics, contracts and business practices, social responsibility through case studies, guest lectures and field trips, and readings. Short written assignments and presentations will be required.

*Prerequisite(s):* DES 221; DES 222; graduate standing in Design or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Independent Study.

*Grade Mode:* Letter.

## **DES 224 – Seminar in Design Research & Teaching (4 units)**

*Course Description:* Work closely with instructor on a research and writing project related to subject matter of undergraduate history courses noted above with the goal of introducing student to advanced historical research processes and development of writing skills.

*Prerequisite(s):* DES 221; DES 222; DES 223; and consent of instructor; concurrent academic appointment (TA) in DES 142A, DES 142B, DES 143, DES 144, DES 145; graduate standing in Design.

*Learning Activities:* Independent Study 6 hour(s), Extensive Writing 4 hour(s), Discussion 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

## **DES 225 – Studio Practice in Design (4 units)**

*Course Description:* Students work together on a collective project to experience the multiple phases of design through an iterative process. Design projects will be geared towards relevance in contemporary social, cultural and political contexts.

*Prerequisite(s):* DES 221.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing in Design or consent of instructor.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

## **DES 226 – Studio Practice & Critique (4 units)**

*Course Description:* Development of design mastery through individual design process and projects. Risk taking and development of the ability to add form to ideas both speculative and practical. Various design methodologies and creative making. Presentation of works in progress. Communication of effective feedback.

*Prerequisite(s):* Graduate status in the Department of Design or consent of instructor.

*Learning Activities:* Studio 5 hour(s), Practice 1 hour(s).

*Enrollment Restriction(s):* Open to Design Graduate students only.

*Repeat Credit:* May be repeated 2 time(s) no more than once per year.

*Grade Mode:* Letter.

## **DES 227 – Thesis Exhibition Studio & Critique (4 units)**

*Course Description:* Development of final thesis exhibition. Focus on audience engagement and accessibility. Ideation, content selection, formal development, spatial planning sketches, scaled models, mockups, material testing, sequencing, staging, technical riders, maintenance requirement write-ups. Individual statement writing, collective catalog writing, exhibition promotion.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Studio 5 hour(s), Practice 1 hour(s).

*Enrollment Restriction(s):* Open to second year Design MFA students only.

*Grade Mode:* Letter.

## **DES 290 – Seminar in Design (4 units)**

*Course Description:* Selected topics in design methodology, research, communication, and education.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **DES 292 – Practicum in Design (1-12 units)**

*Course Description:* Interaction with a working professional in the student's field of interest to apply theories and concepts to working practice.

*Prerequisite(s):* Graduate standing in Design or consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **DES 298 – Directed Group Study for Graduate Students (1-5 units)**

*Course Description:* Directed group study for graduate students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Studio.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **DES 299 – Individual Focused Study (1-12 units)**

*Course Description:* Advanced study in studio practice on independent projects with faculty consultation.

*Prerequisite(s):* Graduate standing in Design or consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **DES 299D – Project Concentration (1-12 units)**

*Course Description:* Student creates a body of original work at a professional level, with written and visual documentation of process and concepts underlying the project, culminating in public presentation.

*Prerequisite(s):* Graduate standing in Design or consent of instructor; minimum of 22 units must be taken in Project Concentration and Individual Focused Study.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **DES 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Designated Emphasis, Biotechnology (DEB)**

## **Graduate Studies**

## **DEB 263 – Biotechnology Fundamentals & Application (2 units)**

*Course Description:* Fundamentals of molecular biology and chemical engineering involved in recombinant DNA technology. Topics: principles of rate processes of biological systems, optimization of bioreactors, and issues related to overexpression and production of recombinant molecules. Participation in student-directed team projects.

*Prerequisite(s):* BIS 101; BIS 102; MIC 102; or consent of instructor; must be a graduate student in good standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**DEB 282 – Biotechnology Internship (7-12 units)**

*Course Description:* Research at a biotechnology company or interdisciplinary cross-college lab for a minimum of three months as part of the Designated Emphasis in Biotechnology Program.

*Prerequisite(s):* Graduate standing and consent of instructor.

*Learning Activities:* Internship 21-36 hour(s).

*Enrollment Restriction(s):* Open only to students participating in the Designated Emphasis in Biotechnology program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**DEB 294 – Current Progress in Biotechnology (1 unit)**

*Course Description:* Seminars presented by guest lecturers on subjects of their own research activities.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* ECH 294.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Dramatic Art (DRA)**

College of Letters & Science

**DRA 001 – Theatre, Performance & Culture (4 units)**

*Course Description:* Introductory investigation of the nature of performance, moving from performance theory to consideration of various manifestations of performance including theatre, film and media, performance art, dance, sports, rituals, political and religious events, and other "occasions."

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have completed DRA 001S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

**DRA 001S – Theatre, Performance & Culture (4 units)**

*Course Description:* Introductory investigation of the nature of performance, moving from performance theory to consideration of various manifestations of performance including theatre, film and media, performance art, dance, sports, rituals, political and religious events, and other "occasions." For Short Term Programs Abroad; may be taught abroad.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have completed DRA 001.

*Grade Mode:* Letter.

**DRA 002 – Acting: The Basics: History & Practice (4 units)**

*Course Description:* Introduction to the historical evolution of the actor—from ancient Greece & Asia to the Hollywood icon & postdramatic performer—and the practical foundations of acting for stage and screen. Onstage opportunities within lecture course structure.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

**DRA 005 – Understanding Performance: Appreciation of Modern Theatre, Dance, Film & Performance Art (4 units)**

*Course Description:* Relevance of theatre and performance to modern culture, science and society. Approaches to theatre/dance/media/performance art, integrated into Mondavi Center for the Arts and Theatre & Dance Department programs.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* SAS 041.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**DRA 010 – Introduction to Acting (4 units)**

*Course Description:* Fundamentals of movement, speech, theatre games, and improvisation. Selected reading and viewing of theatre productions. Intended for students not specializing in Dramatic Art.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**DRA 014 – Introduction to Contemporary Dance (4 units)**

*Course Description:* Introduction to basic issues and methods in contemporary dance. Focus on preparing the student for dancing and dance-making through basic techniques of improvisation and composition. Consideration of dance as a cultural practice.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DRA 020 – Introduction to Dramatic Art (4 units)**

*Course Description:* Understanding and appreciation of both the distinctive and collaborative contributions of playwright, actor, director, and designer to the total work of dramatic art. Study of plays from the major periods of dramatic art in their cultural contexts.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**DRA 021A – Fundamentals of Acting (4 units)**

*Course Description:* Physical and psychological resources of the actor. Experience in individual and group contact and communication, theatre games, advanced improvisation, sound and movement dynamics.

Viewing of theatre productions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Enrollment Restriction(s):* Open to Theatre & Dance majors only; all other students may enroll in DRA 010.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**DRA 024 – Visual Aspects of Dramatic Art (4 units)**

*Course Description:* Understanding and appreciation of the visual aspects of dramatic art: theatre architecture, scenery, lighting, costume, and makeup.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 028 – Entertainment Engineering & Management: Stagecraft to Stage Management (4 units)**

*Course Description:* Introduction to technical production and management in theatre and dance. Topics include stage management, theatrical mechanics, backstage protocols, scenic construction, properties, lighting, basic shop tools, costume shop use and construction, basic make-up, sound equipment, graphics and robotics for theatre.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DRA 030 – Theatre Laboratory (1-5 units)**

*Course Description:* Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Project 2 hour(s).

*Repeat Credit:* May be repeated 11 unit(s).

*Grade Mode:* Letter.

**DRA 040A – Beginning Modern Dance (2 units)**

*Course Description:* Fundamentals of modern dance focusing primarily on the development of techniques and creative problem solving. Basic anatomy, dance terminology, and a general overview of modern dance history.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s) if a non-Dance major; a Dance major may apply to the dance faculty advisor for permission to repeat more times as dance is a repetitive practice that involves constant reiteration and demands this for improvement and better understanding of the somatic and proprioceptive skills.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 040B – Intermediate Modern Dance (2 units)**

*Course Description:* Modern dance techniques. Basic anatomy, dance terminology and a general overview of modern dance history.

*Prerequisite(s):* DRA 040A; or consent of instructor.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) if a Dance major; further repeats negotiated with the Dance faculty advisor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 041A – Beginning Jazz Dance (2 units)**

*Course Description:* Fundamentals of jazz dance; includes warm-ups, dance techniques and combinations. Basic anatomy, dance terminology and general overview of jazz dance history.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**DRA 041B – Intermediate Jazz Dance (2 units)**

*Course Description:* Warm-ups, dance techniques and combinations at the intermediate level. Basic anatomy, dance terminology and a general overview of jazz styles of historically significant jazz choreographers and leading contemporary jazz choreographers.

*Prerequisite(s):* DRA 041A; or consent of instructor.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Letter.

**DRA 042A – Beginning Ballet (2 units)**

*Course Description:* Fundamentals of ballet, focusing on the development of technique through proper alignment, quality, and rhythm. Basic anatomy, ballet terminology, and dance history.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 042B – Intermediate Ballet (2 units)**

*Course Description:* Barre and center work at the intermediate level. Development and refinement of technique through proper alignment, rhythmic, and qualitative understanding. Anatomy, ballet terminology, and dance history.

*Prerequisite(s):* DRA 042A; or consent of instructor.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 043A – Contact Improvisation Dance (2 units)**

*Course Description:* Fundamentals of contact improvisation and its applications to all forms of dance, performance, sports, physical safety and health. Solo improvisation, safety, communication, alignment, basic lifting and weight-sharing, intuition, developing relaxed readiness and personal expression.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 043B – Intermediate Contact Improvisation (2 units)**

*Course Description:* Building on the fundamentals. Reviewing basics, extended improvising, skillfully working with partners of different sizes and abilities, advanced lifting, advanced safety practices, embracing risk and disorientation, subtle nuances of communication.

*Prerequisite(s):* DRA 043A; or consent of instructor.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 044A – Beginning Hip Hop Dance (2 units)**

*Course Description:* Fundamentals of Hip Hop dance focusing on developing a fluid movement vocabulary, facility in body isolations, intricate rhythmic patterning, quick shifts of weight and mastering dance combinations. Discussions on Hip Hop dance history, styles and terminology.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**DRA 044B – Intermediate Hip Hop Dance (2 units)**

*Course Description:* Expansion of Hip Hop dance vocabulary by focusing on mastering body isolations and intricate rhythmic techniques, complex dance combinations, advanced across the floor sequences.

*Prerequisite(s):* DRA 044A; or consent of instructor.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**DRA 055 – Contemporary Local, National & Global Theatre, Dance & Performance (4 units)**

*Course Description:* Introduction a range of contemporary theatre, dance and performance in local, national and international settings. Training in critical approaches to and aesthetic appreciation of these forms.

Emphasis varies based on instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

**DRA 056A – History of Theatre & Dance I: Myth, Magic & Madness (4 units)**

*Course Description:* Exploration of aesthetic movements in various disciplines of theatre and dance from the origins to 1550. Examination of Greek, Roman, Sanskrit, Kathakali, Chinese, Japanese, Mesoamerican, Medieval European, and Indigenous theatre and dance including oral, ritual and shamanic performance. Offered once a year.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**DRA 056B – History of Theatre & Dance II: Romance, Revenge & Rebellion (4 units)**

*Course Description:* Exploration of aesthetic movements in various disciplines of theatre and dance from 1550-1850. Examination of genres related to romance, revenge and rebellion using European, North and South American, and Asian examples. Offered once a year.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**DRA 056C – History of Theatre & Dance III: Sex, Society & the State (4 units)**

*Course Description:* Exploration of aesthetic movements in various disciplines of theatre and dance from 1850-1968. Examination of melodrama, popular theatre, naturalism, psychological realism, and the avant-garde using European, North and South American, Asian, and African examples. Offered once a year.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**DRA 092 – Internship in Dramatic Art (1-12 units)**

*Course Description:* Internship outside the Department of Theatre & Dance enabling students to practice their skills.

*Prerequisite(s):* Consent of instructor and department chairperson.

*Learning Activities:* Variable 1-12 hour(s).

*Enrollment Restriction(s):* Restricted to lower division students with less than 84 units completed.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**DRA 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Learning Activities:* .

*Grade Mode:* Pass/No Pass only.

**DRA 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* .

*Grade Mode:* Pass/No Pass only.

**DRA 111 – Presentation, Communication & Collaboration (4 units)**

*Course Description:* Use of theater techniques for development of clear oral and physical communication skills that build confidence, presentational style and clarity for students whose command of English is at a competent to fluent level.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL).

**DRA 111S – Representation & Identity in Culture & Cinema (4 units)**

*Course Description:* Issues of personal and collective identity via study of film narratives from different cultures. Reflection of dominant cultural identities in film. May be taught abroad in Australia.

*Learning Activities:* Lecture/Discussion 2 hour(s), Film Viewing 4 hour(s).

*Grade Mode:* Letter.

**DRA 114 – Theatre on Film (4 units)**

*Course Description:* Study of six/eight plays on film, using mixed casts and raising issues of diversity. Focus: sociohistorical context for production and reception, interpretation and analysis of topics (gender, ethnicity, age, politics, philosophy), and filming, screenwriting, design, and acting/directing for film.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 2 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL).

**DRA 115 – Advanced Study of Major Film Makers (4 units)**

*Course Description:* Analysis of the contribution of some outstanding film creators. Study of diverse aesthetic theories of the cinema and their application to selected films.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 2 hour(s).

*Repeat Credit:* May be repeated when different film creator studied, or studied with a different methodological approach.

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DRA 116 – Design on Screen (4 units)**

*Course Description:* Analysis of the contribution of outstanding designers for cinema, television and filmed entertainment. Study of diverse aesthetic theories of production design and art direction, costume design, or cinematography. Introductory principles and practice, history.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Cross Listing:* CTS 116.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 120 – Intermediate Acting/Gateway: The Actor's Toolkit (4 units)**

*Course Description:* Implementation of acting tools drawn predominantly from Stanislavsky's 'system'. Gateway into the Advanced Acting courses.

*Prerequisite(s):* DRA 021A; or consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**DRA 121A – Advanced Acting: Scene Study & Script Analysis (4 units)**

*Course Description:* In-depth study, analysis and performance of texts from different eras, genres and styles. Implementation of tools to undertake independent preparation of character creation.

*Prerequisite(s):* DRA 120; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 8 unit(s) (twice) as acting requires repetition to habituate the body and imagination to new practices; new scripts and scenes must be undertaken in the repetition.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**DRA 121B – Advanced Acting: Rehearsal Processes & Practices (4 units)**

*Course Description:* Development of rehearsal practice and etiquette, using a variety of scenes from different eras and genres. Established to enable visiting artists in residence to undertake the instruction, as well as faculty.

*Prerequisite(s):* DRA 120; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 8 unit(s) (twice) as student is exposed to different professional practitioners' working processes; new etudes, scripts and scenes must be undertaken in the repetition.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**DRA 121C – Advanced Acting: Character & Style (4 units)**

*Course Description:* Study of psycho-physical techniques to create characters with an emphasis on non-realistic styles.

*Prerequisite(s):* DRA 120; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 8 unit(s) (twice) as acting requires repetition to habituate the body and imagination to new practices; new scripts and scenes must be undertaken in the repetition.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**DRA 122A – Advanced Acting: Devising & Collaboration (4 units)**

*Course Description:* Study and practice of various devising techniques, to collaborate on and produce a series of short etudes and dramatic scenes/short plays.

*Prerequisite(s):* DRA 120; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 8 unit(s) (twice) as acting requires repetition to habituate the body and imagination to new practices; new scripts and scenes must be undertaken in the repetition.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

**DRA 122B – Advanced Acting: Shakespeare & His Contemporaries (4 units)**

*Course Description:* Study and performance of classical texts (monologues and dialogues), with a focus on Shakespeare and the Elizabethan world view.

*Prerequisite(s):* DRA 120; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 8 unit(s) (twice) as acting requires repetition to habituate the body and imagination to new practices; new monologues and scenes must be undertaken in the repetition.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL).

## **DRA 122C – Advanced Acting: Special Topics in Acting (4 units)**

*Course Description:* Intensive study and practical exploration of a specialized area; for example, World Theatre, Social Theatre, Physical Theatre, Musical Theatre, the Ancient Greeks, etc.

*Prerequisite(s):* DRA 120; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Enrollment Restriction(s):* Restricted to Theatre & Dance majors; limited enrollment.

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

## **DRA 124A – Principles of Theatrical Design: Scenery (4 units)**

*Course Description:* Scene design processes, working drawings, sketching techniques, scale models, methods and materials of scenery construction.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Upper division standing; Pass One restricted to Theatre & Dance majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DRA 124B – Principles of Theatrical Design: Scenery (4 units)**

*Course Description:* Analysis of plays in terms of scene design, elements of design, execution of designs for modern and period plays.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Upper division standing; Pass One restricted to Theatre & Dance majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DRA 124C – Principles of Theatrical Design: Lighting (4 units)**

*Course Description:* Theories of lighting the stage, equipment and control systems, execution of lighting plots.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Enrollment Restriction(s):* Upper division standing; Pass One restricted to Theatre & Dance majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DRA 124D – Principles of Theatrical Design: Costume (4 units)**

*Course Description:* Source materials for theatrical costuming, selecting fabrics, elements of design, analysis of plays in terms of costume design, execution of designs for modern and period plays.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Upper division standing; Pass One restricted to Theatre & Dance majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

## **DRA 124E – Costume Design for Film (4 units)**

*Course Description:* Theory and practice of the art and business of film costume design. Script analysis, costume research, developing design concepts, budgeting, and current production practices and methods. Execution of designs for period and contemporary films. Viewing of current films.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Theatre & Dance majors.

*Cross Listing:* CTS 124E.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

## **DRA 125 – Scenic Painting: Studio (4 units)**

*Course Description:* Scene painting techniques, practices and materials including color mixing and matching, wood graining, faux painting techniques, glazing, creating foliage, stone and brick.

*Prerequisite(s):* DRA 024 or DRA 028; or consent of instructor. Upper division standing in Theatre Dance, Art Studio, or Design.

*Learning Activities:* Lecture 2 hour(s), Studio 1 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DRA 126 – Principles of Performing Arts Stage Management (4 units)**

*Course Description:* Stage management principles for theatre, dance, musical theatre, music, and concerts. The dynamical role of the stage manager in the performing arts, upper-management team.

*Prerequisite(s):* DRA 028.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **DRA 126A – Topics in Entertainment Engineering (4 units)**

*Course Description:* Engineering topics faced by technical designers in live entertainment. Project-based exploration of: theatrical rigging, scenic automation, the role of the technical director, and structural design for the stage.

*Prerequisite(s):* DRA 028 C- or better; consent of instructor.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Theatre & Dance majors.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **DRA 127A – Principles of Directing (4 units)**

*Course Description:* Director's creative approach to the play and to its staging.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DRA 127B – Principles of Directing (4 units)**

*Course Description:* Director's creative approach to the actor.

*Prerequisite(s):* DRA 127A; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s), Rehearsal.

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DRA 128 – Principles of Theatre Sound (4 units)**

*Course Description:* Fundamentals of sound, sound equipment, and sound design as used in modern theatre and other performance venues.

Assembly, set-up, and operation of basic theatre sound reinforcement system, recording system, and theatrical playback system.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DRA 130 – Approaches to Theatrical Design: Practice & Theory (4 units)**

*Course Description:* Advanced design study in specific areas including but not limited to: research, design styles and concepts, new materials and techniques, scenery, lighting, costume, makeup, photography, projections, computer technology, spectacle and special effects, and alternative theatre forms and genres.

*Prerequisite(s):* DRA 124A or DRA 124B or DRA 124C or DRA 124D or DRA 124E; upper division standing in Theatre Dance, Art Studio or Design; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Studio 4 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when topic differs; when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**DRA 135 – Voice in Performance (2 units)**

This version has ended; see updated course, below.

*Course Description:* Progression of exercises to free, develop and strengthen the voice, as a human and then as an actor's instrument with emphasis on how the voice works, to freeing the channel for sound, to interpersonal communication.

*Prerequisite(s):* DRA 021B; or consent of instructor.

*Learning Activities:* Performance Instruction 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**DRA 135 – Voice in Performance (4 units)**

*Course Description:* Progression of exercises to free, develop and strengthen the voice, as a human and then as an actor's instrument with emphasis on how the voice works, to freeing the channel for sound, to interpersonal communication. Exploration of sound use from student's individual history and culture. Required to complete more in-depth and advanced midterm and final assignments. Repeat to further develop an understanding of technique and practice.

*Prerequisite(s):* DRA 120; or consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

This course version is effective from, and including: Winter Quarter 2024.

**DRA 140A – Dance Composition (4 units)**

*Course Description:* Introduction to the craft of choreography. Compose phrases and present movement studies based on the elements of choreography: motivation, space, time, force/energy.

*Prerequisite(s):* DRA 040A or DRA 041A or DRA 042A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DRA 140B – Dance Composition (4 units)**

*Course Description:* Continuation of the study of choreography, focusing on the development of group choreography: duets, trios, quartets and group work, form, and accompaniment.

*Prerequisite(s):* DRA 140A.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**DRA 140C – Dance Composition (4 units)**

*Course Description:* Continuation of study of choreography focusing on sequencing movements for groups. The relation between dance and allied mediums of music, sets, costumes and lighting. Students conceptualize a choreographic issue and explore it through creation of short dance studies.

*Prerequisite(s):* DRA 140A; DRA 140B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**DRA 141 – Introduction to the Fundamentals of Movement (4 units)**

*Course Description:* Introduction to fundamentals of movement that combines intellectual and kinesthetic understanding of the body's skeletal and muscular systems. Explorations based on theories of various body mind specialists including Laban, Feldenkrais, Bartenieff and Sweigard as well as the eastern discipline of Yoga.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**DRA 142 – History of Modern Dance (4 units)**

*Course Description:* Modern Dance tradition, focusing on its theorizations of individual and social identity. Students will write and choreograph analyses of principle dances in this tradition.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**DRA 143 – Dance & Movement Studio (1-4 units)**

*Course Description:* Special studies in dance and movement such as African, Balinese, Baroque, Chinese, European, and stage combat. Offered as needed for stage productions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion/Laboratory 2-8 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DRA 144 – Introduction to Traditional Chinese Physical Culture (4 units)**

*Course Description:* Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of practice with conceptual analysis; contemporary social, educational and artistic applications.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## **DRA 144A – Introduction to Traditional Chinese Embodied Culture (4 units)**

*Course Description:* Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of practice with conceptual analysis; contemporary social, educational and artistic applications.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

## **DRA 144B – Traditional Chinese Physical Culture (4 units)**

*Course Description:* Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of practice with conceptual analysis; contemporary social, educational and artistic applications.

*Prerequisite(s):* DRA 144A.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when content and instructor differs and if student progression is required.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

## **DRA 144C – Daoist Philosophy in Traditional Chinese Movement Culture (4 units)**

*Course Description:* Daoist practices of movement and their relation to daoist philosophy, explored through work in dance laboratory conditions. Integration of practice with conceptual analysis, and critical philosophy around values and ethical action.

*Prerequisite(s):* DRA 144B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when content or instructor differs and if student progression is required.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

## **DRA 145 – Directed Choreography Projects (4 units)**

*Course Description:* Conceptualization, creation, casting, rehearsing, and concert presentation of complete dances, with students integrating elements of stagecraft and directing the on-stage rehearsals.

*Prerequisite(s):* DRA 140A or DRA 140B or DRA 140C; or consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s), Rehearsal.

*Repeat Credit:* May be repeated 4 time(s) with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **DRA 146A – Professional Track Modern Dance I (4 units)**

*Course Description:* Professionally oriented performance training.

Rigorous, consistent training regimen based on traditional modern dance technique. Breath and voice, skeletal and muscular placement, moving from the spine, contraction technique, movement intention.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

## **DRA 146B – Professional Track Modern Dance II (4 units)**

*Course Description:* Body and space relationships in solos, duets and group work; stylistic variations of Graham technique; works of Paul Taylor.

*Prerequisite(s):* DRA 146A; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

## **DRA 146C – Professional Track Modern Dance III (4 units)**

*Course Description:* Continuation of DRA 146B. Time as a theatrical device, sustaining movement and non-movement, phrasing, musicality.

*Prerequisite(s):* DRA 146A; DRA 146B; and consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

## **DRA 150 – American Theatre & Drama (4 units)**

*Course Description:* The history of the theatre from Colonial times to the present. Readings of selected plays.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

## **DRA 151 – Musicals: History, Practice & Production (4 units)**

*Course Description:* Historical exploration of the musical through the lens of practice and production. Choreographic and compositional elements. Tracing of evolution of story through development, production, revival, and adaptation. Collaborative production of excerpts from work.

*Prerequisite(s):* Consent of instructor; DRA 021A or previous experience in theatre performance recommended.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

## **DRA 151S – Australian Performance & Culture (4 units)**

*Course Description:* Australian performance and theatre practices as a product of its culture of origin. Relationships between art and society. May be taught abroad in Australia.

*Learning Activities:* Lecture/Discussion 2 hour(s), Seminar 2 hour(s).

*Grade Mode:* Letter.

**DRA 153 – Latinx Theatre & Performance (4 units)**

*Course Description:* Latinx theatre and performance. Historical, aesthetic, and socio-cultural contexts. Engagement through critical analysis, embodied practice, and creation of new work.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD);

Writing Experience (WE).

**DRA 154 – Asian Theatre & Drama: Contexts & Forms (4 units)**

*Course Description:* Selected Asian plays and performance forms in their cultural and artistic contexts; myth, ritual and the theatre; performance training, visual presentation of the text; political theatre; intercultural performance—the fusion of Asian and Western traditions.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing

Experience (WE).

**DRA 155 – Representing Race in Performance (4 units)**

*Course Description:* Representation and performance of "race" in American culture featuring different sub-headings such as "African American Theatre" or "Asian-Americans on Stage."

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD);

Writing Experience (WE).

**DRA 155A – African American Dance & Culture in the United States, Brazil & the Caribbean (4 units)**

*Course Description:* Comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* AAS 155A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World

Cultures (WC).

**DRA 155B – Ancient & Contemporary Greek Theatre & Dance (6 units)**

*Course Description:* Origins of early theatres and the first actors, playwrights and dancers and their powerful influence on western performance and thought up to present day. Offered in Greece.

*Learning Activities:* Discussion/Laboratory 10 hour(s), Performance Instruction 10 hour(s), Seminar 13 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DRA 156A – Performance Analysis (4 units)**

*Course Description:* Performance on the stage, in the street, in everyday life, ritual and in politics. Satire, irony, creative protest and performance. Social movements, the state and performance as tactical intervention.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD);

Writing Experience (WE).

**DRA 156B – Theatre in History & Place: Local, National & Global Conditions for Production (4 units)**

*Course Description:* Exploration of local, national and global issues in theatre production, with special attention to historical changes in social and political contexts for performance.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**DRA 156C – Modern Aesthetic Movements in Performance (4 units)**

*Course Description:* Important movements in performance, especially theatre and dance, from realism to the present. Primary emphasis on Western traditions though others may be studied.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**DRA 156D – Theatre History Through Shakespeare (4 units)**

*Course Description:* Shakespeare's plays, theatre history, and theatre today. European contexts from 1590-2004 and international theatre from 20th century. Stagecraft, different media (print, stage, film), social/political environments, design, and cultural change (gender, sexuality and ethnicity).

*Learning Activities:* Lecture 4 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**DRA 158 – Performance Studies Undergraduate Seminar (4 units)**

*Course Description:* Focused inquiry into a particular genre, period, movement, artist, or theme in performance. Philosophical and aesthetic issues as well as historical and cultural performance contexts. In-depth research projects in relationship to the subject of inquiry.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**DRA 159 – Contemporary Experimental Performance, Theatre & Drama (4 units)**

*Course Description:* Evaluation and examination of the "New Theatre;" its experimental and innovative nature since the 1960s. Dance, film, stage, performance art and public acts of a performative nature.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 3 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **DRA 159S – Contemporary Experimental Performance, Theatre & Drama (4 units)**

*Course Description:* Evaluation and examination of the "New Theatre;" its experimental and innovative nature since the 1960s. Dance, film, stage, performance art and public acts of a performative nature. May be taught abroad.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 12 unit(s) when instructor or content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **DRA 160A – Principles of Playwriting (4 units)**

*Course Description:* Analysis of dramatic structure; preparation of scenarios; the composition of plays.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **DRA 160B – Principles of Playwriting (4 units)**

*Course Description:* Analysis of dramatic structure; preparation of scenarios; the composition of plays.

*Prerequisite(s):* DRA 160A; and consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **DRA 170 – Media Theatre (4 units)**

*Course Description:* New media and application of in theatre devising and performance. Emphasis on collaborative process in relationship to integration of emerging technologies and formation of new theatrical works. Development of collaborative performance through lecture, demonstration, improvisation and experimentation.

*Learning Activities:* Lecture 1 hour(s), Rehearsal 2 hour(s), Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DRA 174 – Acting for Camera (4 units)**

*Course Description:* Analysis and practice of acting skills required for camera work and digital media.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 6 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when instructor differs.

*Cross Listing:* CDM 107.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **DRA 175 – Small Scale Film Production (4 units)**

*Course Description:* Lecture and intensive workshop teaching small-scale film production. Appointments as a(n) director, director of photography, actor, writer, lighting designer, sound designer and other critical positions are used to produce and submit a short film to a film festival.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Cross Listing:* TCS 175.

*Grade Mode:* Letter.

## **DRA 180 – Theatre Laboratory (1-5 units)**

*Course Description:* Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **DRA 180A – Theatre Laboratory: Performance (1-5 units)**

*Course Description:* Rehearsal and performance of a production directed or choreographed by visiting Granada Artists-in-Residence and/or faculty, and/or the UG Edge Festival.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Rehearsal 12 hour(s).

*Enrollment Restriction(s):* Limited enrollment; admission by audition.

*Repeat Credit:* May be repeated as each production involves different scripts, directions, challenges of rehearsal practices and performance processes, it is possible for students to appear in a variety of productions in the course of their education.

*Grade Mode:* Letter.

## **DRA 180B – Theatre Laboratory: Design (1-4 units)**

*Course Description:* Design-related participation in Theatre & Dance productions involves research, creation and implementation of design concept in collaboration with the director and other members of the production team.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated as each theatrical piece is conceived and produced afresh with new source material, scripts, and production style, the challenges and assignments for the designers are new each time they design a show.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

## **DRA 180C – Theatre Laboratory: Management, Directing, other Production Team (1-5 units)**

*Course Description:* Participation in Theatre & Dance production in management, direction, choreography, dramaturgy, writing or other production related role; research, creation and implementation of production concept in collaboration with members of the production team and cast.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated with required permission from the Theatre & Dance department.

*Grade Mode:* Letter.

## **DRA 180D – Theatre Laboratory: Crew (2-4 units)**

*Course Description:* Participation in Theatre & Dance productions as backstage running crew which will involve skill development, rehearsal and execution of performance.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 6-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 180E – Theatre Laboratory: Scenic (1-4 units)**

*Course Description:* Practical experience working on scenery and properties for Theatre & Dance department productions. Study and execution of basic scenery and prop engineering, construction, painting, rigging. Study of techniques, materials, tools, and equipment use. Skill development, professional etiquette. Safety training requirement.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 180F – Theatre Laboratory: Costume (1-4 units)**

*Course Description:* Practical experience working on costumes for Theatre & Dance department productions. Study and execution of basic costume construction techniques and materials, tools, and equipment use. Skills development, professional etiquette. Safety training requirement.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 180G – Theatre Laboratory: Lighting/Sound/Projection (1-4 units)**

*Course Description:* Practical experience working on lighting, sound or projections for Theatre & Dance department productions. Study and execution of basic techniques, materials, tools, and equipment use. Skill development, professional etiquette. Safety training requirement.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 185A – Special Topics: Artist in Residence-Seminar (4 units)**

*Course Description:* Exploration of contemporary topics in Theatre and Dance. Individual and collaborative project-based learning. Topics vary by instructor.

*Prerequisite(s):* Consent of instructor or upper division major in Theatre and Dance.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Theatre & Dance majors only.

*Repeat Credit:* May be repeated 3 time(s) when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DRA 185B – Special Topics: Artist in Residence-Studio (4 units)**

*Course Description:* Studio course in any area of Theatre & Dance offered by artist in residence. Individual and collaborative studio and practice-based learning. Topics vary by instructor.

*Prerequisite(s):* Consent of instructor or upper division major standing in Theatre Dance.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Theatre & Dance majors.

*Repeat Credit:* May be repeated 3 time(s) when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**DRA 192 – Internships in Theatre & Dance (1-12 units)**

*Course Description:* Theatre production experience in creative, technical or management areas. Experience in galleries, performance sites, or theatre/dance/physical theatre companies.

*Learning Activities:* Internship 3-36 hour(s).

*Credit Limitation(s):* Not open to students who have completed DRA 192S.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**DRA 192S – Internships in Theatre & Dance (1-12 units)**

*Course Description:* Theatre production experience in creative, technical or management areas. Experience in galleries, performance sites, or theatre/dance/physical theatre companies. May be taught abroad.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**DRA 194HA – Special Study for Honors Students (3 units)**

*Course Description:* Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of Theatre & Dance.

*Prerequisite(s):* Qualification for Letters Science Honors Program and admission to Theatre Dance Senior Honors Program.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Pass/No Pass only.

**DRA 194HB – Special Study for Honors Students (3 units)**

*Course Description:* Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of Theatre & Dance.

*Prerequisite(s):* Consent of instructor; qualification for Letters Science Honors Program and admission to Theatre Dance Senior Honors Program.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Letter.

**DRA 195 – Senior Capstone Experience (2 units)**

*Course Description:* Capstone experience for majors. Examination, reflection and synthesis on development. Discussion of professional development and translatable skills. Individual project and development of portfolio.

*Learning Activities:* Project, Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Theatre & Dance Majors who have completed 135 or more units.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**DRA 197T – Tutoring in Dramatic Art (1-5 units)**

*Course Description:* Leading of small voluntary groups affiliated with one of the department's regular courses.

*Prerequisite(s):* Consent of instructor; upper division or graduate standing with major in Theatre Dance; consent of department chairperson.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**DRA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**DRA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**DRA 200 – Methods & Materials in Theatre Research (4 units)**

*Course Description:* Essential research tools in theatre and related fields; bibliographies, primary sources; methods of evaluating and presenting evidence; delineating research areas in the field.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**DRA 211 – Advanced Voice & Speech (3 units)**

*Course Description:* Review a progression of exercises to free, develop and strengthen the voice, first as a human instrument, and then as an actor's instrument using various texts such as Shakespeare, Ibsen and contemporary plays. Required for the M.F.A. degree in Acting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Open only to Dramatic Arts Students and Ph.D. students with an emphasis in Performance and Theatre.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**DRA 212 – Advanced Stage Movement (3 units)**

*Course Description:* Application of modes of exploration, breath placement, and the use of imagery as well as Laban's effort/shape system as a method of analysis in classic and modern plays.

*Prerequisite(s):* Consent of instructor; graduate standing in the MFA Program.

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Open to advanced undergraduates by consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 221 – Special Problems in Advanced Acting (4 units)**

*Course Description:* Advanced acting problems arising from differences in the type and style of plays selected from Greece to the present.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Laboratory 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 224A – Seminar in Theatrical Design: Ancient Worlds; Early 17th Century (4 units)**

*Course Description:* Group study while focusing primarily on one discipline: scenic, costume or lighting design. Periods covered: Greek, Medieval, Renaissance, Shakespearean, Jacobean, early 17th century. Design projects include script analysis, research of period style, fashion, character development, developing design concepts, presentation skills.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Project 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 224B – Seminar in Theatrical Design: Mid-17th Century to 1900 (4 units)**

*Course Description:* Group study focusing primarily on one discipline: scenic, costume or lighting design. Periods covered: Cavalier, Restoration 18th century opera and ballet, 19th century drama. Design projects include script analysis, research of period style, fashion, character development, developing design concepts, presentation skills.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Project 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 224C – Seminar in Theatrical Design: the 20th Century (4 units)**

*Course Description:* Group study focusing primarily on one discipline: scenic, costume or lighting design. Genres covered in 20th century: Realism, Brecht, Musicals, Contemporary Dance, short narrative film. Design projects include script analysis, research of period style, fashion, character development, developing design concepts, presentation skills.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Project 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**DRA 224D – Seminar in Theatrical Design: Contemporary Concepts (4 units)**

*Course Description:* Group study focusing primarily on one discipline: scenic, costume or lighting design. Emphasis on contemporary design concepts for new works and classics: Shakespeare, modern dance, concept plays and musicals. Script and character analysis for design in performance, research, design projects.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Project 2 hour(s).

*Grade Mode:* Letter.

**DRA 224E – Seminar in Theatrical Design: Advanced Concepts (4 units)**

*Course Description:* Group study focusing primarily on one discipline: scenic, costume or lighting design. Emphasis on special issues in contemporary design concepts for new works and classics. Script and character analysis for design in performance, research, design projects.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Project 2 hour(s).

*Grade Mode:* Letter.

## **DRA 225 – Performance Design Studio: Techniques & Media (2 units)**

*Course Description:* Exploration and development of techniques and skills in the performance design process. Drafting, model building, drawing, painting and rendering, costume drawing, color theory, lighting techniques, design portfolio preparation and presentation.

*Prerequisite(s):* DRA 224A (can be concurrent) or DRA 224B (can be concurrent) or DRA 224C (can be concurrent) or DRA 224D (can be concurrent) or DRA 224E (can be concurrent); consent of instructor.

*Learning Activities:* Studio 2 hour(s).

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **DRA 228 – Seminar in Directing Theory: Non-Realism (4 units)**

*Course Description:* Modern directing theory as it applies to non-realistic theatre; development of directorial concepts for production of selected non-realistic plays-Greek to the present; emphasis on textual analysis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **DRA 229 – Special Problems in Directing (4 units)**

*Course Description:* Projects in directing scenes selected from plays from ancient Greece to the present.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Laboratory 2 hour(s), Rehearsal 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

## **DRA 230 – Advanced Problems in Choreography & Performance (2 units)**

*Course Description:* Explores contemporary issues of choreography and performance in depth and how those issues pertain to performance work. Focus will include contemporary thought on representation, legibility, new forms, and cultural attitudes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Letter.

## **DRA 244 – Critical Approaches to Traditional Systems of Body Movement (4 units)**

*Course Description:* Introduction to traditional systems for body movement, development of critical approaches to them, and experiments in how they inform training and practice in theatre, dance, and performance.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion/Laboratory 6 hour(s), Project, Term Paper.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **DRA 250 – Modern Theatre (4 units)**

*Course Description:* Theatre of Europe and America, 1860-1940, with emphasis on the relationship of the dramas of the period to the physical circumstances under which they were produced.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **DRA 251 – Scoring & Scripting in Performance (4 units)**

*Course Description:* Process of weaving together various performance elements brought into play by the artists in their respective disciplines. The "script" is the thread from which the artists' "scores" will layer and transform the "script" into performance for specific time, place, spectators.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **DRA 252 – Performance: Concepts of Space, Place, & Time (4 units)**

*Course Description:* Innovative theories of creating performance spaces, establishing a sense of place, and communicating the concept of time explored through collaborative interaction. Research includes traditional principles, site-specific spaces and consideration of various tempi from music and movement.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **DRA 253 – Approaches to Collaboration (4 units)**

*Course Description:* Exploration of different approaches to collaboration among artists in different media and their influence on the creative process.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **DRA 254 – Performing Identities/Personae (4 units)**

*Course Description:* Historical and contemporary theories of constructing stage identities. Discussion and project collaborations based on theories. Questions of identity related to ethnicity, gender or sexual orientation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **DRA 255 – Composition in the Arts (4 units)**

*Course Description:* Examine manner in which specific elements utilized by actors, dancers, directors, choreographers, and designers are combined or related to form a whole in space and time, as well as methods of sequencing used by each discipline to produce artistic products.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

## **DRA 256 – Visual Language for Performance (4 units)**

*Course Description:* Exploration of different approaches and methods to the visual elements of performance. Focus on design and style for different media and genres, storytelling through visual elements of performance.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

## **DRA 257 – Interdisciplinary Seminar in Theatre, Dance & Performance (1 unit)**

*Course Description:* Interdisciplinary seminar for first- and second-year M.F.A. students in Theatre & Dance. Topics range from current practice in dance, theatre, film and performance, to leading edge developments by outstanding practitioners in the field.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1.50 hour(s), Project 1.50 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.F.A. in Dramatic Art; students taking the Ph.D. in Performance Studies or the D.E. in Studies in Performance & Practice.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

## **DRA 259 – Topics in Contemporary Theatre & Performance (4 units)**

*Course Description:* Special topics designed to study in depth aspects of contemporary performance including performance analysis, cultural and historical context, modes of production, theoretical and political entailments, and issues of spectatorship; e.g., "Brecht & After," "British Theater," "Race & Gender in Performance."

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **DRA 260 – Approaches & Methodologies to Studies in Performance & Practice (4 units)**

*Course Description:* Instruction is offered a variety of disciplinary approaches and methodologies in Performance & Practice, with a focus is on cross-disciplinary learning and research. Usually offered each quarter.

*Prerequisite(s):* Admission to any graduate program in the University and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Enrollment Restriction(s):* Preference to students enrolled in the Designated Emphasis in Studies in Performance and Practice.

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

## **DRA 265A – Performance Studies: Modes of Production (4 units)**

*Course Description:* Introduces students to the literature of performance production in a variety of media: theatre, dance, film, video, computer-based, looking at cultural, aesthetic, rhetorical and political theory. Usually offered in alternate years.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Repeat Credit:* May be repeated 3 time(s) when topic and instructor differs.

*Grade Mode:* Letter.

## **DRA 265B – Performance Studies: Signification & the Body (4 units)**

*Course Description:* Introduces students to analysis of the body in performance, drawing on theoretical models from several fields.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

## **DRA 265C – Performance Studies: Performance & Society (4 units)**

*Course Description:* Introduces students to the role of performance (broadly defined), in everyday life, sociopolitical negotiation, identity, social movements, the media, and the state.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

## **DRA 265D – Performance studies: Theory, History, Criticism (4 units)**

*Course Description:* Introduction to the theory, history and criticism, informing performance studies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

## **DRA 280 – Theatre Laboratory (1-12 units)**

*Course Description:* Advanced practice in acting, designing, directing, playwriting, and technical theatre.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **DRA 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* .

*Grade Mode:* Letter.

## **DRA 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **DRA 299D – Dissertation Research (1-12 units)**

*Course Description:* Dissertation research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **DRA 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **DRA 413 – Stage Make-up (1 unit)**

*Course Description:* Approved for graduate degree credit. Lectures, demonstrations, and practical work in aspects of theatrical make-up.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

## East Asian Studies (EAS)

College of Letters & Science

### EAS 088 – Korean Culture & Society: From Ancient Three Kingdoms to the Global K-Pop (4 units)

*Course Description:* Evolution of Korean society from Three Kingdoms period (B.C.E 57 to C.E. 676) to the contemporary era emphasizing the perseverance and transformations of traditional social and cultural patterns.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* HIS 009C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

### EAS 113 – Cinema & Society in China (4 units)

*Course Description:* Knowledge of Chinese not required. Viewing and analysis of one Chinese film with English subtitles each week, followed by discussion and short essays. Cinematic technique, social values and film topics from 1930s to today.

*Prerequisite(s):* HIS 190C; HIS 193; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHN 113.

*Grade Mode:* Letter.

### EAS 190 – East Asian Studies Seminar (4 units)

*Course Description:* Political, social, cultural, and economic issues in East Asia. Topic varies each year.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### EAS 192 – East Asian Studies Seminar (1-12 units)

*Course Description:* Work experience in the East Asian Studies field, with analytical term paper on a topic approved by the instructor.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s), Term Paper.

*Grade Mode:* Pass/No Pass only.

### EAS 194H – Special Study for Honors Students (1-5 units)

*Course Description:* Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in East Asian Studies culture, society, or language.

*Prerequisite(s):* Open only to majors of senior standing who qualify for Honors Program.

*Learning Activities:* Independent Study 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

### EAS 196A – Honors Seminar (4 units)

*Course Description:* A two-quarter research project culminating in an Honors thesis. A grade of B or higher must be earned to qualify the student for honors distinction at graduation.

*Prerequisite(s):* Consent of instructor; GPA of 3.500 in the major; senior standing.

*Learning Activities:* Seminar 2 hour(s), Conference 2 hour(s).

*Grade Mode:* Pass/No Pass only.

### EAS 196B – Honors Seminar (4 units)

*Course Description:* A two-quarter research project culminating in an Honors thesis. A grade of B or higher must be earned to qualify the student for honors distinction at graduation.

*Prerequisite(s):* Consent of instructor; GPA of 3.500 in the major, senior standing.

*Learning Activities:* Seminar 2 hour(s), Conference 2 hour(s).

*Grade Mode:* Pass/No Pass only.

### EAS 198 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## Ecology (ECL)

College of Agricultural & Environmental Sciences

### ECL 200AN – Principles & Applications of Ecology (5 units)

*Course Description:* Covers principles of community structure and functioning, species diversity patterns, ecosystem ecology and biogeochemistry, landscape ecology, biogeography and phylogenetics.

*Prerequisite(s):* STA 102; MAT 016A; MAT 016B; or consent of instructor; first course in Ecology (e.g., ESP 100).

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to graduate majors.

*Grade Mode:* Letter.

### ECL 200BN – Principles & Applications of Ecology (5 units)

*Course Description:* Provides a broad background in the principles and applications of ecology, and serves as a foundation for advanced ecology courses. Topics include ecophysiology, behavioral ecology, population ecology, genetics and evolution. Emphasis on historical developments, current understanding, and real world applications.

*Prerequisite(s):* STA 102; MAT 016A; MAT 016B; or consent of instructor; first course in Ecology (e.g., ESP 100).

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to graduate majors.

*Grade Mode:* Letter.

### ECL 205 – Community Ecology (4 units)

*Course Description:* Introduction to literature and contemporary research into processes structuring ecological communities.

*Prerequisite(s):* An upper division course in Ecology (ECL).

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

### ECL 206 – Concepts & Methods in Plant Community Ecology (4 units)

*Course Description:* Principles and techniques of vegetation analysis, including structure, composition, and dynamics. Emphasis given to sampling procedures, association analysis, ordination, processes and mechanisms of succession, and classification. Most techniques are demonstrated or conducted during field trips and laboratories.

*Prerequisite(s):* Consent of instructor; introductory courses in statistics and plant ecology.

*Learning Activities:* Lecture 3 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

**ECL 207 – Plant Population Biology (3 units)**

*Course Description:* Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological ecological and genetic approaches to plant population biology.

*Prerequisite(s):* Advanced undergraduate ecology course (e.g., ESP 100, EVE 101, ENT 104 or PLB 117), and advanced undergraduate course in genetics and/or evolution (e.g., BIS 101 or EVE 100).

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* PBG 207.

*Grade Mode:* Letter.

**ECL 208 – Issues in Conservation Biology (4 units)**

*Course Description:* Graduate-level introduction to current research in conservation biology. Emphasizes reading and discussing primary literature. Specific topics will reflect the research interests of UC Davis conservation biology faculty.

*Prerequisite(s):* Introductory biology (e.g. BIS 002B) and an upper division organismal biology class.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECL 212A – Environmental Policy Process (4 units)**

*Course Description:* Introduction to selected topics of the policy process and applications to the field of environmental policy. Develops critical reading skills, understanding of policy theory, and an ability to apply multiple theories to the same phenomena.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Cross Listing:* ESP 212A.

*Grade Mode:* Letter.

**ECL 212B – Environmental Policy Evaluation (4 units)**

*Course Description:* Method and practice, philosophical basis, and political role of policy analysis. Reviews basic concepts from economic theory; how and why environmental problems emerge in a market economy; and tools necessary for solving environmental problems.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Standing.

*Cross Listing:* ESP 212B, ENV 200B.

*Grade Mode:* Letter.

**ECL 214 – Marine Ecology: Concepts & Practice (3 units)**

*Course Description:* Critical review and analysis of concepts and practices in modern marine ecology at the interface of several fields of study including oceanography, evolution, behavior, and physiology. Emphasis on critical thinking, problem solving, and hands-on study. Two field trips required.

*Prerequisite(s):* Consent of instructor. Graduate standing or one course in ecology, one course in evolution or genetics; survey course in marine ecology recommended.

*Learning Activities:* Lecture 1 hour(s), Discussion 1.50 hour(s), Fieldwork 1.50 hour(s).

*Grade Mode:* Letter.

**ECL 215 – Social Ecological Systems (3 units)**

*Course Description:* Overview of social-ecological systems that links environmental policy and decision-making to ecological processes. Delves deeper into different social science topics related to this broader idea. Applying of course readings to case studies chosen by students and a final paper.

*Prerequisite(s):* Completion of core courses for specific graduate programs, for example ECL 200A, ECL 200B.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**ECL 216 – Ecology & Agriculture (4 units)**

*Course Description:* Ecological principles as relevant to agriculture. Integration of ecological approaches into agricultural research to increase ecosystem functions and services. Topics include crop autoecology, biotic interactions among crops and pests, ecosystem and landscape ecology.

*Prerequisite(s):* EVE 011; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed VCR 216. (Former VCR 216).

*Grade Mode:* Letter.

**ECL 219 – Ecosystem Biogeochemistry (4 units)**

*Course Description:* Multi-disciplinary analysis of energy and nutrient transfers within terrestrial ecosystems. Examination of processes and inter- and intra-system interactions between the atmosphere, biosphere, lithosphere, and hydrosphere. Laboratory section uses biogeochemical simulation models to examine case studies.

*Prerequisite(s):* Introductory courses in ecology/biology and soils are recommended; undergraduates accepted with consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Cross Listing:* SSC 219.

*Grade Mode:* Letter.

**ECL 225 – Terrestrial Field Ecology (4 units)**

*Course Description:* Field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results are stressed.

*Prerequisite(s):* Introductory ecology and introductory statistics or consent of instructor.

*Learning Activities:* Seminar 1 hour(s), Fieldwork 12 hour(s).

*Cross Listing:* ENT 225, PBG 225.

*Grade Mode:* Letter.

**ECL 231 – Mathematical Methods in Population Biology (3 units)**

*Course Description:* Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed.

*Prerequisite(s):* MAT 016C or MAT 021C; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PBG 231.

*Grade Mode:* Letter.

**ECL 232 – Theoretical Ecology (3 units)**

*Course Description:* Examination of major conceptual and methodological issues in theoretical ecology. Model formulation and development will be emphasized. Topics differ from year to year.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ECL 233 – Computational Methods in Population Biology (3 units)**

*Course Description:* Numerical methods for simulating population dynamics using the computational software package R. Emphasis placed on model formulation and development, theoretical concepts and philosophical principles to guide simulation efforts, model parameterization, and implementing simulations with R.

*Prerequisite(s):* A course in theoretical ecology (e.g., ECL 231 or an equivalent to ESP 121 from your undergraduate institution) or consent of instructor; no programming experience required.

*Learning Activities:* Lecture/Lab 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* PBG 233.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECL 243 – Ecological Genomics (4 units)**

*Course Description:* Genomics concepts, technologies, and analyses for ecology research. Mixture of lecture, discussion of recent literature, hands-on training in data analysis and experimental design, and research proposal preparation and evaluation. One all-day field trip is required.

*Prerequisite(s):* ECL 242; or equivalent training in ecology and genetics according to the discretion of the instructors.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

**ECL 245 – Climate Change, Water & Society (4 units)**

*Course Description:* Integration of climate science and hydrology with policy to understand hydroclimatology and its impact upon natural and human systems. Assignments: readings, take-home examination on climate and hydrologic science, paper that integrates course concepts into a research prospectus or review article.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Cross Listing:* HYD 245, ATM 245.

*Grade Mode:* Letter.

**ECL 262 – Advanced Population Dynamics (3 units)**

*Course Description:* Logical basis for population models, evaluation of simple ecological models, current population models with age, size, and stage structure, theoretical basis for management and exemplary case histories. Emphasis on development and use of realistic population models in ecological research.

*Prerequisite(s):* Graduate standing; advanced course in ecology (e.g., EVE 101), population dynamics (e.g., WFC 122), and one year of calculus; familiarity with matrix algebra and partial differential equations recommended.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* WFC 262.

*Grade Mode:* Letter.

**ECL 271 – Research Conference in Ecology (1 unit)**

*Course Description:* Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* PBG 271.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECL 280 – Current Anthropology Journal Editorial Workshop (4 units)**

*Course Description:* Reading and offering workshop critiques of manuscripts submitted for publication, and reading and discussion of other relevant work in anthropology and human ecology. Track and edit published comments and authors' replies that accompany major features. Participation in the development of new sections for the electronic edition of the journal, including a "news and views" section and a debate section.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Workshop 1 hour(s), Independent Study 3 hour(s).

*Enrollment Restriction(s):* Students must enroll for all three quarters.

*Repeat Credit:* May be repeated 12 unit(s) with consent of instructor.

*Cross Listing:* ANT 280.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECL 290 – Seminar in Ecology (1-4 units)**

*Course Description:* Topics in ecology. Students are expected to present an oral seminar on a particular aspect of the general topic under consideration.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-4 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECL 296 – Topics in Ecology & Evolution (1 unit)**

*Course Description:* Seminars presented by visiting lecturers, UC Davis faculty, and graduate students.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* PBG 292.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECL 297T – Tutoring in Ecology (1-4 units)**

*Course Description:* Teaching ecology including conducting discussion groups for regular departmental courses under direct guidance of staff.

*Prerequisite(s):* Consent of instructor; graduate standing in ecology.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECL 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECL 299 – Research (1-12 units)***Course Description:* Research.*Prerequisite(s):* Consent of instructor; graduate standing.*Learning Activities:* Variable.*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Economics (ECN)**

**College of Letters & Science****ECN 001A – Principles of Microeconomics (4 units)***Course Description:* ECN 001A & ECN 001B may be taken in either order. Analysis of the allocation of resources and the distribution of income through a price system; competition and monopoly; the role of public policy; comparative economic systems.*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL).**ECN 001AV – Principles of Microeconomics (4 units)***Course Description:* Analysis of the allocation of resources and the distribution of income through a price system; competition and monopoly; the role of public policy; comparative economic systems.*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).*Credit Limitation(s):* Not open for credit to students who have taken ECN 001A.*Grade Mode:* Letter.*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL).**ECN 001AY – Principles of Microeconomics (4 units)***Course Description:* Analysis of the allocation of resources and the distribution of income through a price system; competition and monopoly; the role of public policy; comparative economic systems.*Learning Activities:* Web Virtual Lecture 1.5 hour(s), Lecture 1.5 hour(s), Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL).**ECN 001B – Principles of Macroeconomics (4 units)***Course Description:* ECN 001A & ECN 001B may be taken in either order. Analysis of the economy as a whole; determinants of the level of income, employment and prices; money and banking, economic fluctuations, international trade, economic development; the role of public policy.*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL).**ECN 001BV – Principles of Macroeconomics (4 units)***Course Description:* Analysis of the economy as a whole; determinants of the level of income, employment and prices; money and banking, economic fluctuations, international trade, economic development; the role of public policy.*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).*Grade Mode:* Letter.*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL).**ECN 090X – Lower Division Seminar (1-2 units)***Course Description:* Examination of a special topic in Economics through shared readings, discussions, and written assignments.*Prerequisite(s):* Consent of instructor. Lower division standing.*Learning Activities:* Seminar 1-2 hour(s).*Enrollment Restriction(s):* Limited enrollment.*Grade Mode:* Letter.**ECN 092 – Internship & Field Work (1-12 units)***Course Description:* Intensive study of practical application of concepts in economics, stressing research methods and empirical analysis.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Internship 3-36 hour(s), Term Paper.*Grade Mode:* Pass/No Pass only.**ECN 098 – Group Study for Undergraduates (1-5 units)***Course Description:* Primarily for lower division students.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Variable.*Grade Mode:* Pass/No Pass only.**ECN 099 – Individual Study for Undergraduates (1-5 units)***Course Description:* Individual study for undergraduates.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Variable.*Grade Mode:* Pass/No Pass only.**ECN 100A – Intermediate Micro Theory: Consumer & Producer Theory (4 units)***Course Description:* Consumer and producer theory. Equilibrium and welfare analysis. Topics include competitive markets, consumer and producer surplus at an intermediate level.*Prerequisite(s):* (ECN 001A C- or better or ECN 001AY C- or better or ECN 001AV C- or better); (ECN 001B C- or better, or ECN 001BV C- or better); (MAT 016A C- or better or MAT 017A C- or better or MAT 021A C- or better); (MAT 016B C- or better or MAT 017B C- or better or MAT 021B C- or better).*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).*Credit Limitation(s):* Not open for credit to students that have taken ARE 100A or ECN 100.*Grade Mode:* Letter.

## **ECN 100B – Intermediate Micro Theory: Imperfect Competition & Market Failure (4 units)**

*Course Description:* Imperfect competition and market failure. Topics include exchange, monopoly, game theory, uncertainty, asymmetric information, and public goods.

*Prerequisite(s):* ECN 100A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students that have taken ARE 100B.

*Grade Mode:* Letter.

## **ECN 101 – Intermediate Macro Theory (4 units)**

*Course Description:* Theory of income, employment and prices under static and dynamic conditions, and long term growth.

*Prerequisite(s):* (ECN 001A C- or better or ECN 001AV C- or better); (ECN 001B C- or better, or ECN 001BV C- or better); ((MAT 016A C- or better, MAT 016B C- or better) or (MAT 021A C- or better, MAT 021B C- or better) or (MAT 017A C- or better, MAT 017B C- or better)).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 102 – Analysis of Economic Data (4 units)**

*Course Description:* Analysis of economic data to investigate key relationships emphasized in introductory micro and macro economics. Obtaining, transforming, displaying data; statistical analysis of economic data; basic univariate and multivariate regression analysis.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV); (STA 013 or STA 013Y or STA 032); (MAT 016A or MAT 017A or MAT 021A); (MAT 016B or MAT 017B or MAT 021B); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ECN 103 – Economics of Uncertainty & Information (4 units)**

*Course Description:* Optimal decisions under uncertainty, expected utility theory, economics of insurance, asymmetric information, signalling in the job market, incentives and Principal-Agent theory, optimal search strategies and the reservation price principle.

*Prerequisite(s):* (ECN 100 or ECN 100A or (ARE 100A, ARE 100B)), ECN 100B, (MAT 016A or MAT 017A or MAT 021A), (MAT 016B or MAT 017B or MAT 021B).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 106 – Decision Making (4 units)**

*Course Description:* Descriptive and normative analysis of individual decision making, with applications to personal, professional, financial, and public policy decisions. Emphasis on decision making under uncertainty and over time. Heuristics and biases in the psychology of decisions; overcoming decision traps.

*Prerequisite(s):* ((MAT 016A C- or better, MAT 016B C- or better) or (MAT 017A C- or better, MAT 017B C- or better) or (MAT 021A C- or better, MAT 021B C- or better)); (STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 107 – Neuroeconomics/Reinforcement Learning & Decision Making (4 units)**

*Course Description:* Theoretical and empirical approaches to neuroeconomics (neuroscience of decision making) from psychology, neuroscience, economics, and computer science. Neuroscience of judgment and decision making, behavioral economics, and reinforcement learning.

*Prerequisite(s):* (PSC 100 or PSC 100Y or PSC 135 or ARE 100A or ECN 100A or NPB 162 or NPB 163); (STA 013 or STA 013Y or STA 100 or PSC 103A); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* PSC 133, CGS 107.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL).

## **ECN 110A – World Economic History Before the Industrial Revolution (4 units)**

*Course Description:* Development and application of analytical models to explain the nature and functioning of economies before the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Polynesia, and Pre-Columbian America.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 100BV).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ECN 110B – World Economic History Since the Industrial Revolution (4 units)**

*Course Description:* Development and application of analytical models to explain the nature and functioning of economies since the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Germany, and India.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ECN 111A – Economic History (4 units)**

*Course Description:* Survey of economic change in the United States from Colonial times to 1865; reference to other regions in the Western Hemisphere.

*Prerequisite(s):* (ECN 001A or OR ECN 001AY or ECN 001AV); (ECN 001B or ECN 001 BV); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ECN 111B – Economics History (4 units)**

This version has ended; see updated course, below.

*Course Description:* Survey of economic change in the United States from 1865 to the post World War II era.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV) or (ECN 001B or ECN 001BV); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ECN 111B – Economics History (4 units)**

*Course Description:* Survey of economic change in the United States from 1865 to the post World War II era.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

This course version is effective from, and including: Winter Quarter 2024.

## **ECN 115A – Economic Development (4 units)**

*Course Description:* Major issues encountered in emerging from international poverty, including problems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 115A.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ECN 115B – Economic Development (4 units)**

*Course Description:* Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 115B.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ECN 115BY – Economic Development (4 units)**

*Course Description:* Macroeconomic issues of developing countries. Problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Issues of policy concerning international borrowing and external debt of developing countries.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 1.50 hour(s), Web Virtual Lecture 1.50 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Economics, Managerial Economics, and International Relations Majors.

*Cross Listing:* ARE 115BY.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **ECN 116 – Comparative Economic Systems (4 units)**

*Course Description:* Economics analysis of the relative virtues of capitalism and socialism, including welfare economics. Marxian exploitation theory, the socialist calculation debate (Hayek and Lange), alternative capitalist systems (Japan, Germany, U.S.) and contemporary models of market socialism.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 100B or ARE 100B).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* World Cultures (WC).

## **ECN 117 – Economics of International Immigration (4 units)**

*Course Description:* Introduction to research on the economics of immigration. Immigrant demographics and reasons for migrating. Immigrant success and effects on native populations. Influence of immigrants on those left behind. Discussion of migration policy in the US and other countries.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Economics majors only.

*Credit Limitation(s):* Not open for credit to students who have previously completed an upper division economics course in international immigration.

*Grade Mode:* Letter.

## **ECN 121A – Industrial Organization (4 units)**

*Course Description:* Appraisal of the role of competition and monopoly in the American economy; market structure, conduct, and economic performance of a variety of industries.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 100B or ARE 100B).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ECN 121B – Industrial Organization (4 units)**

*Course Description:* Study of antitrust and economic regulation. Emphasis on applying theoretical models to U.S. industries and case studies, including telecommunications, software, and electricity markets. Topics include natural monopoly, optimal and actual regulatory mechanisms, deregulation, mergers, predatory pricing, and monopolization.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 100B or ARE 100B); ECN 102.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* American Cultures, Governance, & History (ACGH).

## **ECN 122 – Theory of Games & Strategic Behavior (4 units)**

*Course Description:* Introduction to game theory. Explanation of the behavior of rational individuals with interacting and often conflicting interests. Non-cooperative and cooperative theory. Applications to economics, political science and other fields.

*Prerequisite(s):* (MAT 016A, MAT 016B) or (MAT 021A, MAT 021B) or (MAT 017A, MAT 017B); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 125 – Energy Economics (4 units)**

*Course Description:* Application of theoretical and empirical models to examine efficiency in energy production and use. Energy and environmental policy, market structure and power, global climate change, optimal regulation, and real-world applications; e.g., California electricity crisis.

*Prerequisite(s):* ECN 100 or ECN 100A or ARE 100A; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Economics Majors, Energy Systems, Transportation Technology & Policy, and Civil & Environmental Engineering Graduate students and Graduate School of Management.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ECN 130 – Public Microeconomics (4 units)**

*Course Description:* Public expenditures; theory and applications.

Efficiency and equity of competitive markets; externalities, public goods, and market failures; positive and normative aspects of public policy for expenditure, including benefit-cost analysis. Topics include consumer protection, pollution, education, poverty and crime.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 100B or ARE 100B).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 131 – Public Finance (4 units)**

*Course Description:* Economic burden of taxation; equity and efficiency considerations in tax design; structure and economic effects of the U.S. tax system (including personal income tax, corporation income tax, and property tax); tax loopholes; recent developments; tax reform proposals.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 100B or ARE 100B).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 132 – Health Economics (4 units)**

*Course Description:* The health care market, emphasizing the role and use of economics. Individual demand, provision of services by doctors and hospitals, health insurance, managed care and competition, the role of government access to health care.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 102 or ECN 140 or ARE 106 or STA 108); ECN 100B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 133Y – Poverty, Inequality & Public Policy (4 units)**

*Course Description:* Examination of the economics of poverty and inequality in the United States, including measurement, trends, and related policies.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV).

*Learning Activities:* Web Virtual Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited to 99; 3 sections of 33 each.

*Grade Mode:* Letter.

**ECN 134 – Financial Economics (4 units)**

*Course Description:* General background and rationale of corporation; finance as resource allocation over time; decision making under uncertainty and the role of information; capital market and interest rate structure; financial decisions.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (STA 013 or STA 013Y); (ECN 100B or ARE 100B).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No credit for students who have completed ARE 171A.

*Grade Mode:* Letter.

**ECN 135 – Money, Banks, & Financial Institutions (4 units)**

*Course Description:* Banks and the banking system. Uncertainty and asymmetric information in the lending process; efficiency of competitive equilibrium in lending markets. Regulation and the conduct of monetary policy.

*Prerequisite(s):* ECN 101; (STA 013 or STA 013Y).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 136 – Topics in Macroeconomic Theory (4 units)**

*Course Description:* Advanced Topics in macroeconomics theory.

Develops the theoretical and empirical analysis of a specific field of macroeconomics. Possible topics include, business cycle theories, growth theory, monetary economics, political economics and theories of unemployment and inflation.

*Prerequisite(s):* ECN 101.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 137 – Macroeconomic Policy (4 units)**

*Course Description:* Theory and practice of macroeconomic policy, both monetary and fiscal.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 100B or ARE 100B); ECN 101; (STA 013 or STA 013Y).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 138 – Public Economics in International Perspective (4 units)**

*Course Description:* Social problems and government responses in developed and developing countries; health, unemployment, informal insurance, poverty, corruption, and public service delivery; emphasis on quantitative and data analysis skills; applications to real world policy problems.

*Prerequisite(s):* (ECN 100A or ECN 100 or ARE 100A); ECN 102.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Economics majors only.

*Credit Limitation(s):* Not open for credit to students who have previously completed an upper division economics course in international public economics.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

## **ECN 140 – Econometrics (4 units)**

*Course Description:* Problems of observation, estimation and hypotheses testing in economics through the study of the theory and application of linear regression models. Critical evaluation of selected examples of empirical research and exercises in applied economics.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 102 or STA 108); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Economics Majors.

*Grade Mode:* Letter.

## **ECN 141 – Economic & Financial Forecasting (4 units)**

*Course Description:* Introduction to economics and financial forecasting tools. Econometrics modeling methods and real-world data applications using the computing language R. Time-series techniques including auto-regression, random walk, and volatility forecasting. Financial econometrics topics including yield curve modeling and asset pricing.

*Prerequisite(s):* (ECN 100 or ECN 100A); ECN 101; (ECN 102 or STA 108); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Economics majors only.

*Grade Mode:* Letter.

## **ECN 142 – Economics & Business Data Analytics (4 units)**

*Course Description:* Introduction to economics and business data analytics. Statistical learning methods to analyze big data in economics and business data analysis. Statistical learning, linear regression, classification, resampling methods, and linear model selection and regularization.

*Prerequisite(s):* (ECN 100 or ECN 100A); (ECN 102 B or better or ECN 140 B or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open Economics majors only.

*Credit Limitation(s):* Not open for credit to students who have previously completed an upper division economics course in economics and business data analytics.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ECN 145 – Transportation Economics (4 units)**

*Course Description:* Examination of fundamental problems of planning and financing transportation "infrastructure" (roads, ports, airports).

Economics of the automobile industry, as well as the impact of government regulation and deregulation in the airlines and trucking industries. Intended for advanced Economics undergraduates.

*Prerequisite(s):* (ECN 100 or ECN 100A or ARE 100A); (ECN 102 or STA 108); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 151A – Economics of the Labor Market (4 units)**

*Course Description:* Theory of labor supply and demand; determination of wages and employment in the labor market. Policy issues: labor force participation by married women; minimum wages and youth unemployment; effect of unions on wages.

*Prerequisite(s):* ECN 100 or ECN 100A or ARE 100A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 151B – Economics of Human Resources (4 units)**

*Course Description:* Human resource analysis; introduction to human capital theory and economics of education; the basic theory of wage differentials, including theories of labor market discrimination; income distribution; poverty. Policy issues; negative income tax; manpower training programs; incomes policy.

*Prerequisite(s):* ECN 100 or ECN 100A or ARE 100A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 152 – Economics of Education (4 units)**

*Course Description:* Application of theoretical and empirical tools of economics to the education sector. Demand for Education; Education Production and Market Structures in Education. Policy applications: class size reduction, school finance equalization, accountability, and school choice.

*Prerequisite(s):* (ECN 100 C- or better or ECN 100A or ARE 100A C- or better); (ECN 100B or ARE 100B C- or better); ECN 102 C- or better; (STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 160A – International Microeconomics (4 units)**

*Course Description:* International grade theory: impact of trade on the domestic and world economies; public policy toward external trade.

*Prerequisite(s):* ECN 100 or ECN 100A or ARE 100A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed to students who have completed ECN 162.

*Grade Mode:* Letter.

## **ECN 160B – International Macroeconomics (4 units)**

*Course Description:* Macroeconomic theory of an open economy. Balance of payments adjustment mechanism, international monetary economics issues; international financial institutions and their policies.

*Prerequisite(s):* ECN 101.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed to students who have completed ECN 162.

*Grade Mode:* Letter.

## **ECN 162 – International Economic Relations (4 units)**

*Course Description:* International trade & monetary relations, trade policy, exchange rate policy, policies toward international capital migration and investment. Emphasis on current policy issues. Intended especially for non-majors.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECN 160A or ECN 160B.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

**ECN 164 – International Finance (4 units)**

*Course Description:* Advanced international finance. Decision-making processes of large firms, institutional investors and sovereign governments, and their interactions in global financial markets. Pricing of currencies, equities and bonds as well as intermediation and regulation of asset markets. Solving theoretical models, analyzing financial data, and presenting real-life case studies.

*Prerequisite(s):* (ECN 100A or ECN 100 or ARE 100A); ECN 101.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Economics majors only.

*Credit Limitation(s):* Not open for credit to students who have previously completed an advanced upper division economics course in economic international finance.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ECN 167 – Economic Development in Weak States (4 units)**

*Course Description:* Barriers to economic development in developing countries. Economic and policy tools to address barriers within a functioning, well-intentioned government and non-functioning or ill-intentioned governments. Conflict between the state and other subnational actors for legitimate political control. Field experiments and other methodology to understand the success of economic and policy tools in weak states.

*Prerequisite(s):* ECN 100A; ECN 100B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Economics majors only.

*Credit Limitation(s):* Not open for credit to students who have previously completed an upper division economics course in economic development in weak states.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ECN 171 – Economy of East Asia (4 units)**

*Course Description:* Intensive reading, discussion and research on selected topics from the economies of the countries of East Asia. Consult department for course scheduling.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (ECN 001B or ECN 001BV); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 190 – Topics in Economics (4 units)**

*Course Description:* Selected topics in economic analysis and public policy. Variable content.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ECN 190X – Upper Division Seminar (1-4 units)**

*Course Description:* In-depth examination at an upper division level of a special topic in Economics. Emphasis on focused analytical work. May not be repeated for credit.

*Prerequisite(s):* (ECN 100 or ECN 100A); ECN 100B; ECN 101; and consent of instructor.

*Learning Activities:* Seminar 1-4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**ECN 192 – Internship (1-6 units)**

*Course Description:* Internship experience off and on campus in all subject areas offered in the Department of Economics. Supervised by a member of the staff.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-18 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ECN 194HA – Special Study for Honors Students (4 units)**

*Course Description:* A program of research culminating in the writing of a senior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* Major in Economics with senior standing; consent of instructor and completion of 135 units with a minimum GPA of 3.500 in courses counted toward the major.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

**ECN 194HB – Special Study for Honors Students (4 units)**

*Course Description:* A program of research culminating in the writing of a senior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* Major in Economics with senior standing; consent of instructor and completion of 135 units with a minimum GPA of 3.500 in courses counted toward the major.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

**ECN 197T – Tutoring in Economics (1-5 units)**

*Course Description:* Undergraduates assist the instructor by tutoring students in one of the department's regularly scheduled courses.

*Prerequisite(s):* Consent of instructor and chairperson.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

**ECN 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ECN 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ECN 200A – Microeconomic Theory (4 units)**

*Course Description:* Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 200A.

*Grade Mode:* Letter.

**ECN 200B – Microeconomic Theory (4 units)**

*Course Description:* Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure.

*Prerequisite(s):* ECN 200A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 200B.

*Grade Mode:* Letter.

**ECN 200C – Microeconomic Theory (4 units)**

*Course Description:* Uncertainty and information economics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on applications to markets with firms that are imperfect competitors or consumers that are imperfectly informed.

*Prerequisite(s):* ECN 200B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 200C.

*Grade Mode:* Letter.

**ECN 200D – Macroeconomic Theory (4 units)**

*Course Description:* Macro static theory of income, employment, and prices.

*Prerequisite(s):* ECN 101; MAT 021A; MAT 021B; MAT 021C; or equivalent courses.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 200E – Macroeconomic Theory (4 units)**

*Course Description:* Macrodynamic theory of income, employment, and prices.

*Prerequisite(s):* ECN 200B (can be concurrent); ECN 200D.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 200F – Macroeconomic Theory (4 units)**

*Course Description:* Interaction between financial markets' frictions and macroeconomic fluctuations. Leverage and the financial accelerator, fire sales, credit booms and busts, liquidity, the role of intermediaries and the risk of bank runs, speculative bubbles, and incomplete markets and precautionary savings.

*Prerequisite(s):* ECN 200A; ECN 200B; ECN 200C { can be concurrent }; ECN 200D; ECN 200E.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 201A – History of Economic Thought (4 units)**

*Course Description:* Economic thought from the classical Greece era to modern times.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 201B – History of Economic Thought II (4 units)**

*Course Description:* Origins and emergence of modern economic analysis.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 203A – Advanced Economic Theory (4 units)**

*Course Description:* Advanced topics in general equilibrium theory and welfare economics: existence, determinateness and efficiency; intertemporal economies; uncertainty.

*Prerequisite(s):* ECN 200A; ECN 200B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 203B – Advanced Economic Theory: Game Theory (4 units)**

*Course Description:* Covers the most recent developments in game theory, with the focus changing from year to year. Main topics are: refinements Nash equilibrium, repeated games, evolution, social situations, bounded rationality, and bargaining theory.

*Prerequisite(s):* ECN 200A; ECN 200B; ECN 200C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 203C – Topics in Economic Theory (4 units)**

*Course Description:* Selected topics in contemporary microeconomic theory.

*Prerequisite(s):* ECN 200A; ECN 200B; ECN 200C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated with the consent of the Graduate Studies Committee.

*Grade Mode:* Letter.

**ECN 210A – Economic History (4 units)**

*Course Description:* Economic history of the eastern hemisphere in the modern period. Medieval Europe or other regions may be studied, depending on student interest.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**ECN 210B – Economic History (4 units)**

*Course Description:* The United States from Colonial times to the present. Other areas of the western hemisphere may be studied, according to student interest.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**ECN 210C – Economic History (4 units)**

*Course Description:* Selected topics and issues, emphasis on current research. (Quarter offered to be flexible.)

*Prerequisite(s):* A graduate course in economic history.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**ECN 214 – Development Economics (4 units)**

*Course Description:* Review of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts.

*Prerequisite(s):* ARE 100A; ARE 100B; ECN 101; ARE 204/ECN 204 and ECN 160A-ECN 160B recommended.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* ARE 214.

*Grade Mode:* Letter.

## **ECN 215A – Microdevelopment Theory & Methods I (4 units)**

*Course Description:* Agricultural development theory, with a focus on microeconomics. Agricultural household behavior with and without market imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts.

*Prerequisite(s):* ECN 200A or ECN 204; ECN 240A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 215A.

*Grade Mode:* Letter.

## **ECN 215B – Open Macroeconomics of Development (4 units)**

*Course Description:* Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt are discussed in the macroeconomic framework of an open developing country. Basic analytical focus is real exchange rate and its impact on sectoral allocation of resources.

*Prerequisite(s):* (ARE 200A or ECN 200A); (ARE 204 or ECN 204); (ECN 214 or ECN 215A); ECN 200D or ECN 205.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 215B.

*Grade Mode:* Letter.

## **ECN 215C – Microdevelopment Theory & Methods II (4 units)**

*Course Description:* Extension of development theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multisectoral, including village and regional models. Computable general equilibrium methods and applications.

*Prerequisite(s):* ECN 215A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 215C.

*Grade Mode:* Letter.

## **ECN 215D – Environmental & Economic Development (4 units)**

*Course Description:* Interdisciplinary course drawing on theoretical and empirical research on interactions between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and development economics.

*Prerequisite(s):* ECN 200A; (ECN 204 or ARE 275).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 215D.

*Grade Mode:* Letter.

## **ECN 216 – Energy & Climate Policy (4 units)**

*Course Description:* Fundamentals of energy technology, economics, and policy. Survey and analysis of current and prospective climate policies at the local and global level, including but not limited to cap-and-trade, emissions offsets, intensity standards, technology standards, mandates and subsidies.

*Prerequisite(s):* ECN 100A or ARE 100A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion.

*Enrollment Restriction(s):* Pass One restricted to graduate students in the following programs: Economics, Energy Graduate Group, and Transportation Technology and Policy Graduate Group.

*Cross Listing:* EGG 202.

*Grade Mode:* Letter.

## **ECN 221A – The Theory of Industrial Organization (4 units)**

*Course Description:* Game theory is used to analyze strategic interaction of firms in industries. Topics include models of competition, product differentiation, entry-deterring strategies, contractual arrangements, vertical control and antitrust issues.

*Prerequisite(s):* ECN 200A; ECN 200B; ECN 200C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 221B – Empirical Analysis in Industrial Organization (4 units)**

*Course Description:* Recent empirical work in industrial organization. Topics include empirical analysis of cartels, product differentiation, innovation and technological change, and imperfect competition in international markets.

*Prerequisite(s):* ECN 221A; ECN 240B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 221C – Industrial Organization & Regulation (4 units)**

*Course Description:* Optimal regulation of natural monopoly. Topics include regulatory mechanisms for single and multiple output firms under symmetric and asymmetric information, optimality without regulation, the economic theory of regulation, and empirical studies of regulation and deregulation.

*Prerequisite(s):* ECN 221A; ECN 240B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 230A – Public Economics (4 units)**

*Course Description:* Measures of deadweight loss and consumer surplus; optimal commodity and income taxation; tax incidence; policy issues in personal taxation, corporate taxation, and social insurance; the evaluation of effective tax rates.

*Prerequisite(s):* ECN 200C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 230B – Public Economics (4 units)**

*Course Description:* Effects of government policies on economic behavior; labor supply, program participation, investment, consumption and savings.

*Prerequisite(s):* ECN 240A; ECN 240B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 230C – Public Economics (4 units)**

*Course Description:* Advanced topics in economics of the public sector, with emphasis on current research. Topics differ from year to year.

*Prerequisite(s):* ECN 200C; ECN 240B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 233 – Poverty & Public Policy (4 units)**

*Course Description:* Interdisciplinary course covering qualitative and quantitative U.S. based poverty research. Topics include measurement, statistics, theories and evidence on the causes and consequences of poverty, and the history and efficacy of major anti-poverty programs.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**ECN 235A – Macroeconomics (4 units)**

*Course Description:* Frontiers of applied/empirical macroeconomics. Evidence and lessons from macroeconomic history for The Great Depression, financial crises, efficient markets, parity conditions, capital flows, default, financial crises, exchange rates, growth, and other current empirical research topics.

*Prerequisite(s):* ECN 200D; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 235B – Macroeconomics (4 units)**

*Course Description:* Search theory, theory of real-world markets characterized by search frictions, with applications: Labor economics: models of unemployment and wages differentials; Financial economics: determination of asset prices in OTC financial markets; Monetary Economics: foundations for money as a medium of exchange.

*Prerequisite(s):* ECN 200D; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 235C – Macroeconomics (4 units)**

*Course Description:* Basic numerical methods for analytically intractable problems in economics. Techniques presented applicable in a wide range of fields including macroeconomics, econometrics, resource economics, labor economics, economic theory, international trade, finance, game theory, public finance, contract theory, and others.

*Prerequisite(s):* ECN 200D; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ECN 235D – Macroeconomics (4 units)**

*Course Description:* Selected topics in Macroeconomics.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated with consent of Economics Graduate Studies Committee.

*Grade Mode:* Letter.

**ECN 239 – Econometric Foundations (4 units)**

*Course Description:* Prepares students for econometric theory and empirical work by examining the statistical foundation of econometrics. Special attention is paid to problems specific to non-experimental data common to social sciences. Topics from matrix algebra are also covered.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 239.

*Grade Mode:* Letter.

**ECN 240A – Econometric Methods (4 units)**

*Course Description:* Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedasticity; autocorrelation; lagged dependent variables.

*Prerequisite(s):* ECN 239; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 240A.

*Grade Mode:* Letter.

**ECN 240B – Econometric Methods (4 units)**

*Course Description:* Topics include asymptotic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, errorcorrection models, and qualitative and limited dependent variable models.

*Prerequisite(s):* ECN 240A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 240B.

*Grade Mode:* Letter.

**ECN 240C – Time Series Econometrics (4 units)**

*Course Description:* Probability theory; estimation, inference and forecasting of time series models; trends and non-standard asymptotic theory; vector time series methods and cointegration; time series models for higher order moments and transition data; state-space modeling and the Kalman filter.

*Prerequisite(s):* ECN 240B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 240C.

*Grade Mode:* Letter.

**ECN 240D – Cross Section Econometrics (4 units)**

*Course Description:* Estimation and inference for nonlinear regression models for cross-section data; models for discrete data and for limited dependent variables; models for panel data; additional topics such as bootstrap and semiparametric regression.

*Prerequisite(s):* ECN 240B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 240D.

*Grade Mode:* Letter.

**ECN 240E – Topics in Time Series Econometrics (4 units)**

*Course Description:* Modern econometric techniques for time series data. Expand on topics covered in ECN 240A, ECN 240B, ECN 240C. Content may differ year to year.

*Prerequisite(s):* ECN 240C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 240E.

*Grade Mode:* Letter.

## **ECN 240F – Topics in Cross Section Econometrics (4 units)**

*Course Description:* Modern econometrics techniques for cross-section data. Expand on topics covered in ECN 240A, ECN 240B, ECN 240D. Content may differ year to year.

*Prerequisite(s):* ECN 240D; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ARE 240F.

*Grade Mode:* Letter.

## **ECN 250A – Labor Economics (4 units)**

*Course Description:* Philosophy, theory and history of American and foreign labor movements; union structure, organization and collective bargaining under changing labor market conditions; current labor market issues.

*Prerequisite(s):* (ECN 150A and ECN 150B) or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 250B – Labor Economics (4 units)**

*Course Description:* Microeconomic theory of labor supply and labor demand, estimation of labor supply and demand functions; human capital theory; labor market analysis.

*Prerequisite(s):* ECN 151A; or consent of instructor; ECN 204 or ECN 200A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 260A – International Economics (4 units)**

*Course Description:* Theory of trade determinants; gains from trade; tariffs and effective protection; economic unions.

*Prerequisite(s):* ECN 200A or ECN 204.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 260B – International Economics (4 units)**

*Course Description:* Balance of payments adjustment mechanisms; foreign exchange markets theories of balance of payments policy and international monetary mechanisms.

*Prerequisite(s):* ECN 200D; ECN 200E.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 260CN – International Investment & Trade (4 units)**

*Course Description:* Analysis of foreign investment and its links to trade; theories of the firm as they relate to firm's export and investment decisions; and an introduction to the political economy of trade policies.

*Prerequisite(s):* ECN 260A.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **ECN 260D – Topics in International Macroeconomics (4 units)**

*Course Description:* Survey of current literature in international macroeconomic theory.

*Prerequisite(s):* ECN 260B; or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **ECN 260E – Topics in International Trade (4 units)**

*Course Description:* Current literature in international trade theory.

*Prerequisite(s):* ECN 260A; ECN 260B.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **ECN 260F – International Macroeconomic Policy (4 units)**

*Course Description:* Theory and practice of international macroeconomic policy. Topics include exchange rate regimes, international financial institutions, crises and current topics.

*Prerequisite(s):* ECN 260B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 270A – Economics of Growth (4 units)**

*Course Description:* Modern theories and empirics of economic growth beginning with the neoclassical theories up to current endogenous growth models. Emphasis on the analysis of human capital and growth, technological innovation, its diffusion and empirical evidence on growth.

*Prerequisite(s):* ECN 200D; ECN 200E.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 270B – Economics of Growth (4 units)**

*Course Description:* Empirical analysis of growth patterns and growth models. Emphasis on the relationship between macroeconomic management and long-term growth; the use of foreign capital in accelerating growth and its occasional mishaps; the comparison of growth performance in East Asia and Latin America since WW2; the experiences of centrally-planned economies and transitions to market-based growth; and the transformation from an industrial economy to a knowledge economy.

*Prerequisite(s):* ECN 200D; ECN 200E.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 270C – Economics of Growth (4 units)**

*Course Description:* Institutional bases; politics; contracts and commitment; money and finance; malthusian dynamics; modern economic growth; transition of industrialization; dual economies, core and periphery; sources of convergence and divergence; openness and growth; resources, demography, and geography; institutions, imperialism, and class conflicts.

*Prerequisite(s):* ECN 200D; ECN 200E.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ECN 280 – Orientation to Economic Research (2 units)**

*Course Description:* Bridge the gap between students' classwork and their subsequent research. Topics such as the origination of a research project, some mechanics of empirical research and hints on the submission of research papers.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECN 290 – Topics in Economics (4 units)**

*Course Description:* Selected topics in economic analysis and public policy, focusing on current research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ECN 291 – Contemporary Economics Seminar (2 units)**

*Course Description:* Seminar series on topics of current interest.

*Prerequisite(s):* Graduate standing in Economics.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECN 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Discussion 1-5 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECN 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECN 299D – Dissertation Research (1-12 units)**

*Course Description:* Dissertation research.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ECN 397 – Teaching of Economics (2 units)**

*Course Description:* Teaching of economics: methods of instruction, organization of courses, examination and evaluation procedures.

*Prerequisite(s):* Graduate standing in economics.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Education (EDU)

**School of Education****EDU 065A – Foundations for University Success: Introduction to the University System (2 units)**

*Course Description:* Introduction to resources supporting first year student academic success and transition to a tier one research university.

*Prerequisite(s):* Consent of instructor; student must be a part of an approved Foundations for University Success program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork.

*Grade Mode:* Pass/No Pass only.

**EDU 065B – Foundations for University Success: Introduction to Research at a Tier 1 University (2 units)**

*Course Description:* Development of important skills necessary for research including critical thinking, study skills, writing skills, and presentation skills.

*Prerequisite(s):* Consent of instructor; student must be a part of an approved Foundations for University Success program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork.

*Grade Mode:* Pass/No Pass only.

*General Education:* Oral Skills (OL).

**EDU 065C – Foundations for University Success: Internships, Graduate School & Careers (2 units)**

*Course Description:* Resources to explore academic and career connections and opportunities including internships, volunteer opportunities, graduate schools and careers.

*Prerequisite(s):* Consent of instructor; student must be a part of an approved Foundations for University Success program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork.

*Grade Mode:* Pass/No Pass only.

**EDU 081 – Learning in Science & Mathematics (2 units)**

*Course Description:* Exploration of how students learn and develop understanding in science and mathematics classrooms. Introduction to case studies and interview techniques and their use in K-6 classrooms to illuminate factors that affect student learning.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 2 hour(s).

*Enrollment Restriction(s):* Limited to 26 students per section.

*Cross Listing:* GEL 081.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS); Visual Literacy (VL); Writing Experience (WE).

**EDU 092 – Internship (1-3 units)**

*Course Description:* Internship as a teacher's aide or tutor in K-12 classrooms under the supervision of a faculty member.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-9 hour(s).

*Enrollment Restriction(s):* Enrollment dependent on availability of intern placements.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**EDU 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**EDU 100 – Introduction to Schools (4 units)**

*Course Description:* Study of occupational concerns of teachers; skills for observing classroom activities; school organization and finance; school reform movement; observing, aiding, and tutoring in schools.

*Learning Activities:* Lecture 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL).

**EDU 110 – Educational Psychology: General (4 units)**

*Course Description:* Learning processes, cognitive development, individual differences, testing and evaluation.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**EDU 114 – Quantitative Methods in Educational Research (4 units)**

*Course Description:* Problems and methods in data analysis. Design of research projects. Some consideration of procedures suited to digital computers.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

**EDU 115 – Educating Children with Disabilities (2 units)**

*Course Description:* Educational issues and processes involved in teaching children with disabilities. Focuses on the structure of special education, with an emphasis on meeting the educational needs of children who are mainstreamed in regular classes.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**EDU 119 – Use & Misuse of Standardized Tests (4 units)**

*Course Description:* Principles underlying educational and psychological testing. Purposes of testing for individual achievement and evaluation of school programs. Interpretation and misinterpretations of outcomes.

Analysis of SAT, GRE and other common tests. Experience in test administration and outcome interpretation.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

**EDU 120 – Philosophical & Social Foundations of Education (4 units)**

*Course Description:* Philosophical, historical, and sociological study of education and the school in our society.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**EDU 121 – Introduction to Education Policy Analysis: Tools, Methods & Frameworks (4 units)**

*Course Description:* Introduces students to the field of education policy analysis with a specific emphasis on the quantitative frameworks and analytical tools, drawn primarily from economics and statistics, that are used to guide and inform educational policymaking.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

**EDU 122 – Children, Learning & Material Culture (4 units)**

*Course Description:* How material artifacts shape what and how children learn in school, at home, and in the community. Artifacts examined include books, computers, household appliances, toys and games, entertainment media, collectibles, sports equipment, clothing, folk arts and crafts, and neighborhood space.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion 1 hour(s), Fieldwork.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL); Writing Experience (WE).

**EDU 130 – Issues in Higher Education (4 units)**

*Course Description:* Analysis of current issues in higher education and of some practical implications of varying philosophical approaches to the role of the university.

*Learning Activities:* Discussion 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**EDU 142 – Introduction to Environmental Education (4 units)**

*Course Description:* Study of history, philosophy, principles and approaches to environmental education (EE) and outreach; learning theories, teaching strategies and techniques in EE and outreach; evaluation of EE curricula in non-formal and in-school contexts; observing, aiding and facilitating local environmental education programs.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL).

**EDU 147 – Anglos, Latinos, & Spanish Black Legend: Anti-Hispanic Prejudice Origins & Educational Implications (4 units)**

*Course Description:* Examination of anti-Hispanic prejudice in the United States focusing on the "Black Legend," a 16th-century, anti-Spanish myth underpinning the doctrine of "Manifest Destiny." Exploration of the Legend's presence in contemporary American society through interviews and analysis of school textbooks.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork, Term Paper.

*Cross Listing:* SPA 147.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**EDU 150 – Cultural Diversity & Education in a Sociopolitical Context (4 units)**

*Course Description:* Introduction to cultural diversity and education in a sociopolitical context. Interactive course. Small and large-group discussions explore, extend, and apply readings; range of writing genres for responses to assignments and course themes; lectures, slide shows, speakers, brief fieldwork, and presentations.

*Learning Activities:* Lecture/Discussion 4 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

## **EDU 151 – History & Approaches to Multilingualism in K-12 Contexts (3 units)**

*Course Description:* First and second language acquisition processes for emergent bilinguals/dual language learners with an emphasis on sociocultural contexts and equity. The history and politics of bilingual education, benefits of bilingualism, role of family and community, assessments, language varieties and dialectical differences, translanguaging, and strategies for scaffolding instruction. Current research on bilingualism and pedagogical programs and trends will be addressed.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Acceptance in Teacher Credential Program.

*Grade Mode:* Letter.

## **EDU 152 – Academic Spanish for Bilingual Teachers (3 units)**

*Course Description:* Communicative class taught in Spanish focused on the development of Spanish communication skills for current and/or future bilingual teachers. Main topics are related to school content areas in bilingual settings, with an emphasis on standard and Southwest Spanish dialects.

*Prerequisite(s):* Acceptance in Teaching Credential Program or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork, Recitation 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

## **EDU 153 – Diversity in the K-12 Classroom (2 units)**

*Course Description:* Analysis of research on learning styles among culturally diverse students with review and evaluation of responsive curricula and classroom teaching techniques. The ethnographic interview as a research tool.

*Prerequisite(s):* Acceptance in Teaching Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **EDU 154 – Languaging in Chicanx & Latinx Communities & Schools (4 units)**

*Course Description:* Interdisciplinary research on the diverse communicative practices of individuals from Chicanx/Latinx communities in the U.S. Critiques deficit orientation of early social science research and introduces scholarship providing contextualized and nuanced findings about the linguistic practices that Chicanxs and Latinxs use to communicate across a range of learning settings in and out of schools.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Domestic Diversity (DD).

## **EDU 155 – Ethnic Studies in K-12 Schools (4 units)**

*Course Description:* Brief historical genealogy of Ethnic Studies as an interdisciplinary field, content and pedagogical knowledge of Ethnic Studies approaches in K-12 school settings and grassroots communities, and reviews the existing research of Ethnic Studies literacies in US public schools.

*Learning Activities:* Lecture 4 hour(s),

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **EDU 160A – Introduction to Peer Counseling (2 units)**

*Course Description:* Introduction to peer counseling techniques and development of peer counseling skills.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Pass/No Pass only.

## **EDU 160B – Issues in Peer Counseling (2 units)**

*Course Description:* In-depth review and development of skills for specific counseling topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

## **EDU 163 – Guidance & Counseling (4 units)**

*Course Description:* Nature and scope of pupil personnel services; basic tools and techniques of guidance; theory and practice of counseling psychology, with emphasis on educational and vocational adjustment.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EDU 173 – Language Development (4 units)**

*Course Description:* Theory and research on children's acquisition of their native language, including the sound system, grammatical systems, and basic semantic categories.

*Prerequisite(s):* LIN 001 or LIN 001Y; or consent of instructor. LIN 103A, LIN 103B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* LIN 173.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **EDU 180A – Computers in Education (1 unit)**

*Course Description:* Applications of computers in education as instructional, intellectual, and communication tools.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 2 hour(s), Project 3 hour(s).

*Enrollment Restriction(s):* Restricted to Teaching Credential Majors.

*Grade Mode:* Letter.

## **EDU 180B – Computers in Education (1 unit)**

*Course Description:* Applications of computers in education as instructional, intellectual, and communication tools.

*Prerequisite(s):* EDU 180A; acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 2 hour(s), Project 3 hour(s).

*Enrollment Restriction(s):* Restricted to Teaching Credential Majors.

*Grade Mode:* Letter.

## **EDU 180C – Computers in Education (1 unit)**

*Course Description:* Applications of computers in education as instructional, intellectual, and communication tools.

*Prerequisite(s):* EDU 180B; acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 2 hour(s), Project 3 hour(s).

*Enrollment Restriction(s):* Restricted to Teaching Credential Majors.

*Grade Mode:* Letter.

**EDU 181 – Teaching in Science & Mathematics (2 units)**

*Course Description:* Exploration of effective teaching practices based on examination of how middle school students learn math and science. Selected readings, discussion and field experience in middle school classrooms.

*Prerequisite(s):* Consent of instructor; major in mathematics, science, or engineering; or completion of a one-year sequence of science or calculus.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 2 hour(s).

*Enrollment Restriction(s):* Limited to 40 students per section.

*Cross Listing:* GEL 181.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**EDU 182 – Computer Project for Curricular Integration (1 unit)**

*Course Description:* Design and implementation of a curricular unit to integrate computer technology into a K-12 classroom setting. A project-based seminar intended for students with substantial prior experience with instructional use of computers and related technologies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed EDU 180 or EDU 181.

*Grade Mode:* Letter.

**EDU 183 – Teaching High School Mathematics & Science (3 units)**

*Course Description:* Exploration and creation of effective teaching practices based on examination of how high school students learn mathematics and science. Field experience in high school classrooms.

*Prerequisite(s):* Major in mathematics, science, or engineering; or completion of a one-year sequence of science or calculus and consent of the instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork.

*Enrollment Restriction(s):* Limited to 40 students per section.

*Cross Listing:* GEL 183.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

**EDU 185 – Learning in a Digital Age: Information, Schooling, & Society (4 units)**

*Course Description:* Focus on the changing nature of learning in a digital age: social media, ubiquitous connectivity, online education, electronic communication, writing, gaming, and youth culture. Readings drawn from major recent works detailing fundamental shifts in information, schooling, and society.

*Learning Activities:* Lecture/Discussion 2 hour(s), Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL).

**EDU 192 – Internship (1-3 units)**

*Course Description:* Internship as a tutor, teacher's aide, or peer counselor in a school or educational counseling setting under the supervision of a faculty member. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 2-8 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**EDU 197T – Tutoring in Education (1-2 units)**

*Course Description:* Leading of small voluntary discussion groups affiliated with the School's upper division courses under the supervision of, and at the option of, the course instructor, who will submit a written evaluation of the student's work.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 1-2 hour(s).

*Repeat Credit:* May be repeated 1 time(s) up to 4 units.

*Grade Mode:* Pass/No Pass only.

**EDU 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**EDU 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**EDU 200 – Educational Research (4 units)**

*Course Description:* Defining educational research questions, reviewing relevant literature, developing research designs, developing research instruments, selecting appropriate data analysis procedures, and writing research projects. A case problem will provide practice in designing and reporting research.

*Prerequisite(s):* Introductory statistics or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

**EDU 201 – Qualitative Research in Education (4 units)**

*Course Description:* Examines the design and conduct of educational research using non-numerical data (e.g., text, discourse, imagery and artifacts). Focuses on issues (e.g., validity, reliability, generalizability, ethics) and reporting genres (e.g., narrative accounts, case studies, and arguments).

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Lecture 2 hour(s).

*Grade Mode:* Letter.

**EDU 202N – Computer Analysis of Qualitative Data (4 units)**

*Course Description:* Critical and practical understanding of how to use computer software programs to analyze qualitative data (text, images, and videotape) in conducting social research.

*Learning Activities:* Seminar 3 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

**EDU 203 – Educational Testing & Evaluation (4 units)**

*Course Description:* Introduces the theoretical assumptions underlying traditional test construction, as well as the basic statistical principles involved in the design, evaluation, and interpretation of standardized tests. Introduces the debates surrounding the uses of different kinds of tests and evaluation tools.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EDU 204A – Quantitative Methods in Educational Research: Analysis of Correlational Designs (4 units)**

*Course Description:* Methods for analysis of correlational data in educational research. Topics include multiple correlation and regression, discriminant analysis, logistic regression, and canonical correlation. Emphasis on conceptual understanding of the techniques and use of statistical software.

*Prerequisite(s):* Introductory statistics or consent of instructor.

*Learning Activities:* Discussion 2 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

## **EDU 204B – Quantitative Methods in Educational Research: Experimental Designs (4 units)**

*Course Description:* Methods for analysis of experimental data in educational research. Topics include ANOVA, fixed v. random effects models, repeated measures ANOVA, analysis of co-variance, MANOVA, chi square tests, small sample solutions to t and ANOVA.

*Prerequisite(s):* Introductory statistics or consent of instructor.

*Learning Activities:* Discussion 2 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

## **EDU 205A – Ethnographic Research in Schools I: Current Theory & Practice (4 units)**

*Course Description:* Current literature from anthropology and society related to schools. Emphasis on the organizational structure of institutions, and the analysis of face-to-face interaction. Explore the relationship between field-based research and theory development on the acquisition of knowledge in specific social and cultural contexts.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EDU 205B – Ethnographic Research in Schools II: Field-Based Research Projects (4 units)**

*Course Description:* Research projects in specific schools with cooperative critical analysis of the design, data collection, and inferencing by researchers. Continue to meet with instructors as a group throughout the quarter to discuss specific projects.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EDU 206A – Inquiry into Classroom Practice: Traditions & Approaches (2 units)**

*Course Description:* Introduction to traditions and approaches of teachers conducting research in their own classrooms: purposes, focal areas, methods of data collection and analysis, and written genre conventions.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork.

*Grade Mode:* Letter.

## **EDU 206B – Inquiry into Classroom Practice: Application of Teacher Research Approaches (4 units)**

*Course Description:* Analysis and application of teacher research through the development, implementation and evaluation of a short-term classroom research-based intervention. Particular attention to research that enhances learning of English language learners and under-performing students.

*Prerequisite(s):* EDU 206A; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate Teaching Credential students.

*Grade Mode:* Letter.

## **EDU 206C – Inquiry into Classroom Practice: Study Design (4 units)**

*Course Description:* Proposal development for classroom-based inquiry designed to address student learning needs. Mixed methods research design and preliminary data collection approaches. Design and application of baseline student assessment for proposal development. Literature review. Data collection in K-12 classrooms required.

*Prerequisite(s):* EDU 206B; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Fieldwork 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate MA Credential students.

*Grade Mode:* Letter.

## **EDU 206D – Inquiry into Classroom Practice: Data Analysis & Research Reporting (4 units)**

*Course Description:* Support of the inquiry in EDU 206C through continuous collaborative critique and feedback resulting in the writing and presentation of a research study.

*Prerequisite(s):* EDU 206C; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Fieldwork 1 hour(s), Extensive Writing/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate MA Credential students.

*Grade Mode:* Letter.

## **EDU 207 – Concepts of the Curriculum (4 units)**

*Course Description:* Development of the skills of philosophical analysis and argument for the establishment of a point of view, in the consideration of curriculum theory and practice. Classical and contemporary approaches to subject matter and activity emphases, hidden curriculum, and moral education.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

## **EDU 208 – Presenting Educational Research in Written Reports (4 units)**

*Course Description:* Rhetorical and substantive challenges of presenting educational research through written reports; research rhetoric and genres; competing discourse conventions of educational research, policy, and practice; the social organization of publishing educational research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

## **EDU 209 – Image-Based Field Research (4 units)**

*Course Description:* Critical and practical understanding of video tape and still photography as resources for enhancing field research in schools and other social setting.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 2 hour(s).

*Grade Mode:* Letter.

## **EDU 210 – Psychological Perspectives on School Learning (4 units)**

*Course Description:* Study of human learning theory and research related to learning of academic content. Review of contemporary issues of constructivism, problem solving, expertise, conceptual change, transfer, and metacognition.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **EDU 211 – Sociocultural & Situative Perspectives on Learning & Cognition (4 units)**

*Course Description:* Sociocultural and situative theories of cognition and learning. Major ideas of L.S. Vygotsky, followed by modern perspectives: situated cognition, cognitive apprenticeship, situated learning, communities of practice, cultural-historical activity theory, and distributed cognition. Implications of each theoretical perspective for educational practice.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **EDU 213 – Individual Assessment (4 units)**

*Course Description:* Theories of intellectual functioning and the measurement of cognitive abilities in school-aged children. Supervised practice in administration and scoring of contemporary tests for children including the WISC-R, the WAIS-R, the Stanford Binet, the McCarthy Scales of Children's Ability.

*Prerequisite(s):* Introductory statistics or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EDU 215 – Research on Achievement Motivation in Education (4 units)**

*Course Description:* Analysis and critique of recent research on cognitive processes related to achievement motivation in school settings. Topics include self-determination theory, attribution theory, goal theory, intrinsic and extrinsic motivation, learned helplessness, psychological reactance, gender and culture, and research design.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 220 – Concepts & Methods of Policy Analysis (4 units)**

*Course Description:* Introduction to concepts and methods of policy analysis. Emphasis on the relationship between educational issues and problems; policy development; constructing persuasive policy analyses; issues related to policy process.

*Learning Activities:* Seminar 3 hour(s), Fieldwork, Term Paper.

*Grade Mode:* Letter.

## **EDU 221 – Culture & Social Organization of Schools (4 units)**

*Course Description:* Culture and social organization of schools. Examines perspectives of social researchers, educational policy-makers, and school members and their implications for educational research, policy and practice.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 222 – School Change & Educational Reform (4 units)**

*Course Description:* Analysis of models, processes, and case studies of school change and educational reform with respect to variable characteristics of schools and schooling, planned and unplanned change, the moral evaluation of school change, and the role of educational research.

*Learning Activities:* Lecture/Discussion 2 hour(s), Seminar 2 hour(s).

*Grade Mode:* Letter.

## **EDU 223 – Education & Social Policy (4 units)**

*Course Description:* Focuses on understanding the social and political context of education in the U.S. and California and how education policy is formed in the broader public arena. Develops skills in educational policy analysis. (Former EDU 237.)

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 225 – Education Policy & Law (4 units)**

*Course Description:* Examination of law as an instrument of social policy. Specific focus on the legalization of education decision making, its causes, dimensions, and effects on administrative and teacher authority.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EDU 226 – Culture & Social Organization of Higher Education (4 units)**

*Course Description:* Critical study of culture and social organization of higher education institutions policies and functions in the U.S., with some attention to other countries.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

## **EDU 228 – Politics & Governance of Education (4 units)**

*Course Description:* Examination of political power, representation, influence, decision-making and inter-governmental relations in the public schools.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 229 – Education Finance Policy (4 units)**

*Course Description:* Examination of (1) United States financing public education, (2) the relationship between school finance and education policy, and (3) the relationship between education finance and education practice.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 230 – Special Topics in Education Policy (4 units)**

*Course Description:* Selected topics in education policy. Designed to facilitate preparation for the qualifying examination or dissertation.

Critically analyze scholarly work including their own works in progress.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EDU 235 – Critical Pedagogy (4 units)**

*Course Description:* A socio-cultural critique, from an interdisciplinary perspective, of educational reform and change. The critique will include an analysis of the influence of text content on the perpetuation of social power differences.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 236 – Application of Hierarchical Linear Models in Education Research (4 units)**

*Course Description:* Application of hierarchical linear models in education research across multiple areas, such as policy, curriculum, and assessment. Develop working knowledge of hierarchical linear modeling and an understanding of its use in existing research as well as student's work.

*Prerequisite(s):* EDU 204A; or similar course with permission of the instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 2 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 237 – Survey Research Methods (4 units)**

*Course Description:* Theories, principles and application of survey research methodology. Students develop, validate, and administer survey instruments; select representative samples; conduct focus groups; and collect, organize, and analyze survey data. Familiarity with introductory concepts in descriptive and inferential statistics is assumed.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 1 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 238 – Participatory Action Research (PAR) (4 units)**

*Course Description:* Principles and strategies of PAR and related methodologies that emphasize collaborating with those affected by the issue being researched in order to educate, take action or effect social change. Conduct interviews with potential collaborators, case analyses and research proposals.

*Prerequisite(s):* Introductory research methods course recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

## **EDU 239 – Interview Methods (4 units)**

*Course Description:* Introduction to qualitative interviewing, focused in particular on narrative and self-story as both practical method and theoretical stance. Complete a case-focused interview project during the course: designing an interview protocol, conducting the interview, transcribing, analyzing, and presenting their research.

*Prerequisite(s):* EDU 201 or equivalent course recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 242 – Research on Text Comprehension (4 units)**

*Course Description:* Analysis of recent research related to cognitive processing of written texts. Topics include word decoding, schema theory, background knowledge, assimilation, accommodation, working memory, processing depth, vocabulary acquisition, sentence-level processes, text-level processes, text structure, implications for curriculum and instruction.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 243 – Research on the Teaching & Learning of Writing (4 units)**

*Course Description:* Study of issues in research on composition; history of composition studies; data analysis techniques; product and process approaches; cognitive and social perspectives.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 244 – Topical Seminar in Language, Literacy & Culture (4 units)**

*Course Description:* Critical study of selected issues of language, literacy, and culture as they relate to education.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topics differ.

*Grade Mode:* Letter.

## **EDU 245 – Theory & Research in Early Literacy (4 units)**

*Course Description:* Analysis of children's initial processes in learning to read extending from the preschool years into second grade. Topics include emergent literacy, phonological awareness, word recognition, decoding, spelling, vocabulary, comprehension, second language reading, assessment, intervention, and instruction.

*Learning Activities:* Seminar 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **EDU 246 – Reading as a Social & Cultural Process (4 units)**

*Course Description:* Recent theoretical and empirical work on reading in social contexts. Topics include reading as an individual interactive process; reading as a social and cultural process; critical perspectives on reading; implications of contrastive theoretical perspectives for curriculum and instruction in reading.

*Prerequisite(s):* EDU 211 recommended.

*Learning Activities:* Lecture 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

## **EDU 247 – Research on Response to Culturally Diverse Literature, K-12 (4 units)**

*Course Description:* Research on response to culturally diverse literature in classrooms and other K-12 settings. Topics include reader response theories, values in expanding the literary canon, problems of cultural authenticity, resistance to multicultural literature, and instruction for diverse texts and learners.

*Learning Activities:* Seminar 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

## **EDU 248 – Academic Language & Literacies (4 units)**

*Course Description:* Exploration of theories and research on academic language and literacies for the schooling of first and second language learners. Students use basic qualitative methods to collect and analyze classroom language and literacy data.

*Learning Activities:* Seminar 3 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 249 – Discourse Analysis in Educational Settings (4 units)**

*Course Description:* Examines form and type in discourse (e.g., narration, conversation, routines), approaches to discourse analysis, and research on classroom discourse (lessons, teaching/learning interactional sequences). Final term paper is an analysis of discourse data tape-recorded by student in a field setting.

*Prerequisite(s):* An introductory linguistics or sociolinguistics course or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EDU 251 – Research in Bilingual & Second Language Education (3 units)**

*Course Description:* Discussion and analysis of recent research in bilingual and second language education. Topics include:language acquisition in second language learners and bilinguals, second language teaching methods, language-use models in bilingual education, interaction analysis in bilingual/cross-cultural classrooms,use of the vernacular in classrooms.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **EDU 253 – Inquiry into Classroom Practice: Bilingual Methods (4 units)**

*Course Description:* Analysis and application of teacher research through the development, implementation and evaluation of a short-term research-based classroom intervention. Research that enhances learning of multilingual language learners.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

## **EDU 255 – Curriculum Development & Evaluation in Mathematics (4 units)**

*Course Description:* Analysis of curricular issues and goals in mathematics education, including long-term trends, current status and influences, proposed changes, and evaluation issues. Selected curriculum projects examined.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 256A – Research in Mathematics Education (4 units)**

*Course Description:* Examination of research process in mathematics education; review of critical productive problems identified by researchers; evolution of trends, issues, theories and hypotheses in various areas of mathematics education research. Emphasizes foundations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 256B – Research in Mathematics Education (4 units)**

*Course Description:* Current research issues and activities in mathematics education: status, trends, theories and hypotheses. Formulation of research questions and design of studies. Projection of future directions for research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 257 – Computer Technology in Mathematics Education (4 units)**

*Course Description:* Roles of calculators, computers, and graphing calculators in mathematics education will be addressed, with emphasis on the impact of these technologies on curriculum reform. Selected efforts to integrate technology into mathematics instruction will be examined.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 260 – The Modern History of Science Education (4 units)**

*Course Description:* History of curricular issues and goals in science education from the late-19th century forward, including long-term trends, current status and influences, proposed changes, and evaluation issues. National science standards and curriculum projects.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 262A – Research Topics in Science Education I (4 units)**

*Course Description:* Research process and product in science education; review of critical science education issues; evolution of trends, theories and hypotheses in various areas of science education research. Survey of current major research in science education.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 262B – Research Topics in Science Education II (4 units)**

*Course Description:* Current research issues and activities in science education: status, trends, theories and hypotheses. Formulation of research questions, design of studies and critical, in-depth review of literature related to the student's research interests.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 264 – Scientific Literacy & Science Education Reform (4 units)**

*Course Description:* Current trends in science education reform locally, regionally, and nationally focusing on scientific literacy. Equity, access and "science for all."

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **EDU 270 – Research on Teacher Education & Development (4 units)**

*Course Description:* Research on teacher preparation in university credential programs and on professional development of in-service teachers, with special attention to teacher preparation for work with culturally and linguistically diverse youth.

*Learning Activities:* Seminar 3 hour(s), Project.

*Grade Mode:* Letter.

## **EDU 271 – Supervision of Student Teachers: Research, Theory & Practice (4 units)**

*Course Description:* Research, theory and practice in the preparation and supervision of teachers. Practice in the supervision of candidates in university teaching credential programs during the student teaching field placement and the mentoring of novice teachers by expert teachers.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

## **EDU 275A – Effective Instruction: Curriculum & Assessment-Theory, Research, & Practice (2 units)**

*Course Description:* Examination of contemporary theories of curriculum development, research about the relationship among instructional planning, classroom assessment, and student learning to guide teaching practice.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Teaching Credential majors.

*Grade Mode:* Letter.

## **EDU 275B – Effective Instruction: English Language Development & Instructing English Language Learners (2 units)**

*Course Description:* Analysis and application of English language acquisition and development research to teaching practice. Particular attention to research that enhances learning of English language learners and under-performing students.

*Prerequisite(s):* Acceptance in the Teaching Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **EDU 280A – Inquiry & Practice: Qualitative Research for Educational Leaders (4 units)**

*Course Description:* Prepares students to understand the nature/assumptions/logic of qualitative methodology as applied to educational settings, focusing on issues of design/conceptualization/ interpretation/application of qualitative research procedures. Use these methods in conducting studies in their educational settings.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 280B – Inquiry & Practice: Quantitative Research for Educational Leaders (4 units)**

*Course Description:* Focus is on field-based and general quantitative research methods in education. Acquire skills and knowledge to collect, organize, analyze, and interpret univariate and multivariate quantitative data in educational research, dissertation projects, and field-based projects.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 280C – Inquiry & Practice: Research Design & Application for Educational Leaders (4 units)**

*Course Description:* Educational leaders are introduced to qualitative, quantitative, and mixed-methods educational research methods and learn to frame research questions, identify data/data sources, use descriptive statistics, critically examine research studies, make sense of educational research/policy, and conduct independent studies.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 281A – Problem-Based Learning Courses: Part 1 (4 units)**

*Course Description:* Students identify problems from their educational settings, engage in data collection/analysis, write-up the process/results, and present to class. Work may become a dissertation proposal, if the problem or its extension is of sufficient interest and value.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Extensive Writing/Discussion, Fieldwork.

*Grade Mode:* Letter.

## **EDU 281B – Problem-Based Learning Courses: Part 2 (4 units)**

*Course Description:* Continuation of part one.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Extensive Writing/Discussion, Fieldwork.

*Grade Mode:* Letter.

## **EDU 281C – Problem-Based Learning Courses: Part 3 (4 units)**

*Course Description:* Continuation of part two.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Extensive Writing/Discussion, Fieldwork.

*Grade Mode:* Letter.

## **EDU 282A – Beginning Issues & Practices: Contemporary Educational Leadership (4 units)**

*Course Description:* Explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Reflect on and refine their personal theory of leadership.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 282B – Beginning Issues & Practices: Diversity Issues for Educational Leaders (4 units)**

*Course Description:* Diversity of stakeholders and community issues in California schools and colleges will be explored. Emphasis will be placed on the interaction between underrepresented segments of society and educational institutions. Best Practices in leading diverse schools will be explored.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 283A – Advanced Issues & Practices: Leadership Across Communities (4 units)**

*Course Description:* Examine the theory/practice/process of leadership in community-building and collaboration in/across communities, while addressing the utilization of human and material resources and the creation of partnerships, community linkages, and collaborative efforts.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 283B – Advanced Issues & Practices: Leadership & Student Services (4 units)**

*Course Description:* Practical and theoretical perspectives for building a sense of vision to lead the profession of student affairs and to meet the needs of the whole student.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 284A – Policy: History & Theory of Educational Policy (4 units)**

*Course Description:* Learn/analyze the history/theory of educational policy. Explore how education leaders have/can positively influence the process and implement effective policies in their local institutions. Policy issues covered: educational opportunity, equity, access, regulation, testing, tenure, accountability.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 284B – Policy: Formulating & Influencing Policy (4 units)**

*Course Description:* Conduct critical analyses of policy at the federal, judicial, state, regional and local levels. Specific California and federal policy environment structures, processes and people will be examined for intended consequences, ethical dilemmas, social justice and equity issues.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 284C – Policy: Possibilities & Limitations of Educational Policy in a Democracy (4 units)**

*Course Description:* Critically examine the democratic purposes of education in light of existing National, State, and local policy reform efforts. Questions include, "In what ways are these reforms and policies guided by democratic ideas and challenged by those ideals."

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 285A – Educational Finance, Human Resources, & Law; Human & Financial Assets; Allocations & Budgets (4 units)**

*Course Description:* Topics include: education finance theory, contemporary finance policy issues, intergovernmental relations, effective resource management, budget analysis and preparation.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 285B – Educational Finance, Human Resources, & Law: Ethical & Legal Issues in Education (4 units)**

*Course Description:* Human resource and legal concepts and activities governing decisions of school leaders in public education. Attention to theory, application, and practice of personnel and risk management, curriculum, student services, teacher rights, torts, student rights.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 285C – Educational Finance, Human Resources, & Law: Human Resources & Personnel (4 units)**

*Course Description:* Human resource management research and theory and for applying human resource techniques in the educational setting.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 286A – Organizational Structures & Change: Data-Driven Decision-Making for Change (4 units)**

*Course Description:* Use and examine multiple sources of information and data and trends found in making quality decisions to improve P-12/ community college settings and addressing problems at sites. Learn limitations of these data sources.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 286B – Organizational Structures & Change: Curriculum & Instruction Issues in Education (4 units)**

*Course Description:* Addresses the historical development of various curriculum and instructional methodologies found in public and private schools and colleges, and their impact on current curriculum development and reform efforts at the national, state and local level.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Fieldwork, Project.

*Grade Mode:* Letter.

## **EDU 287 – CANDEL Dissertation Seminars (6-12 units)**

*Course Description:* Third-year seminars encourage students to complete dissertations within the year. Cohort members meet together in every three-week meetings with faculty members and share their writing, data collection, analysis, discussion of results, development of conclusions/ implications.

*Prerequisite(s):* Admission into the CANDEL EdD program or consent of instructor.

*Learning Activities:* Variable 18-36 hour(s).

*Repeat Credit:* May be repeated 9 time(s) until dissertation is completed.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EDU 287D – CANDEL Dissertation (6-12 units)**

*Course Description:* Cohort members continue to meet with faculty and share their writing, data collection, analysis, development of conclusions/ implications.

*Prerequisite(s):* Consent of instructor; passing of qualifying exams in CANDEL program and advancement to candidacy.

*Learning Activities:* Variable 18-36 hour(s).

*Repeat Credit:* May be repeated 9 time(s) until dissertation is completed.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EDU 288AV – Inquiry & Practice: Academic Writing for Educational Leaders (4 units)**

*Course Description:* Rigorous practice in the types of writing required of educational doctorate (CANDEL) students. Synthesizing literature as part of a literature review; crafting arguments using empirical and theoretical literature; and addressing implications of research as they relate to policy and practice.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Admission into the CANDEL EdD program or consent of instructor.

*Grade Mode:* Letter.

## **EDU 291 – Proseminar in Education (4 units)**

*Course Description:* Professional induction into educational research field and Graduate Group in Education at UC Davis. Introduction to landscape of educational research methodologies, purposes and theories. Analysis of debates within field. Investigation of K-12 educational outreach efforts at UC Davis.

*Prerequisite(s):* Admission to the M.A. or Ph.D. graduate program in Education.

*Learning Activities:* Seminar 3 hour(s), Fieldwork 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) divided as an M.A. student once; as a Ph.D. student once.

*Grade Mode:* Letter.

## **EDU 292 – Special Topics in Education (2-4 units)**

*Course Description:* Selected topics in education. Designed to facilitate preparation for the qualifying examination or dissertation. Students will critically analyze scholarly work including their own works in progress.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 2-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **EDU 294 – Special Topics in Science, Agriculture & Mathematics Education (4 units)**

*Course Description:* Critical study of special topics of research relevant to science, agricultural and mathematics education. Students and faculty present work-in-progress on a major research project, and critically analyze and discuss one another's developing scholarly work.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EDU 295 – Special Topics in Learning & Mind Science (4 units)**

*Course Description:* Critical study of selected issues in the learning sciences, neurodevelopmental disorders, and psychometrics and measurement, as they relate to education.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topics differs.

*Grade Mode:* Letter.

## **EDU 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EDU 299 – Individual Study (1-6 units)**

*Course Description:* Individual study under the direction of a faculty member.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EDU 299D – Research (1-12 units)**

*Course Description:* Research for individual graduate students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EDU 300 – Reading in the Elementary School (4 units)**

*Course Description:* Principles, procedures, and curriculum materials for teaching of reading. Includes decoding skills with a special emphasis on phonics, comprehension skills, study skills, and reading in the content areas.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

**EDU 300A – Reading in the Elementary School, Part A (1 unit)**

*Course Description:* Principles, procedures, and curriculum materials for teaching of reading. Includes decoding skills with a special emphasis on phonics, comprehension skills, study skills, and reading in the content areas.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Pass/No Pass only.

**EDU 300B – Reading in the Elementary Schools, Part B (3 units)**

*Course Description:* Principles, procedures, and curriculum materials for teaching of reading. Includes decoding skills with a special emphasis on phonics, comprehension skills, study skills, and reading in the content areas.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**EDU 301 – Reading in the Secondary School (4 units)**

*Course Description:* Principles, procedures, and materials to help secondary school teachers improve the reading competence of students. Strategies for enhancing learning through reading and writing in all disciplines, with special attention to linguistically diverse populations.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

**EDU 301A – Teaching Literacy in High School Contexts (2 units)**

*Course Description:* Focuses on secondary school literacy practices and strategies for engaging English-speaking and bilingual students with textual, image, and digital literacies across content areas. Covers reading and writing, the Common Core and Language Proficiency standards.

*Prerequisite(s):* Consent of instructor. Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the secondary credential program.

*Grade Mode:* Letter.

**EDU 301B – Teaching Literacy in High School Contexts (2 units)**

*Course Description:* Focuses on secondary school literacy practices and strategies for engaging English-speaking and bilingual students with textual, image, and digital literacies across content areas. Covers reading and writing, the Common Core and Language Proficiency standards.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the secondary credential program.

*Grade Mode:* Letter.

**EDU 302 – Language Arts in the Elementary School (2 units)**

*Course Description:* Principles, procedures, and materials for the teaching of oral and written expression, listening skills, drama, and children's literature in elementary schools.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**EDU 303 – Art Education in the Elementary School (2 units)**

*Course Description:* Understanding the principles of education in the arts through participation. Development of concepts, introduction to media, and techniques suitable for the elementary school with emphasis on cross-discipline exploration.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

**EDU 304A – Teaching in the Elementary Schools (2-18 units)**

*Course Description:* Supervised teaching in regular classrooms in elementary schools. Selection and organization of teaching materials.

Introduction to techniques of diagnosing school achievement of children.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 9-48 hour(s).

*Grade Mode:* Letter.

**EDU 304B – Teaching in the Elementary Schools (2-18 units)**

*Course Description:* Supervised teaching in regular classrooms in elementary schools. Current conceptions of elementary school curriculum, emphasis on contributions from the social, biological, and physical sciences. Emphasis on effective teaching methods.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 9-48 hour(s).

*Grade Mode:* Letter.

**EDU 304C – Teaching in the Elementary Schools (2-18 units)**

*Course Description:* Supervised teaching in regular classrooms in elementary schools. Evaluation of teaching materials including instructional technology. Current elementary school curriculum with emphasis on contributions from fine arts and humanities.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 9-48 hour(s).

*Grade Mode:* Letter.

**EDU 305A – Teaching in the Middle Grades (5-8 units)**

*Course Description:* Supervised teaching in regular or special education classrooms in middle grades. Current conceptions of the middle-grades curriculum with emphasis on social, biological, and physical sciences. Effective teaching methods.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Seminar 2 hour(s), Seminar 2 hour(s), Variable 15-30 hour(s).

*Grade Mode:* Letter.

**EDU 306A – Teaching in the Secondary Schools (2-18 units)**

*Course Description:* Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 9-48 hour(s).

*Grade Mode:* Letter.

**EDU 306B – Teaching in the Secondary Schools (2-18 units)**

*Course Description:* Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 9-48 hour(s).

*Grade Mode:* Letter.

**EDU 306C – Teaching in the Secondary Schools (2-18 units)**

*Course Description:* Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 9-48 hour(s).

*Grade Mode:* Letter.

**EDU 307 – Methods in Elementary Science (2 units)**

*Course Description:* Principles, procedures, and materials for teaching the biological and physical sciences in elementary schools.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

**EDU 308 – Methods in Elementary Social Studies (2 units)**

*Course Description:* Principles, procedures, and materials for teaching history and the social sciences in elementary schools.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

**EDU 309 – The Teaching of Mathematics, K-9 (3 units)**

*Course Description:* Mathematics curriculum and teaching methods for K-9 reflecting the needs of California's diverse student populations.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**EDU 309A – The Teaching of Mathematics, K-9, Part A (1 unit)**

*Course Description:* Mathematics curriculum and teaching methods for K-9 reflecting the needs of California's diverse student populations.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Pass/No Pass only.

**EDU 309B – The Teaching of Mathematics, K-9, Part B (2 units)**

*Course Description:* Mathematics curriculum and teaching methods for K-9 reflecting the needs of California's diverse student populations.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**EDU 310 – Teaching as Reflective Practice (1 unit)**

*Course Description:* Presentation of issues related to classroom instruction and professional practice, reflections on classroom instruction and other documentation related to student teaching experience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Acceptance in Teacher Credential Program.

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Letter.

**EDU 320 – Creating Classroom Communities (1 unit)**

*Course Description:* Observation of classrooms at beginning of academic year for first-hand experience with teachers' approaches to creating communities and setting routines. Candidates are placed with students they will teach during student teaching. Candidates may take on teaching tasks as appropriate.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 30 hour(s).

*Enrollment Restriction(s):* Acceptance in Teacher Credential Program.

*Grade Mode:* Letter.

**EDU 322A – Pedagogical Preparation for Secondary Social Science I (3 units)**

*Course Description:* Introduction to teaching methods and curriculum approaches for secondary social science teaching. State and national curriculum standards; application of learning theory to effective instruction; interdisciplinary teaching and active learning approaches; effective teaching strategies for English learners.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EDU 322B – Pedagogical Preparation for Secondary Social Science II (3 units)**

*Course Description:* Intermediate teaching methods and curriculum approaches for secondary social science teaching. Interdisciplinary approaches to teaching major themes across social science content areas; teaching potentially controversial social science topics; teaching democratic civic values, student assessment and evaluation.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 1 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

## **EDU 323A – Physical Science in the Secondary School (3 units)**

*Course Description:* Activity-based overview of concepts and processes in secondary school physical sciences. Emphasis upon philosophy, appropriate teaching methods, materials, assessment and evaluation of learning.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Discussion/Laboratory 2 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **EDU 323B – Life Sciences in the Secondary School (3 units)**

*Course Description:* Activity-based overview of concepts and processes in secondary school biology and life sciences. Emphasis on philosophy, appropriate teaching methods, materials, assessment and evaluation of learning, and issues.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Discussion/Laboratory 2 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **EDU 324A – Methods & Technology in Secondary Mathematics I (4 units)**

*Course Description:* Introduction to methods and curriculum for teaching mathematics at the secondary level. Introduction to applications of computer technology as instructional, intellectual, and communication tools for mathematics teachers.

*Prerequisite(s):* Consent of instructor. Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EDU 324B – Methods in Secondary Mathematics II (3 units)**

*Course Description:* Expansion of methods and curriculum for teaching mathematics at the secondary level. Intermediate applications of computer technology as instructional, intellectual, and communication tools in mathematics teaching.

*Prerequisite(s):* Consent of instructor. Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **EDU 325 – Research & Methods in Secondary English Language Arts (4 units)**

*Course Description:* Research on teaching and learning in the language arts. Principles, procedures and materials for improving the writing, reading and oral language of secondary students, with special attention to students from culturally and linguistically diverse populations.

*Prerequisite(s):* Consent of instructor. Acceptance in Teacher Credential Program.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EDU 326 – Teaching Language Minority Students in Secondary Schools: Methods & Research (4 units)**

*Course Description:* Research on principles, procedures and curricula for teaching discipline-specific concepts to language-minority students in secondary schools. Second-language acquisition principles and instructional strategies.

*Prerequisite(s):* Consent of instructor. Acceptance in Teacher Credential Program.

*Learning Activities:* Seminar 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

## **EDU 327A – Teaching Methods for Secondary Foreign Language/Spanish, Part I (3 units)**

*Course Description:* Introduction to methods for teaching Spanish as a foreign and a heritage language in secondary schools. State and National Standards. Theories on second language acquisition. Lesson plans. Effective teaching strategies and class management.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EDU 327B – Teaching Methods for Secondary Foreign Language/Spanish, Part II (3 units)**

*Course Description:* Continuation to methods for teaching Spanish as a foreign and a heritage language in secondary schools. Research and practice on foreign and heritage language teaching. Expansion of effective teaching strategies and class management.

*Prerequisite(s):* Acceptance in Teacher Credential Program.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EDU 380 – Active Literacy Academyo—The UK Experience (2 units)**

*Course Description:* One-week introduction to the teaching of dense text for teachers of grades K-12. Examination of Shakespeare's canon and immersion in active classroom practices that deepen engagement and understanding of key themes that transcend content areas.

*Prerequisite(s):* Consent of Instructor; consent of instructor based on selection/application process of participants.

*Learning Activities:* Lecture/Discussion 45 hour(s).

*Enrollment Restriction(s):* Admission to Active Literacy Academy through application process.

*Grade Mode:* Passed/Not Passed only.

## **EDU 398 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EDU 399 – Individual Study (1-5 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Education Abroad Program (EAP)**

College of Letters & Science

**EAP 001 – Global Thinking (4 units)**

*Course Description:* Global perspectives on challenges facing our planet and humanity in historical and contemporary contexts. Understanding transnational systems' impacts and roles in generating equitable solutions. Global diversity and global action on climate, migration, public health, food/water, inequality, and more.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**EAP 090X – International Education Seminar (1 unit)**

*Course Description:* Seminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues.

*Prerequisite(s):* Open to lower division applicants for EAP or UC Davis study abroad and international internship programs.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**EAP 180 – Education Abroad: Special Topics (1-12 units)**

*Course Description:* Students who participate in approved international programs take this course up to 12 units while studying abroad.

*Prerequisite(s):* Minimum GPA requirement for each study abroad program as specified in the written agreement between UC Davis and the host institution; prerequisites for language courses may also apply.

*Learning Activities:* Lecture/Discussion 3-12 hour(s), Discussion/Laboratory 3 hour(s).

*Repeat Credit:* May be repeated when credits are reviewed by departments & Dean's Office to determine how they fulfill UC Davis requirements.

*Grade Mode:* Letter.

**EAP 190X – International Education Seminar (1 unit)**

*Course Description:* Seminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues.

*Prerequisite(s):* Open to upper division applicants for EAP or UC Davis study abroad and international internship programs.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**EAP 192 – Internship in Education Abroad (1-12 units)**

*Course Description:* Internship with Education Abroad program, potentially either at university or taught abroad.

*Prerequisite(s):* Participation in a study abroad program.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

# Electrical & Computer Engineering (EEC)

College of Engineering

**EEC 001 – Introduction to Electrical & Computer Engineering (2 units)**

*Course Description:* Introduction to Electrical & Computer Engineering with focus on sub-disciplines of Electrical & Computer Engineering, engineering design, and problem solving. Microcontrollers, analog circuits, signal processing, and communications links. Application of topics to create a functional device.

*Learning Activities:* Lecture 1 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 007 – Introduction to Programming & Microcontrollers (4 units)**

*Course Description:* Programming computers using C/C++ languages. Software engineering and object-oriented design. Programming for hardware devices.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Electrical Engineering majors only.

*Credit Limitation(s):* Only 2 units of credit for students who have previously taken ECS 036A or ECS 032A.

*Grade Mode:* Letter.

**EEC 010 – Introduction to Digital & Analog Systems (4 units)**

*Course Description:* Interactive and practical introduction to fundamental concepts of electrical and computer engineering by implementing electronic systems, which can be digitally controlled and interrogated, with a programmable microcontroller with the ability to program the electrical connections between analog and digital components.

*Learning Activities:* (ECS 030 or ECS 036B or EEC 007); ENG 017; consent of instructor.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 018 – Digital Systems I (5 units)**

*Course Description:* Introduction to digital system design including combinational logic design, sequential and asynchronous circuits, computer arithmetic, memory systems and algorithmic state machine design; computer aided design (CAD) methodologies and tools.

*Prerequisite(s):* ENG 017.

*Learning Activities:* Lecture 3 hour(s), Laboratory 4 hour(s).

*Credit Limitation(s):* No credit to students who have previously completed EEC 180A.

*Grade Mode:* Letter.

**EEC 089A – Special Topics in Electromagnetics (1-5 units)**

*Course Description:* Special topics in Electromagnetics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 089B – Special Topics in Physical Electronics (1-5 units)**

*Course Description:* Special topics in Physical Electronics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 089C – Special Topics in Active & Passive Circuits (1-5 units)**

*Course Description:* Special topics in Active & Passive Circuits.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 089D – Special Topics in Signals & Systems (1-5 units)**

*Course Description:* Special topics in Signals & Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 089E – Special Topics in Computer Systems & Software (1-5 units)**

*Course Description:* Special topics in Computer Systems & Software.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 089F – Special Topics in Digital System Design (1-5 units)**

*Course Description:* Special topics in Digital System Design.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 090C – Research Group Conference in Electrical & Computer Engineering (1 unit)**

*Course Description:* Research group conferences.

*Prerequisite(s):* Consent of instructor. Lower division standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**EEC 090X – Lower Division Seminar (1-4 units)**

*Course Description:* Examination of a special topic in a small group setting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**EEC 092 – Internship in Electrical & Computer Engineering (1-5 units)**

*Course Description:* Supervised work experience in Electrical & Computer Engineering.

*Prerequisite(s):* Lower division standing; project approval prior to period of internship.

*Learning Activities:* Internship 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**EEC 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**EEC 099 – Special Study for Lower Division Students (1-5 units)**

*Course Description:* Special study for lower division students.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**EEC 100 – Circuits II (5 units)**

*Course Description:* Theory, application, and design of analog circuits.

Methods of analysis including frequency response, SPICE simulation, and Laplace transform. Operational amplifiers and design of active filters.

*Prerequisite(s):* ENG 017 C- or better; (MAT 022B or MAT 027B).

*Learning Activities:* Laboratory 3 hour(s), Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to the following majors: Electrical Engineering, Computer Engineering, Computer Science & Engineering, Electrical Engineering/Materials Science, Biomedical Engineering, Applied Physics, graduate students in the Electrical & Computer Engineering major.

*Credit Limitation(s):* Students who have completed EEC 100 may receive 3.5 units of credit.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**EEC 105A – EE-Emerge 1 (1 unit)**

*Course Description:* Work in groups to conceive, design and prototype electronic exhibits to promote engineering to the public.

*Learning Activities:* Workshop 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Electrical & Computer Engineering Junior and Sophomore-level students.

*Grade Mode:* Pass/No Pass only.

**EEC 105B – EE-Emerge 2 (2 units)**

*Course Description:* Work in groups to construct electronic exhibits.

*Learning Activities:* Workshop 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Electrical & Computer Engineering Junior and Sophomore-level students.

*Grade Mode:* Pass/No Pass only.

**EEC 105C – EE-Emerge 3 (1 unit)**

*Course Description:* Work in groups to present electronic exhibits to the public.

*Prerequisite(s):* EEC 105B.

*Learning Activities:* Workshop 1 hour(s).

*Grade Mode:* Pass/No Pass only.

## **EEC 110A – Electronic Circuits I (4 units)**

*Course Description:* Use and modeling of nonlinear solid-state electronic devices in basic analog and digital circuits. Introduction to the design of transistor amplifiers and logic gates.

*Prerequisite(s):* EEC 100; (EEC 140A (can be concurrent) or EEC 140AV (can be concurrent) or EEC 111 (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **EEC 110B – Electronic Circuits II (4 units)**

*Course Description:* Analysis and design of integrated circuits. Single-stage amplifiers, cascaded amplifier stages, differential amplifiers, current sources, frequency response, and return-ratio analysis of feedback amplifiers.

*Prerequisite(s):* EEC 110A.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **EEC 111 – Digital Electronic Circuits (4 units)**

*Course Description:* MOS device fundamentals, introduction to the design of CMOS logic gates, layout, circuits, and modeling. Examination of voltage transfer characteristics, and propagation delay.

*Prerequisite(s):* EEC 100.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Computer Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 112 – Communication Electronics (4 units)**

This version has ended; see updated course, below.

*Course Description:* Electronic circuits for analog and digital communication, including oscillators, mixers, tuned amplifiers, modulators, demodulators, and phase-locked loops. Circuits for amplitude modulation (AM) and frequency modulation (FM) are emphasized.

*Prerequisite(s):* EEC 110A; EEC 150A; EEC 110B recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 112 – Communication Electronics (4 units)**

*Course Description:* Electronic circuits for analog and digital communication, including oscillators, mixers, tuned amplifiers, modulators, demodulators, and phase-locked loops. Circuits for amplitude modulation (AM) and frequency modulation (FM) are emphasized.

*Prerequisite(s):* EEC 110A; EEC 150; EEC 110B recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

This course version is effective from, and including: Winter Quarter 2024.

## **EEC 113 – Power Electronic Circuits (4 units)**

*Course Description:* Electronic circuits for power applications, including linear voltage regulators, switching DC-DC converters, DC-AC converters (inverters) and AC-DC converters (rectifiers). Control loop and stability of circuits.

*Prerequisite(s):* EEC 110A or (EEC 111, (EEC 157A or EEC 157AV)).

*Learning Activities:* Lecture/Lab 4 hour(s).

*Grade Mode:* Letter.

## **EEC 116 – VLSI Design (4 units)**

*Course Description:* CMOS devices, layout, circuits, and functional units; VLSI fabrication and design methodologies.

*Prerequisite(s):* EEC 110A or EEC 111; EEC 018 or 180A recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 118 – Digital Integrated Circuits (4 units)**

*Course Description:* Analysis and design of digital integrated circuits.

Emphasis on MOS logic circuit families. Logic gate construction, voltage transfer characteristics, propagation delay, and power consumption. Regenerative circuits, sequential elements, interconnect, RAMs, ROMs, and PLAs.

*Prerequisite(s):* EEC 110A; (EEC 018 or EEC 180A).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 119A – Integrated Circuit Design Project (3 units)**

*Course Description:* Design course involving architecture, circuit design, physical design, and validation through extensive simulation of a digital or mixed-signal integrated circuit of substantial complexity under given design constraints. Team project that includes a final report.

*Prerequisite(s):* EEC 116 or EEC 118.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 119B – Integrated Circuit Design Project (3 units)**

*Course Description:* Design course involving architecture, circuit design, physical design, and validation through extensive simulation of a digital or mixed-signal integrated circuit of substantial complexity under given design constraints. Team project that includes a final report.

*Prerequisite(s):* EEC 119A.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 130A – Electromagnetics I (4 units)**

*Course Description:* Basics of static electric and magnetic fields and fields in materials. Work and scalar potential. Maxwell's equations in integral and differential form. Plan waves in lossless media. Lossless transmission lines.

*Prerequisite(s):* MAT 021D; (PHY 009C or PHY 009HD); ENG 017.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 130B – Introductory Electromagnetics II (4 units)**

*Course Description:* Plane wave propagation in lossy media, reflections, guided waves, simple modulated waves and dispersion, and basic antennas.

*Prerequisite(s):* EEC 130A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 132A – RF & Microwaves in Wireless Communication (5 units)**

*Course Description:* Study of Radio Frequency and Microwave theory and practice for design of wireless electronic systems. Transmission lines, microwave integrated circuits, circuit analysis of electromagnetic energy transfer systems, the scattering parameters.

*Prerequisite(s):* EEC 110A; EEC 130B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 132B – RF & Microwaves in Wireless Communication (5 units)**

*Course Description:* Passive RF and microwave device analysis, design, fabrication, and testing for wireless applications. RF and microwave filter and coupler design. Introductory analysis and design of RF and microwave transistor amplifiers.

*Prerequisite(s):* EEC 132A.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 132C – RF & Microwaves in Wireless Communications (5 units)**

*Course Description:* RF and microwave amplifier theory and design, including transistor circuit models, stability considerations, noise models and low noise design. Theory and design of microwave transistor oscillators and mixers. Wireless system design and analysis.

*Prerequisite(s):* EEC 132B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 133 – Electromagnetic Radiation & Antenna Analysis (4 units)**

*Course Description:* Properties of electromagnetic radiation; analysis and design of antennas: ideal, small loop, aperture, and arrays; antenna simulations/measurements.

*Prerequisite(s):* EEC 130B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 134A – RF/Microwave Systems Design (3 units)**

*Course Description:* Board-level RF design, fabrication, and characterization of an RF/microwave system, including the antenna, RF front-end, baseband, mix-signal circuits, and digital signal processing models.

*Prerequisite(s):* EEC 130B or EEC 110B or EEC 150A.

*Learning Activities:* Workshop 3 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Limited to 24 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 134B – RF/Microwave Systems Design (3 units)**

*Course Description:* Board-level RF design, fabrication, and characterization of an RF/microwave system, including the antenna, RF front-end, baseband, mix-signal circuits, and digital signal processing models.

*Prerequisite(s):* EEC 134A.

*Learning Activities:* Workshop 3 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Limited to 24 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 135 – Optoelectronics for High-Speed Data Networking & Computing Systems (4 units)**

*Course Description:* Principles of optical communication systems. Planar dielectric waveguides. Optical fibers. Silicon photonics. Attenuation and dispersion in optical fibers. Optical sources, detectors, transmitters, receivers, modulators, optical amplifiers, and optical multiplexers/demultiplexers. Optics in data centers and computing systems. Design of digital optical communication links.

*Prerequisite(s):* EEC 130B.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 136A – Electronic Design Project (3 units)**

*Course Description:* Optical, electronic and communication-engineering design of an opto-electronic system operating under performance and economic constraints. Measurement techniques will be designed and implemented, and the system will be characterized.

*Prerequisite(s):* (ECS 036B or EEC 007); EEC 018; EEC 100; (EEC 110B or EEC 180 or EEC 157A (can be concurrent) or EEC 157AV (can be concurrent)).

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to major.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 136B – Electronic Design Project (3 units)**

*Course Description:* Optical, electronic and communication-engineering design of an opto-electronic system operating under performance and economic constraints. Measurement techniques will be designed and implemented, and the system will be characterized.

*Prerequisite(s):* EEC 136A.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 140A – Principles of Device Physics I (4 units)**

*Course Description:* Semiconductor device fundamentals, equilibrium and non-equilibrium statistical mechanics, conductivity, diffusion, electrons and holes, p-n and Schottky junctions, first-order metal-oxide-semiconductor (MOS) field effect transistors, bipolar junction transistor fundamentals.

*Prerequisite(s):* ENG 017 (can be concurrent); (PHY 009D or PHY 009HE).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EEC 140AV – Principles of Device Physics I (4 units)**

*Course Description:* Semiconductor device fundamentals, equilibrium and non-equilibrium statistical mechanics, conductivity, diffusion, electrons and holes, p-n and Schottky junctions, first-order metal-oxide-semiconductor (MOS) field effect transistors, bipolar junction transistor fundamentals.

*Prerequisite(s):* ENG 017 (can be concurrent); (PHY 009D or PHY 009HE).

*Learning Activities:* Web Virtual Lecture 3 hour(s); Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Electrical Engineering majors.

*Grade Mode:* Letter.

**EEC 140B – Principles of Device Physics II (4 units)**

*Course Description:* Electrical properties, designs, models and advanced concepts for MOS, Bipolar, and Junction Field-Effect Transistors, including scaling, minority-carrier distributions, non-ideal effects, and device fabrication methods. MESFET and heterojunction bipolar transistors (HBTs). Fundamentals of solar cells, photodetectors, LEDs and semiconductor lasers.

*Prerequisite(s):* EEC 140A or EEC 140AV.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 145 – Electronic Materials (4 units)**

*Course Description:* Electronic and physical properties of materials used in electronics, ICs, optoelectronics and MEMS. Semiconductors, dielectrics, metals, optical materials, organic semiconductive, optical and nonlinear properties, as well as their synthesis and deposition methods.

*Prerequisite(s):* EEC 140A or EEC 140AV.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 146A – Integrated Circuits Fabrication (4 units)**

*Course Description:* Theoretical and experimental study of basic fabrication processes for metal oxide semiconductor integrated circuits, including oxidation, photolithography, impurity diffusion, metallization, wet chemical etching, and characterization.

*Prerequisite(s):* EEC 140A or EEC 140AV.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 146B – Advanced Integrated Circuits Fabrication (3 units)**

*Course Description:* Fabrication processes for CMOS VLSI. Laboratory projects examine deposition of thin films, ion implantation, process simulation, anisotropic plasma etching, sputter metallization, and C-V analysis. Topics include isolation, projection alignment, epilayer growth, thin gate oxidation, and rapid thermal annealing.

*Prerequisite(s):* EEC 146A.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Electrical, Computer, and Electrical/Materials Science majors and Electrical Engineering graduate students; non-majors accommodated when space available.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 150 – Introduction to Signals & Systems (4 units)**

*Course Description:* Characterization and analysis of continuous-time linear systems. Fourier series and transforms with applications. Introduction to communication systems. Transfer functions and block diagrams. Elements of feedback systems. Stability of linear systems.

*Prerequisite(s):* EEC 100; (ENG 006 or MAT 022AL).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 151 – Digital Signals & Systems (4 units)**

*Course Description:* Characterization and analysis of discrete time systems. Difference equation models. Z-transform analysis methods. Frequency Analysis. Discrete and fast Fourier transforms. Digital Filtering.

*Prerequisite(s):* EEC 100.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 152 – Digital Signal Processing (4 units)**

*Course Description:* Theory and practice of real-time digital signal processing. Fundamentals of real-time systems. Programmable architectures including I/O, memory, peripherals, interrupts, DMA. Interfacing issues with A/D and D/A converters to a programmable DSP. Specification driven design and implementation of simple DSP applications.

*Prerequisite(s):* EEC 150B; (EEC 070 or ECS 050).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 157A – Control Systems (4 units)**

*Course Description:* Analysis and design of feedback control systems. Examples are drawn from electrical and mechanical systems as well as other engineering fields. Mathematical modeling of systems, stability criteria, root-locus and frequency domain design methods.

*Prerequisite(s):* EEC 100.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 157AV – Control Systems (4 units)**

*Course Description:* Analysis and design of feedback control systems. Examples drawn from electrical and mechanical systems as well as other engineering fields. Mathematical modeling of systems, stability criteria, root-locus and frequency domain design methods.

*Prerequisite(s):* EEC 100.

*Learning Activities:* Web Virtual Lecture 3 hour(s); Web Electronic Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 157B – Control Systems (4 units)**

*Course Description:* Control system design; transfer-function and state-space methods; sampled-data implementation, digital control. Laboratory includes feedback system experiments and simulation studies.

*Prerequisite(s):* EEC 157A or EEC 157AV.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 157BY – Control Systems (4 units)**

*Course Description:* Control system design; transfer-function and state-space methods; sampled-data implementation, digital control. Laboratory includes feedback system experiments and simulation studies.

*Prerequisite(s):* EEC 157A or EEC 157AV.

*Learning Activities:* Web Virtual Lecture 3 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 160 – Signal Analysis & Communications (4 units)**

This version has ended; see updated course, below.

*Course Description:* Signal analysis based on Fourier methods. Fourier series and transforms; time-sampling, convolution, and filtering; spectral density; modulation: carrier-amplitude, carrier-frequency, and pulse-amplitude.

*Prerequisite(s):* EEC 150A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 160 – Signal Analysis & Communications (4 units)**

*Course Description:* Signal analysis based on Fourier methods. Fourier series and transforms; time-sampling, convolution, and filtering; spectral density; modulation: carrier-amplitude, carrier-frequency, and pulse-amplitude.

*Prerequisite(s):* EEC 150.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

This course version is effective from, and including: Fall Quarter 2023.

**EEC 161 – Applied Probability for Electrical & Computer Engineers (4 units)**

*Course Description:* Axioms of probability, discrete and continuous random variables, expectation and moments. Transformation of random variables. Joint and conditional densities. Limit theorems, Markov and Poisson processes. Applications in Electrical and Computer Engineering.

*Prerequisite(s):* (ENG 006 or MAT 022AL); MAT 021D; MAT 022A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 165 – Statistical & Digital Communication (4 units)**

*Course Description:* Introduction to random process models of modulated signals and noise, and analysis of receiver performance. Analog and digitally modulated signals. Signal-to-noise ratio, probability of error, matched filters. Intersymbol interference, pulse shaping and equalization. Carrier and clock synchronization.

*Prerequisite(s):* EEC 160; EEC 161.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 170 – Introduction to Computer Architecture (4 units)**

*Course Description:* Introduces basic aspects of computer architecture, including computer performance measurement, instruction set design, computer arithmetic, pipelined/non-pipelined implementation, and memory hierarchies (cache and virtual memory). Presents a simplified Reduced Instruction Set Computer using logic design methods from the prerequisite course.

*Prerequisite(s):* (ECS 036B or ECS 030 or ECS 034 or EEC 007); (EEC 018 or EEC 180A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 171 – Parallel Computer Architecture (4 units)**

*Course Description:* Organization and design of parallel processors including shared-memory multiprocessors, cache coherence, memory consistency, snooping protocols, synchronization, scalable multiprocessors, message passing protocols, distributed shared memory and interconnection networks.

*Prerequisite(s):* EEC 170 or ECS 154B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 172 – Embedded Systems (4 units)**

*Course Description:* Introduction to embedded-system hardware and software. Topics include: embedded processor and memory architecture; input/output hardware and software, including interrupts and direct memory access; interfacing with sensors and actuators; wired and wireless embedded networking.

*Prerequisite(s):* (EEC 170 or ECS 154A); EEC 100.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 173A – Computer Networks (4 units)**

*Course Description:* Overview of computer networks, TCP/IP protocol suite, computer-networking applications and protocols, transport-layer protocols, network architectures, Internet Protocol (IP), routing, link-layer protocols, local area and wireless networks, medium access control, physical aspects of data transmission, and network-performance analysis.

*Prerequisite(s):* (ECS 060 or ECS 032B or ECS 036C); (ECS 132 or EEC 161 or MAT 135A or STA 131A or STA 120 or STA 032).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Computer Science, Computer Science Engineering and Computer Engineering Majors only.

*Credit Limitation(s):* Only 2 units of credit for students who have taken ECS 157.

*Cross Listing:* ECS 152A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 173B – Advanced Topics in Computer Networks (4 units)**

*Course Description:* Advanced topics in computer networks, wireless networks, multimedia networking, traffic analysis and modeling, network design and management, network simulation and performance analysis, and design projects in communication networks.

*Prerequisite(s):* EEC 173A or ECS 152A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ECS 152C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 174AY – Applied Machine Learning (3 units)**

*Course Description:* Applied machine learning (ML) and deep learning (DL) in engineering systems. Design and evaluation of components that are critical to artificial intelligence (AI) driven control systems, including but not limited to sensor fusion, feature engineering, computer vision (semantic segmentation, objection detection), ML based classification, and learning-based control systems. Team project including a final presentation and report.

*Prerequisite(s):* ENG 006 or MAT 022AL); (EEC 007 or ECS 036B); (EEC 161 or EEC 151 or ECS 036C).

*Learning Activities:* Laboratory 3 hour(s), Web Virtual Lecture 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Computer Engineering and Electrical Engineering majors.

*Grade Mode:* Letter.

## **EEC 174BY – Applied Machine Learning Senior Design Projects (3 units)**

*Course Description:* Design, development, and evaluation of components that are critical to artificial intelligence (AI) driven control systems.

Team project including a final presentation and report. Example design themes include but not limited to self-driving cars, smart healthcare, and precision agriculture.

*Prerequisite(s):* EEC 174AY.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EEC 175A – Internet of Things (3 units)**

*Course Description:* Introduction to principles, technologies, challenges, and required expertise to build the Internet of Things (IoT) solutions. Sensing, computing, wireless communication, IP communication, and cloud processing for building an IoT solution.

*Prerequisite(s):* EEC 018; (EEC 111 or EEC 110A).

*Learning Activities:* Lecture 1 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EEC 175B – Internet of Things Senior Design Project (3 units)**

*Course Description:* Propose and design a senior IoT design project, using the design principles they have studied in the prerequisite course, Internet of Things.

*Prerequisite(s):* EEC 175A.

*Learning Activities:* Lecture 1 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EEC 180 – Digital Systems II (5 units)**

*Course Description:* Computer-aided design of digital systems with emphasis on hardware description languages (VHDL), logic synthesis, and field-programmable gate arrays (FPGA). May cover advanced topics in digital system design such as static timing analysis, pipelining, memory system design, testing digital circuits.

*Prerequisite(s):* EEC 018 or EEC 180A.

*Learning Activities:* Lecture 3 hour(s), Laboratory 4 hour(s).

*Credit Limitation(s):* No credit to students who have previously completed EEC 180B.

*Grade Mode:* Letter.

## **EEC 181A – Digital Systems Design Project (3 units)**

*Course Description:* Digital-system and computer-engineering design course involving architecture, design, implementation and testing of a prototype application-specific processor under given design constraints. Team project includes a final presentation and report.

*Prerequisite(s):* (EEC 180 or EEC 180B); EEC 170.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 181B – Digital Systems Design Project (3 units)**

*Course Description:* Digital-system and computer-engineering design course involving architecture, design, implementation and testing of a prototype application-specific processor under given design constraints. Team project includes a final presentation and report.

*Prerequisite(s):* EEC 181A.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 183 – Testing & Verification of Digital Systems (5 units)**

*Course Description:* Computer aided-testing and design verification techniques for digital systems; physical fault testing; simulation-based design verification; formal verification; timing analysis.

*Prerequisite(s):* EEC 170; EEC 180B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189A – Special Topics in Electrical Engineering & Computer Science: Computer Science (1-5 units)**

*Course Description:* Special topics in Computer Science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189B – Special Topics in Electrical Engineering & Computer Science: Programming Systems (1-5 units)**

*Course Description:* Special topics in Programming Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EEC 189C – Special Topics in Electrical Engineering & Computer Science: Digital Systems (1-5 units)***Course Description:* Special topics in Digital Systems.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189D – Special Topics in Electrical Engineering & Computer Science: Communications (1-5 units)***Course Description:* Special topics in Communications.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189E – Special Topics in Electrical Engineering & Computer Science: Signal Transmission (1-5 units)***Course Description:* Special topics in Signal Transmission.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189F – Special Topics in Electrical Engineering & Computer Science: Digital Communication (1-5 units)***Course Description:* Special topics in Digital Communication.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189G – Special Topics in Electrical Engineering & Computer Science: Control Systems (1-5 units)***Course Description:* Special topics in Control Systems.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189H – Special Topics in Electrical Engineering & Computer Science: Robotics (1-5 units)***Course Description:* Special topics in Robotics.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189I – Special Topics in Electrical Engineering & Computer Science: Signal Processing (1-5 units)***Course Description:* Special topics in Signal Processing.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189J – Special Topics in Electrical Engineering & Computer Science: Image Processing (1-5 units)***Course Description:* Special topics in Image Processing.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189K – Special Topics in Electrical Engineering & Computer Science: High-Frequency Phenomena & Devices (1-5 units)***Course Description:* Special topics in High-Frequency Phenomena & Devices.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189L – Special Topics in ECS: Solid-State Devices & Physical Electronics (1-5 units)***Course Description:* Special topics in Solid-State Devices & Physical Electronics.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189M – Special Topics in Electrical Engineering & Computer Science: Systems Theory (1-5 units)***Course Description:* Special topics in Systems Theory.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).**EEC 189N – Special Topics in Electrical Engineering & Computer Science: Active & Passive Circuits (1-5 units)***Course Description:* Special topics in Active & Passive Circuits.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture, Laboratory, Lecture/Lab.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.*General Education:* Science & Engineering (SE).

## **EEC 1890 – Special Topics in Electrical Engineering & Computer Science: Integrated Circuits (1-5 units)**

*Course Description:* Special topics in Integrated Circuits.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189P – Special Topics in Electrical Engineering & Computer Science: Computer Software (1-5 units)**

*Course Description:* Special topics in Computer Software.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189Q – Special Topics in Electrical Engineering & Computer Science: Computer Engineering (1-5 units)**

*Course Description:* Special topics in Computer Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189R – Special Topics in Electrical Engineering & Computer Science: Microprocessing (1-5 units)**

*Course Description:* Special topics in Microprocessing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189S – Special Topics in Electrical Engineering & Computer Science: Electronics (1-5 units)**

*Course Description:* Special topics in Electronics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189T – Special Topics in Electrical Engineering & Computer Science: Electromagnetics (1-5 units)**

*Course Description:* Special topics in Electromagnetics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189U – Special Topics in Electrical Engineering & Computer Science: Opto-Electronics (1-5 units)**

*Course Description:* Special topics in Opto-Electronics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory, Lecture/Lab.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 189W – Special Topics in Electrical Engineering & Computer Science: Computer Networks (1-5 units)**

*Course Description:* Special topics in Computer Networks.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 190C – Research Group Conferences in Electrical & Computer Engineering (1 unit)**

*Course Description:* Research group conferences.

*Prerequisite(s):* Consent of instructor. Upper division standing in Electrical and Computer Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EEC 192 – Internship in Electrical & Computer Engineering (1-6 units)**

*Course Description:* Supervised work experience in electrical and computer engineering.

*Prerequisite(s):* Consent of instructor. Completion of a minimum of 84 units; project approval before period of internship.

*Learning Activities:* Internship 3-18 hour(s).

*Repeat Credit:* May be repeated when project differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EEC 193A – Senior Design Project (3 units)**

*Course Description:* Team design project for seniors in Electrical or Computer Engineering. Project involves analysis, design, implementation and evaluation of an Electrical Engineering or Computer Engineering system. Project is supervised by a faculty member.

*Prerequisite(s):* EEC 196 (can be concurrent); and consent of instructor.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Restricted to senior standing in Electrical or Computer Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 193B – Senior Design Project (3 units)**

*Course Description:* Team design project for seniors in Electrical Engineering or Computer Engineering. Project involves analysis, design, implementation and evaluation of an Electrical Engineering or Computer Engineering system. Project supervised by a faculty member.

*Prerequisite(s):* EEC 193A.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 195A – Autonomous Vehicle Design Project (3 units)**

*Course Description:* Design and construct an autonomous race car. Work in groups to design, build and test speed control circuits, track sensing circuits, and a steering control loop.

*Prerequisite(s):* (ECS 036A or EEC 007); EEC 018; (EEC 110B or EEC 157A (can be concurrent) or EEC 157AV (can be concurrent) or ECS 036B).

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to major.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 195B – Autonomous Vehicle Design Project (3 units)**

*Course Description:* Design and construct an autonomous race car. Students work in groups to design, build and test speed control circuits, track sensing circuits, and a steering control loop.

*Prerequisite(s):* EEC 195A.

*Learning Activities:* Workshop 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 196 – Issues in Engineering Design (1 unit)**

*Course Description:* Covers various electrical and computer engineering standards and realistic design constraints including economic, manufacturability, sustainability, ethical, health & safety, environmental, social, and political.

*Prerequisite(s):* Senior standing in Electrical or Computer Engineering.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EEC 197T – Tutoring in Electrical & Computer Engineering (1-3 units)**

*Course Description:* Tutoring in Electrical & Computer Engineering courses, especially introductory circuits. For upper division undergraduate students who will provide tutorial assistance.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Discussion 1 hour(s), Discussion/Laboratory 2-8 hour(s).

*Grade Mode:* Pass/No Pass only.

## **EEC 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EEC 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **EEC 200 – Navigating Graduate School (1 unit)**

*Course Description:* Practical and non-technical skills necessary for first-year students in the Electrical & Computer Engineering Graduate Group. Mentorship, time management, research ethics, science communication, intellectual property.

*Prerequisite(s):* First-year Electrical Computer Engineering graduate student, Electrical Computer Engineering transfer student, or instructor approval.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EEC 201 – Digital Signal Processing (4 units)**

*Course Description:* Theory and design of digital filters. Classification of digital filters, linear phase systems, all-pass functions, FIR and IIR filter design methods and optimality measures, numerically robust structures for digital filters.

*Prerequisite(s):* EEC 150B; STA 120 or MAT 131 or MAT 167 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 205 – Computational Methods in Biomedical Imaging (4 units)**

*Course Description:* Analytic tomographic reconstruction from projections in 2D and 3D; model-based image reconstruction methods; maximum likelihood and Bayesian methods; applications to CT, PET, and SPECT.

*Prerequisite(s):* (BIM 105 or STA 120); (BIM 108 or EEC 150A).

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* BIM 252.

*Grade Mode:* Letter.

## **EEC 206 – Digital Image Processing (4 units)**

*Course Description:* Two-dimensional systems theory, image perception, sampling and quantization, transform theory and applications, enhancement, filtering and restoration, image analysis, and image processing systems.

*Prerequisite(s):* EEC 150B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EEC 210 – MOS Analog Circuit Design (4 units)**

*Course Description:* Analysis and design of MOS amplifiers, bias circuits, voltage references and other analog circuits. Stability and compensation of feedback amplifiers. Introduction to noise analysis in MOS circuits.

*Prerequisite(s):* EEC 110B; (EEC 140A or EEC 140AV).

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 211 – Advanced Analog Circuit Design (4 units)**

*Course Description:* Noise and distortion in electronic circuits and systems. Application to communication circuits. Specific applications include mixers, low-noise amplifiers, power amplifiers, phase-locked loops, oscillators and receiver architectures.

*Prerequisite(s):* EEC 210; STA 131A EEC 112 recommended.

*Learning Activities:* Lecture 3 hour(s), Project (Term Project).

*Grade Mode:* Letter.

## **EEC 212 – Analog MOS IC Design for Signal Processing (4 units)**

*Course Description:* Analysis and design of analog MOS integrated circuits. Passive components, Single-ended and fully differential op amps, Sampled-data and continuous-time filters.

*Prerequisite(s):* EEC 210.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

## **EEC 213 – Data-Conversion Techniques & Circuits (4 units)**

*Course Description:* Digital-to-analog and analog-to-digital conversion; component characteristics and matching; sample-and-hold, comparator, amplifier, and reference circuits.

*Prerequisite(s):* EEC 210.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 214 – Integrated Circuit Design for Power Electronics (4 units)**

*Course Description:* IC design for power electronics. Linear and switching regulation. Integrated power management. DC/DC and AC/DC conversion. Applications in portable electronics and wireless sensors.

*Prerequisite(s):* EEC 210.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EEC 215 – Circuits for Digital Communications (4 units)**

*Course Description:* Analog, digital, and mixed-signal CMOS implementations of communication-circuit blocks: gain control, adaptive equalizers, sampling detectors, clock recovery.

*Prerequisite(s):* EEC 150B; EEC 210 (can be concurrent); EEC 165, EEC 166, or EEC 265 recommended.

*Learning Activities:* Lecture 3 hour(s), Project (Term Project).

*Grade Mode:* Letter.

## **EEC 216 – Low Power Digital Integrated Circuit Design (4 units)**

*Course Description:* Integrated circuit design for low power and energy consumption. Low power architectures, logic styles and circuit design. Variable supply and threshold voltages. Leakage management. Power estimation. Energy sources, power electronics, and energy recovery.

Applications in portable electronics and sensors. Thermodynamic limits.

*Prerequisite(s):* EEC 118.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EEC 221 – Radio Frequency & Microwave Filter Design (4 units)**

*Course Description:* Design of radio frequency and microwave filters including filter specification and approximation theory. Passive LC filter design covers doubly-terminated reactance two-port synthesis and coupling matrix based synthesis. Active filter design includes sensitivity, op-amp building blocks, and cascade filter design.

*Prerequisite(s):* EEC 132A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EEC 222 – RF IC Design (4 units)**

*Course Description:* Radio frequency (RF) solid-state devices, RF device modeling and design rules; non-linear RF circuit design techniques; use of non-linear computer-aided (CAD) tools; RF power amplifier design.

*Prerequisite(s):* EEC 210.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EEC 223 – RF Integrated Circuits for Wireless Communications (4 units)**

*Course Description:* Integrated RF front end circuit design of receivers and synthesizers for wireless communications, such as LNA, mixers, PLL; noise and linearity analysis and specifications; theory and working mechanism of synthesizers and phase noise analysis.

*Prerequisite(s):* EEC 132A; EEC 112.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 224 – Terahertz & mm-Wave Integrated Circuit Design (4 units)**

*Course Description:* Fundamental theory of RF transmitter and receiver, including noise analysis, transceiver architectures, and antenna arrays. Fundamental limitations, theory and design of amplifiers, oscillators and signal sources at THz and mm-wave frequencies.

*Prerequisite(s):* EEC 132A; EEC 112; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 228 – Advanced Microwave Circuit & Device Design Techniques (4 units)**

*Course Description:* Theory, design, fabrication, analysis of advanced microwave circuits and devices. Wideband transformers, stripline/microstripline broadband couplers. Lumped and distributed filter synthesis. Broadband matching theory applied to microwave devices. Wideband and low noise FET/HEMT amplifiers. Advanced microwave oscillator theory. Phase noise analysis.

*Prerequisite(s):* EEC 132B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EEC 229 – RF-MEMS & Adaptive Wireless Frontends (4 units)**

*Course Description:* Focuses on the modeling, design, fabrication, and characterization of RF-MEMS while providing a thorough introduction to the technology with an emphasis on how it will benefit the design of adaptive RF/microwave wireless systems.

*Prerequisite(s):* EEC 130A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EEC 230 – Electromagnetics (4 units)**

*Course Description:* Maxwell's equations, plane waves, reflection and refraction, complex waves, waveguides, resonant cavities, and basic antennas.

*Prerequisite(s):* EEC 130B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EEC 231A – Plasma Physics & Controlled Fusion I (4 units)**

*Course Description:* Equilibrium plasma properties; single particle motion; fluid equations; waves & instabilities in a fluid plasma; plasma kinetic theory & transport coefficients; linear & nonlinear Vlasov theory; fluctuations, correlations & radiation; inertial & magnetic confinement systems in controlled fusion.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Graduate Standing in Engineering or Consent of Instructor.

*Grade Mode:* Letter.

## **EEC 231B – Plasma Physics & Controlled Fusion II (4 units)**

*Course Description:* Equilibrium plasma properties; single particle motion; fluid equations; waves & instabilities in a fluid plasma; plasma kinetic theory & transport coefficients; linear & nonlinear Vlasov theory; fluctuations, correlations & radiation; inertial & magnetic confinement systems in controlled fusion.

*Prerequisite(s):* EEC 231A; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 231C – Plasma Physics & Controlled Fusion III (4 units)**

*Course Description:* Equilibrium plasma properties; single particle motion; fluid equations; waves & instabilities in a fluid plasma; plasma kinetic theory & transport coefficients; linear & nonlinear Vlasov theory; fluctuations, correlations & radiation; inertial & magnetic confinement systems in controlled fusion.

*Prerequisite(s):* EEC 231B; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 232A – Advanced Applied Electromagnetics I (4 units)**

*Course Description:* The exact formulation of applied electromagnetic problems using Green's functions. Applications of these techniques to transmission circuits.

*Prerequisite(s):* EEC 132B or EEC 230.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 232B – Advanced Applied Electromagnetics II (4 units)**

*Course Description:* An advanced treatment of electromagnetics with applications to passive microwave devices and antennas.

*Prerequisite(s):* EEC 132B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EEC 233 – High Speed Signal Integrity (4 units)**

*Course Description:* Design and analysis of interconnects in high-speed circuits and sub-systems; understanding of high-speed signal propagation and signal integrity concepts; electromagnetic modeling tools and experimental techniques.

*Prerequisite(s):* EEC 130B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EEC 234A – Physics & Technology of Microwave Vacuum Electron Beam Devices I (4 units)**

*Course Description:* Physics & technology of electron beam emission, flow and transport, electron gun design, space charge waves & klystrons with applications to accelerator systems, RF power sources for radar & communication systems, thermionic energy conversion, and electric space propulsion. Recent advances in materials & manufacturing technologies are also reviewed.

*Prerequisite(s):* B.S. degree in physics or engineering or the equivalent background or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 234B – Physics & Technology of Microwave Vacuum Electron Beam Devices II (4 units)**

*Course Description:* Theory, modeling, & experimental design of traveling wave tubes, backward wave oscillators, and extended interaction oscillators employed in satellite commutations, plasma imaging, and underground imaging systems.

*Prerequisite(s):* EEC 234A; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 234C – Physics & Technology of Microwave Vacuum Electron Beam Devices III (4 units)**

*Course Description:* Physics & technology of gyrotrons, gyro-amplifiers, free electron lasers, magnetrons, cross-field amplifiers, and relativistic devices employed in plasma fusion reactors, microwave heating, and high power microwave applications.

*Prerequisite(s):* EEC 234B; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 235 – Photonics (4 units)**

*Course Description:* Optical propagation of electromagnetic waves and beams in photonic components and the design of such devices using numerical techniques.

*Prerequisite(s):* EEC 130B; EEC 230 recommended.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 236 – Nonlinear Optical Applications (3 units)**

*Course Description:* Nonlinear optical interactions in optical communication, optical information processing and integrated optics. Basic concepts underlying optical nonlinear interactions in materials and guided media.

*Prerequisite(s):* EEC 130B; EEC 230 (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed EEC 233.

*Grade Mode:* Letter.

**EEC 237A – Lasers (3 units)**

*Course Description:* Theoretical and practical description of lasers. Theory of population inversion, amplification and oscillation using semiclassical oscillator model and rate equations. Description and design of real laser system.

*Prerequisite(s):* EEC 235; EEC 130B; or the equivalent of EEC 130B.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed EEC 226A.

*Grade Mode:* Letter.

**EEC 237B – Laser Physics II (4 units)**

*Course Description:* Oscillation threshold. Coupled cavity/atomic rate equations, Linear pulse propagation; dispersion, broadening, compression. Nonlinear pulse propagation. Energy extraction. Optical beams, resonators, eigenmodes, axial/transverse modes. Paraxial ray optics, resonator stability, ABCD matrices. Laser dynamics; transients, spiking, Q-switching, active and passive modelocking.

*Prerequisite(s):* EEC 237A or EAD 265A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Credit Limitation(s):* Not open for credit to students who have completed EEC 226B.

*Grade Mode:* Letter.

**EEC 238 – Semiconductor Lasers & Photonic Integration (4 units)**

*Course Description:* Understanding of fundamental optical transitions in semiconductors and quantum-confined systems are applied to diode & unipolar lasers and selected photonic devices. The importance of radiative and non-radiative recombination, simulated emission, excitons in quantum wells, and strained quantum layers are considered. Photonic integrated circuits based on active (with optical gain) and passive (without optical gain).

*Prerequisite(s):* EEC 140A or EEC 140AV.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 239A – Optical Communication Technologies for High-Speed Data Networking (4 units)**

*Course Description:* Enabling technologies for optical fiber communication and data center networks. Physical layer issues for component and system technologies in high-speed data optical communications. High-capacity data multiplexing technologies including wavelength-division-multiplexing, time-division-multiplexing, and advanced coherent modulation. Optical signal transmission, optical amplification, and optical switching for telecom and data center networks.

*Prerequisite(s):* EEC 130B.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 239B – High-Capacity Optical Data Systems & Networks (4 units)**

*Course Description:* High-capacity optical data systems and networks, built-on modern optical communication technologies. Technologies behind data center networking, software defined networking, and RF-optical networking. Physical layer issues in light of networking architectures and protocols. Optical communications systems design and integration. Systems technologies and higher-level network architecture, case studies. WDM, TDM, and EON networking, optical and wireless access technologies based on PON and ROF.

*Prerequisite(s):* EEC 239A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 240 – Semiconductor Device Physics (4 units)**

*Course Description:* Physical principles, characteristics and models of various semiconductor materials and devices, including: P-N junction, metal-semiconductor diodes, junction, and insulated-gate field effect transistors. Elements of basic design exercises to explore circuit design, RF phenomenon, optoelectronics, solid-state devices, materials, and large-scale integration.

*Prerequisite(s):* EEC 140B.

*Learning Activities:* Lecture 3 hour(s); Project.

*Grade Mode:* Letter.

**EEC 241 – Introduction to Molecular Electronics (4 units)**

*Course Description:* Examines molecules for electronic devices and sensors. Covers: electronic states of molecules, charge transport in nanoscale systems, and fabrication and measurement of molecular-scale devices. Specific Topics: Hartree-Fock & Density Functional Theory, Landauer formalism, coulomb blockade, tunneling and hopping transport.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**EEC 242 – Advanced Nanostructured Devices (4 units)**

*Course Description:* Physics of nano-structured materials and device operation. Overview of new devices enabled by nanotechnology; fabrication and characterization methods; applications of nano-structures and devices.

*Prerequisite(s):* EEC 130A; (EEC 140A or EEC 140AV).

*Learning Activities:* Lecture 4 hour(s); Project.

*Grade Mode:* Letter.

**EEC 243 – Optical Imaging & Microscopy (4 units)**

*Course Description:* Theory and techniques of optical imaging & microscopy. Fourier optics; light propagation & light detection; imaging contrast mechanisms; optical & microscopy techniques.

*Prerequisite(s):* PHY 009B; EEC130AB recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EEC 244 – Introduction to Neuroengineering (4 units)**

*Course Description:* Survey of neuroengineering field from engineering and biological perspectives; micro-/nano-fabrication technology; optical and electrical techniques to monitor and modulate neural activity; computational tools and control systems; prosthetics and human machine interfaces; human performance and rehabilitation; cognitive neuroengineering; neuroethics; extensive proposal development to merge aforementioned themes into a multidisciplinary project.

*Prerequisite(s):* Graduate standing; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s); Discussion 1 hour(s); Extensive Writing.

*Grade Mode:* Letter.

**EEC 245 – Micro- & Nano-Technology in Life Sciences (4 units)**

*Course Description:* Survey of biodevice design from engineering and biological perspectives; micro-/nano-fabrication techniques; surface science and mass transport; essential biological processes and models; proposal development skills on merging aforementioned themes.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* ECH 245, EMS 245, MAE 245.

*Grade Mode:* Letter.

**EEC 246 – Advanced Projects in IC Fabrication (4 units)**

*Course Description:* Individualized projects in the fabrication of analog or digital integrated electronic or optoelectronic circuits.

*Prerequisite(s):* EEC 146B.

*Learning Activities:* Discussion 1 hour(s), Laboratory 9 hour(s).

*Grade Mode:* Letter.

**EEC 247 – Advanced Semiconductor Devices (4 units)**

*Course Description:* Semiconductor devices, including MOSFETs, heterojunction transistors, light-emitting diodes, lasers, sensors, detectors, power and high-voltage transistors, MEMS resonators, organic semiconductors and photovoltaics. All material is from recent literature, encouraging students to utilize search methods and critically assess the latest research.

*Prerequisite(s):* Graduate standing in Engineering.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

**EEC 248 – Photovoltaics & Solar Cells (3 units)**

*Course Description:* Physics and application of photovoltaics and solar cells, including design, fabrication technology, and grid incorporation. Mono and microcrystalline silicon devices; thin-film technologies, heterojunction and organic-semiconductor technologies. Collectors, electrical inverters and infrastructure issues. Challenges and concerns.

*Prerequisite(s):* EEC 140B; or consent of instructor, or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EMS 246.

*Grade Mode:* Letter.

**EEC 249 – Nanofabrication (4 units)**

*Course Description:* Theory and practice of nanofabrication (top-down and bottom-up approaches), used for producing integrated circuits, electronic devices, sensors, and microstructures. Process development and characterization.

*Prerequisite(s):* Graduate standing in Engineering.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EEC 250 – Linear Systems & Signals (4 units)**

*Course Description:* Mathematical description of systems. Selected topics in linear algebra. Solution of the state equations and an analysis of stability, controllability, observability, realizations, state feedback and state estimation. Discrete-time signals and systems, and the Z-transform.

*Prerequisite(s):* EEC 150A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 251 – Nonlinear Systems (4 units)**

*Course Description:* Nonlinear differential equations, second-order systems, approximation methods, bifurcations, Lyapunov stability, absolute stability, Popov criterion, circle criterion, sliding-mode control, feedback linearization techniques.

*Prerequisite(s):* EEC 250.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 252 – Multivariable Control System Design (4 units)**

*Course Description:* Review of single-loop feedback design. Stability, performance and robustness of multi-input multi-output control systems. H-infinity design. Frequency response methods. Optimization-based design. Algebraic design methods for uncertain systems.

*Prerequisite(s):* EEC 250.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 254 – Optimization (3 units)**

*Course Description:* Modeling optimization problems in engineering design and other applications; optimality conditions; unconstrained optimization (gradient, Newton, conjugate gradient and quasi-Newton methods); duality and Lagrangian relaxation constrained optimization. (Primal method and an introduction to penalty and augmented Lagrangian methods.)

*Prerequisite(s):* MAT 022A; Knowledge of FORTRAN or C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**EEC 255 – Robotic Systems (3 units)**

*Course Description:* Introduction to robotic systems. Mechanical manipulators, kinematics, manipulator positioning and path planning. Dynamics of manipulators. Robot motion programming and control algorithm design.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**EEC 256 – Reinforcement Learning (4 units)**

*Course Description:* Reinforcement Learning (RL) is the subset of machine learning, the core of artificial intelligence. Topics include fundamentals of RL, bandit problems, Markov decision processes, and dynamic programming.

*Prerequisite(s):* EEC 260; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 260 – Random Signals & Noise (4 units)**

*Course Description:* Random processes as probabilistic models for signals and noise. Probability and random variables, Convergence and limit theorems, Specification of random processes, Markov Chains, Wiener process and white Gaussian noise, Poisson process and shot noise, Processing and frequency analysis of random signals.

*Prerequisite(s):* EEC 150A; EEC 161.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EEC 261 – Signal Processing for Communications (4 units)**

*Course Description:* Signal processing in wireless and wireline communication systems. Characterization and distortion of wireless and wireline channels. Channel equalization and maximum likelihood sequence estimation. Channel precoding and pre-equalization. OFDM and transmit diversity. Array processing.

*Prerequisite(s):* EEC 165; EEC 260; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 262 – Multi-access Communications Theory (4 units)**

*Course Description:* Maximum stable throughput of Poisson collision channels. Classic collision resolution algorithms. Carrier sensing multiple access and its performance analysis. System stability analysis. Joint design of the physical/medium access control layers. Capacity region of multi-access channels. Multi-access with correlated sources.

*Prerequisite(s):* (EEC 173A or ECS 152A); STA 120; or equivalent of STA 120.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

**EEC 263 – Optimal & Adaptive Filtering (4 units)**

*Course Description:* Geometric formulation of least-squares estimation problems. Theory and applications of optimum Wiener and Kalman filtering. MAP and maximum likelihood estimation of hidden Markov models, Viterbi algorithm. Adaptive filtering algorithms, properties and applications.

*Prerequisite(s):* EEC 260.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EEC 264 – Estimation & Detection of Signals in Noise (4 units)**

*Course Description:* Introduction to parameter estimation and detections of signals in noise. Bayes and Neyman-Pearson likelihood-ratio tests for signal detection. Maximum-likelihood parameter estimation. Detection of known and Gaussian signals in white or colored noise. Applications to communications, radar, signal processing.

*Prerequisite(s):* EEC 260.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EEC 265 – Principles of Digital Communications (4 units)**

*Course Description:* Introduction to digital communications. Coding for analog sources. Characterization of signals and systems. Modulation and demodulation for the additive Gaussian channel. Digital signaling over bandwidth-constrained linear filter channels and over fading multipath channels. Spread spectrum signals.

*Prerequisite(s):* EEC 165; EEC 260; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 266 – Information Theory & Coding (4 units)**

*Course Description:* Topics include Entropy, Relatively Entropy, Mutual Information; Asymptotic Equipartition Property; Entropy Rates of Stochastic Process; Data Compression; Channel Capacity; Differential Entropy; Gaussian Channel; Rate Distortion Theory; Network Information Theory.

*Prerequisite(s):* EEC 161.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

**EEC 267 – Mobile Communications (4 units)**

*Course Description:* Time-varying multi-path fading channel models and receiver performance in fading channels; multiple access techniques and multiple access receivers design and performance; optimum design and the capacity of wireless channels.

*Prerequisite(s):* EEC 260; EEC 265 (can be concurrent).

*Learning Activities:* Lecture/Lab 3 hour(s).

*Grade Mode:* Letter.

**EEC 269A – Error Correcting Codes I (4 units)**

*Course Description:* Introduction to theory and practice of block codes, linear block codes, cyclic codes, decoding algorithms, and coding techniques.

*Prerequisite(s):* MAT 022A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**EEC 269B – Error Correcting Codes II (3 units)**

*Course Description:* Introduction to convolutional codes, turbo codes, trellis and block coded modulation codes, soft-decision decoding algorithms, the Viterbi algorithm, reliability-based decoding, trellis-based decoding, multistage decoding.

*Prerequisite(s):* EEC 165; EEC 269A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**EEC 270 – Computer Architecture (4 units)**

*Course Description:* Introduction to modern techniques for high-performance single and multiple processor systems. Topics include advanced pipeline design, advanced memory hierarchy design, optimizing pipeline and memory use, and memory sharing among multiprocessors. Case studies of recent single and multiple processor systems.

*Prerequisite(s):* EEC 170 or ECS 154B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EEC 272 – High-Performance Computer Architecture (4 units)**

*Course Description:* Designing and analysis of high performance computer architecture with emphasis on vector processing, on-chip interconnect networks, chip-level multiprocessors, memory and storage subsystem design and impact of technological advances on computer architecture.

*Prerequisite(s):* EEC 270 or ECS 201A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 273 – Networking Architecture & Resource Management (4 units)**

*Course Description:* Design & implementation principles of networking architecture and protocols. Internet, data center, and telephony case studies. Topics: Internet data & control planes; application & services; resource management; Quality of Service (QoS) provisioning; traffic engineering; performance evaluation, software-defined networks, & future research issues.

*Prerequisite(s):* ECS 152A or EEC 173A.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One and Pass Two only open to Graduate Students in Computer Science and Electrical & Computer Engineering.

*Grade Mode:* Letter.

## **EEC 279 – Modern Parallel Computing (4 units)**

*Course Description:* Exploration of the architecture of modern parallel computers, their programming models, and their programming systems.

*Prerequisite(s):* Prior experience in C/C++ required; experience with other computer architecture, computer graphics, algorithms, and data structures are also useful; all assignments use C/C++.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 281 – VLSI Digital Signal Processing (4 units)**

*Course Description:* Digital signal processors, building blocks, and algorithms. Design and implementation of processor algorithms, architectures, control, functional units, and circuit topologies for increased performance and reduced circuit size and power dissipation.

*Prerequisite(s):* EEC 150B; EEC 170; (EEC 180 or EEC 180B); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 283 – Advanced Design Verification of Digital Systems (4 units)**

*Course Description:* Design verification techniques for digital systems; simulation-based design verification techniques; formal verification techniques, including equivalence checking, model checking, and theorem proving; timing analysis and verification; application of design certification techniques to microprocessors.

*Prerequisite(s):* EEC 170; (EEC 018 or EEC 180A).

*Learning Activities:* Lecture 3 hour(s), Project 1 hour(s).

*Grade Mode:* Letter.

## **EEC 284 – Design & Optimization of Embedded Computing Systems (4 units)**

*Course Description:* Introduction to design and optimization of digital computing systems for embedded applications. Topics include combinatorial optimization techniques, performance and energy optimization in embedded systems, compilation and architecture-specific mapping, programmable and reconfigurable platforms; design automation and algorithmic improvements to design process.

*Prerequisite(s):* EEC 170; (EEC 180 or EEC 180B); or consent of instructor. ECS 122A recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **EEC 286 – Introduction to Digital System Testing (4 units)**

*Course Description:* Review of several current techniques used to detect physical faults in both combinational and sequential circuits. Topics include fault modeling, fault simulation, test generation, compression techniques, and testing architectures.

*Prerequisite(s):* EEC 018.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **EEC 289A – Special Topics in Electrical & Computer Engineering: Computer Science (1-5 units)**

*Course Description:* Special topics in Computer Science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EEC 289B – Special Topics in Electrical & Computer Engineering: Programming Systems (1-5 units)**

*Course Description:* Special topics in Programming Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EEC 289C – Special Topics in Electrical & Computer Engineering: Digital Systems (1-5 units)**

*Course Description:* Special topics in Digital Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EEC 289D – Special Topics in Electrical & Computer Engineering: Digital Systems (1-5 units)**

*Course Description:* Special topics in Digital Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289E – Special Topics in Electrical & Computer Engineering: Signal Transmission (1-5 units)**

*Course Description:* Special topics in Signal Transmission.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289F – Special Topics in Electrical & Computer Engineering: Digital Communication (1-5 units)**

*Course Description:* Special topics in Digital Communication.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289G – Special Topics in Electrical & Computer Engineering: Control Systems (1-5 units)**

*Course Description:* Special topics in Control Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289H – Special Topics in Electrical & Computer Engineering: Robotics (1-5 units)**

*Course Description:* Special topics in Robotics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289I – Special Topics in Electrical & Computer Engineering: Signal Processing (1-5 units)**

*Course Description:* Special topics in Signal Processing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289J – Special Topics in Electrical & Computer Engineering: Image Processing (1-5 units)**

*Course Description:* Special topics in Image Processing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289K – Special Topics in Electrical & Computer Engineering: High Frequency Phenomena & Devices (1-5 units)**

*Course Description:* Special topics in High Frequency Phenomena & Devices.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289L – Special Topics in Electrical & Computer Engineering: Solid-State Devices & Physical Electronics (1-5 units)**

*Course Description:* Special topics in Solid-State Devices & Physical Electronics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289M – Special Topics in Electrical & Computer Engineering: Systems Theory (1-5 units)**

*Course Description:* Special topics in Systems Theory.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289N – Special Topics in Electrical & Computer Engineering: Active & Passive Circuits (1-5 units)**

*Course Description:* Special topics in Active & Passive Circuits.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289O – Special Topics in Electrical & Computer Engineering: Integrated Circuits (1-5 units)**

*Course Description:* Special topics in Integrated Circuits.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289P – Special Topics in Electrical & Computer Engineering: Computer Software (1-5 units)**

*Course Description:* Special topics in Computer Software.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289Q – Special Topics in Electrical & Computer Engineering: Computer Engineering (1-5 units)**

*Course Description:* Special topics in Computer Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289R – Special Topics in Electrical & Computer Engineering: Microprocessing (1-5 units)**

*Course Description:* Special topics in Microprocessing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289S – Special Topics in Electrical & Computer Engineering: Electronics (1-5 units)**

*Course Description:* Special topics in Electronics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289T – Special Topics in Electrical & Computer Engineering: Electromagnetics (1-5 units)**

*Course Description:* Special topics in Electromagnetics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289U – Special Topics in Electrical & Computer Engineering: Optoelectronics (1-5 units)**

*Course Description:* Special topics in Optoelectronics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 289W – Special Topics in Electrical Engineering & Computer Science: Computer Networks (1-5 units)**

*Course Description:* Special topics in Computer Networks.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EEC 290 – Seminar in Electrical & Computer Engineering (1 unit)**

*Course Description:* Discussion and presentation of current research and development in Electrical & Computer Engineering.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 290C – Graduate Research Group Conference in Electrical & Computer Engineering (1 unit)**

*Course Description:* Research problems, progress, and techniques in electrical and computer engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 290P – Capstone Project For MS Plan II (4 units)**

*Course Description:* Conducting research projects in electrical and computer engineering. Communicating research results in written reports and oral presentations. Systemic project implementation to answer a comprehensive scientific or technical question in the area of electrical and computer engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Term Paper, Lecture 1 hour(s), Extensive Problem Solving.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 291 – Solid-State Circuit Research Laboratory Seminar (1 unit)**

*Course Description:* Lectures on solid-state circuit and system design by various visiting experts in the field.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 292 – Seminar in Solid-State Technology (1 unit)**

*Course Description:* Lectures on solid-state technology by various visiting experts in the field.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 293 – Computer Engineering Research Seminar (1 unit)**

*Course Description:* Lectures, tutorials and seminars on topics in computer engineering.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 294 – Communications, Signal & Image Processing Seminar (1 unit)**

*Course Description:* Communications, signal and image processing, video engineering and computer vision.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 295 – Systems, Control & Robotics Seminar (1 unit)**

*Course Description:* Seminars on current research in systems and control by faculty and visiting experts. Technical presentations and lectures on current topics in robotics research and robotics technology.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 296 – Photonics Research Seminar (1 unit)**

*Course Description:* Lectures on photonics and related areas by faculty and visiting experts.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EEC 299 – Research (1-12 units)***Course Description:* Research.*Learning Activities:* Variable.*Grade Mode:* Satisfactory/Unsatisfactory only.**EEC 390 – The Teaching of Electrical Engineering (1 unit)***Course Description:* Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.*Prerequisite(s):* Meet qualifications for teaching assistant and/or associate-in in Electrical Engineering.*Learning Activities:* Discussion 1 hour(s).*Repeat Credit:* May be repeated.*Grade Mode:* Satisfactory/Unsatisfactory only.**EEC 396 – Teaching Assistant Training Practicum (1-4 units)***Course Description:* Teaching Assistant training.*Prerequisite(s):* Graduate standing.*Learning Activities:* Variable.*Repeat Credit:* May be repeated.*Grade Mode:* Pass/No Pass only.

## **Emergency Medicine (EMR)**

**School of Medicine****EMR 092 – Emergency Medicine Clinical Research Internship (1-4 units)***Course Description:* Intended to give the undergraduate student an opportunity to conduct "hands-on" clinical research in the Emergency Department. Through the lecture/discussion, students will learn the basics of conducting and developing clinical research studies, using examples from ongoing studies.*Prerequisite(s):* Consent of instructor; undergraduate student in good academic standing at UC Davis.*Learning Activities:* Internship 6-12 hour(s).*Credit Limitation(s):* Units awarded depend on hours worked.*Repeat Credit:* May be repeated 4 unit(s).*Grade Mode:* Pass/No Pass only.**EMR 092C – Joan Viteri Memorial Clinic Preceptorship (1.5 units)***Course Description:* Directed towards the undergraduate students at UC Davis that volunteer at the Joan Viteri Memorial Clinic (JVMC).*Prerequisite(s):* Consent of instructor.*Learning Activities:* Clinical Activity, Seminar 1 hour(s).*Repeat Credit:* May be repeated.*Grade Mode:* Pass/No Pass only.**EMR 192 – Emergency Medicine Clinical Research Internship (1-4 units)***Course Description:* Intended to give the upper division undergraduate student an opportunity to conduct "hands-on" clinical research in the Emergency Department. Through the lecture/discussion, students learn the basics of conducting and developing clinical research studies.*Prerequisite(s):* Consent of instructor; undergraduate student in good academic standing at UC Davis.*Learning Activities:* Internship 6-12 hour(s).*Repeat Credit:* May be repeated 2 time(s).*Grade Mode:* Pass/No Pass only.**EMR 192A – Joan Viteri Memorial Clinic (JVMC) Student Volunteer (1 unit)***Course Description:* Field experience in health care delivery, patient histories and physical examinations, health promotions and disease prevention, diagnosis and treatment of episodic, acute and chronic illness, basic laboratory testing and appropriate referral and follow-up. Students must apply and interview.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Lecture/Discussion 1 hour(s).*Enrollment Restriction(s):* Open to undergraduate students only.*Repeat Credit:* May be repeated 9 time(s).*Grade Mode:* Pass/No Pass only.**EMR 199A – Special Study for Advanced Undergraduates (4-12 units)***Course Description:* For students interested in working on specific EM projects in a more extensive way. Must commit at least four hours per week for two quarters.*Prerequisite(s):* Consent of instructor; experienced RA's who have successfully performed in the EMRAP program for a minimum of three quarters; must have database skills.*Learning Activities:* Variable 4-12 hour(s).*Credit Limitation(s):* Credit awarded upon completion of EMR 199B.*Grade Mode:* Letter.**EMR 299 – Research (1-12 units)***Course Description:* Directed research in the Department of Emergency Medicine.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Variable 1-12 hour(s).*Repeat Credit:* May be repeated.*Grade Mode:* Satisfactory/Unsatisfactory only.**EMR 401 – Preceptorship in Emergency Medicine (1-6 units)***Course Description:* Exposure to the specialty of Emergency Medicine and observation of a wide array of patients in the Emergency Department.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Clinical Activity 10 hour(s).*Repeat Credit:* May be repeated.*Grade Mode:* Pass/Fail only.

## **EMR 405A – Fundamentals of Point-of-Care Ultrasound (1 unit)**

*Course Description:* First in a longitudinal elective course spanning the first two years of medical school. Introduces the fundamental concepts and technique of ultrasonography in preparation for patient assessment during clinical work. Through a series of lectures accompanied by hands-on practice sessions and case challenges, spaced teaching and deliberate practice, students will grasp the fundamentals of diagnostic ultrasound and solidify their knowledge of key medical science concepts.

*Learning Activities:* Lecture 5 hour(s), Discussion/Laboratory 4 hour(s).

*Grade Mode:* Pass/Fail only.

## **EMR 405B – Fundamentals of Point-of-Care Ultrasound (1 unit)**

*Course Description:* Second longitudinal elective course spanning the first two years of medical school. Introduces the fundamental concepts and technique of ultrasonography in preparation for patient assessment during clinical work. Through a series of lectures accompanied by hands-on practice sessions and case challenges, spaced teaching and deliberate practice, students will grasp the fundamentals of diagnostic ultrasound and solidify their knowledge of key medical science concepts.

*Learning Activities:* Lecture 5 hour(s), Discussion/Laboratory 4 hour(s).

*Grade Mode:* Pass/Fail only.

## **EMR 430 – Introduction to Medical Toxicology (3-6 units)**

*Course Description:* In-depth review of clinical and medical toxicologic emergencies. Rotation includes contact with toxicology trained emergency faculty, didactic lectures, journal club, simulation training and exposure to a very busy poison control center.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good standing.

*Learning Activities:* Variable 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **EMR 431 – Diagnostic Medicine for the Undifferentiated Patient (3 units)**

*Course Description:* Distance Learning Didactic Elective. Develop skills for clinical assessment and diagnostic planning for common acute complaints. Develop a process for further expansion of clinical assessment skills that can be utilized for any chief complaint. Develop a broad differential diagnosis based solely on the chief complaint; "scripts" are created. Problem-based learning, self-study, and a diagnostic modality project is utilized.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Pass/Fail only.

## **EMR 435 – Wilderness Medicine (3-6 units)**

*Course Description:* Introductory elective course for students to explore how physicians can interact with the environment in austere conditions through lectures, hands-on/field experience, and case-based learning.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 20 hour(s), Clinical Activity 12 hour(s), Independent Study 8 hour(s).

*Grade Mode:* Pass/Fail only.

## **EMR 440 – Emergency Medicine Clerkship (4.5-6 units)**

*Course Description:* Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion.

*Prerequisite(s):* Satisfactory completion of Medicine, Surgery, and Pediatric Clerkship.

*Learning Activities:* Variable, Clinical Activity 46 hour(s), Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **EMR 445 – Emergency Medicine Ultrasound for Fourth-Year Medical Student (3-6 units)**

*Course Description:* Intended for students interested in learning both the technical and cognitive skills of bedside ultrasound. Emphasis will be on the use of ultrasound in emergency medicine as a diagnostic tool and in procedural guidance.

*Prerequisite(s):* Fourth-year Medical Student in good standing; interest in Emergency Medicine or Critical Care is recommended; EMR 440 or equivalent is recommended prior to the rotation.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

## **EMR 450 – Ambulatory Elective in Emergency Medicine (3-18 units)**

*Course Description:* Credit will be given for approved non-AI Emergency Medicine courses at other institutions to which there is not an equal learning experience at UC Davis.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to MS4 students in good standing; externships/away rotations only.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail.

## **EMR 455A – Focus on POCUS A (6 units)**

This version has ended; see updated course, below.

*Course Description:* Directed towards gaining a greater proficiency of point-of-care ultrasound. Particularly useful for those pursuing careers that use this modality heavily in clinical practice such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **EMR 455A – Focus on POCUS A (3-6 units)**

*Course Description:* Directed towards gaining a greater proficiency of point-of-care ultrasound. Particularly useful for those pursuing careers that use this modality heavily in clinical practice such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s).

*Grade Mode:* Honors/Pass/Fail.

This course version is effective from, and including: Fall Quarter 2023.

### **EMR 455A – Focus on POCUS A (3-6 units)**

*Course Description:* Gain a greater proficiency of point-of-care ultrasound. Particularly useful for pursuing careers that use this modality heavily in clinical practice, such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s).

*Grade Mode:* Honors/Pass/Fail.

This course version is effective from, and including: Winter Quarter 2024.

## **EMR 455B – Focus on POCUS B (6 units)**

*Course Description:* Directed towards gaining a greater proficiency of point-of-care ultrasound. Particularly useful for those pursuing careers that use this modality heavily in clinical practice such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **EMR 465 – Externship in Emergency Medicine (3-9 units)**

*Course Description:* Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion.

*Prerequisite(s):* Satisfactory completion of Medicine, Surgery and Pediatrics.

*Learning Activities:* Clinical Activity 36 hour(s), Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **EMR 470 – Pediatric Emergency Medicine Clerkship (3-6 units)**

*Course Description:* See patients in the Pediatric area of the Emergency Department under the supervision of an Emergency Medicine Attending. Emphasis on recognition and management of the acutely ill pediatric patient and treatment of common pediatric complaints.

*Prerequisite(s):* Satisfactory completion of Medicine, Surgery, and Pediatrics.

*Learning Activities:* Clinical Activity 36 hour(s), Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to fourth-year medical student in good standing only.

*Grade Mode:* Honors/Pass/Fail.

## **EMR 475 – Addiction Medicine; Advanced Clinical Clerkship (3-6 units)**

*Course Description:* Consists primarily of clinical experiences, with complementary didactics. Clinical experiences will be multidisciplinary, working with drug and alcohol counselors, harm reduction workers, and physicians in family medicine, emergency medicine, internal medicine, and psychiatry. Clinical skills focus on risk factors, diagnosis, comorbidities, and treatment of substance use disorders.

*Learning Activities:* Variable, Clinical Activity.

*Grade Mode:* Pass/Fail only.

## **EMR 480 – Understanding Health Policy: A Focus on Analysis & Translation (1-6 units)**

*Course Description:* Paradigm of healthcare delivery in the U.S. is changing rapidly. To prepare the next generation of physician leaders, provide the skills, tools, and knowledge needed to impact decisions made at the policy level.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 16 hour(s), Independent Study 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **EMR 490 – Emergency Procedures Elective (3 units)**

*Course Description:* Simulator-based skills training for emergency procedures. Topics include airway management, central venous access, chest tube placement, and general critical care resuscitation skills.

*Prerequisite(s):* Current basic life support (BLS) certification.

*Learning Activities:* Discussion/Laboratory 24 hour(s), Web Virtual Lecture 8 hour(s), Tutorial 4 hour(s), Independent Study 4 hour(s).

*Enrollment Restriction(s):* Restricted to fourth-year medical student in good standing only.

*Grade Mode:* Pass/Fail only.

## **EMR 493A – Cardiac Arrest, Resuscitation & Repurfusion SSM (3 units)**

*Course Description:* Special Studies Module, a four-week course specific to the topics of Cardiac Arrest, Resuscitation & Repurfusion.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **EMR 493B – Cardiac Arrest, Resuscitation & Repurfusion SSM (3 units)**

*Course Description:* Special Studies Module, a four-week course specific to the topics of Cardiac Arrest, Resuscitation & Repurfusion.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **EMR 499 – Research (2-18 units)**

*Course Description:* Elective where topics may be selected in either basic or clinical research areas of Emergency and/or Critical Care Medicine. The goals will be tailored to each individual student. Enrollment requires prior discussion and consent of instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory.

*Grade Mode:* Honors/Pass/Fail.

# **Endocrinology & Metabolism (ENM)**

School of Medicine

## **ENM 192 – Internship in Endocrinology (1-12 units)**

*Course Description:* Supervised work experience in endocrinology.

*Prerequisite(s):* Upper division standing; approval of project by preceptor prior to internship.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **ENM 299 – Research (1-12 units)**

*Course Description:* Endocrinology research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ENM 460 – Endocrinology Clinical Clerkship (3-18 units)**

*Course Description:* Participation with members of subspecialty service in the initial evaluation, work-up, management and follow-up of patients with endocrinologic disorders.

*Prerequisite(s):* IMD 430; and/or consent of instructor.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

## **ENM 465 – Clinical Nutrition Clerkship (3-18 units)**

*Course Description:* In-depth experience in assessment and monitoring of nutritional support of patients whose illnesses are complicated by malnutrition and of patients with problems in under-nutrition due to various illnesses.

*Prerequisite(s):* IMD 430; consent of instructor of record.

*Learning Activities:* Clinical Activity 30 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **ENM 480 – Insights in Endocrinology (1-3 units)**

*Course Description:* First- or second-year students observe in morning Endocrine and Diabetes clinics; attend bi-weekly noon and afternoon endocrine conferences. Present brief endocrine physiology oral presentation to the endocrine group.

*Prerequisite(s):* Consent of instructor; student in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **ENM 499 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

# **Energy Systems (EGG)**

Graduate Studies

## **EGG 200 – Introduction to Energy Systems (4 units)**

*Course Description:* Technical, societal and environmental components of energy systems at global, national and regional scales from an interdisciplinary perspective. Energy resources; end-uses and demand; electricity systems; energy efficiency; energy justice; energy emissions; energy policy.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EGG 201 – Life Cycle Assessment for Sustainable Engineering (4 units)**

*Course Description:* Life cycle assessment methodology. Emphasis on applications to infrastructure and energy systems. Life cycle design, life cycle cost methods, other tools from industrial ecology, and links to policy.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Enrollment restricted to graduate students.

*Credit Limitation(s):* Not open to students who have taken ECI 244.

*Cross Listing:* ECI 244A.

*Grade Mode:* Letter.

## **EGG 202 – Energy & Climate Policy (4 units)**

*Course Description:* Fundamentals of energy technology, economics, and policy. Survey and analysis of current and prospective climate policies at the local and global level, including but not limited to cap-and-trade, emissions offsets, intensity standards, technology standards, mandates and subsidies.

*Prerequisite(s):* ECN 100A or ARE 100A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion.

*Enrollment Restriction(s):* Pass One restricted to graduate students in Economics, Energy Graduate Group, and Transportation Technology & Policy Graduate Group.

*Cross Listing:* ECN 216.

*Grade Mode:* Letter.

**EGG 290 – Energy Seminar (1 unit)**

*Course Description:* Selected topics of current interest in energy. Topics vary and will be announced at the beginning of each quarter. Seminar speakers include invited speakers from outside the university as well as faculty.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EGG 298A – Group Study (1-5 units)**

*Course Description:* Directed reading and discussion on select topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**EGG 298B – Group Study (1-5 units)**

*Course Description:* Directed reading and discussion on select topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EGG 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Engineering (ENG)****College of Engineering****ENG 001 – Introduction to Engineering (1 unit)**

*Course Description:* Introduction to the role of engineers in the acquisition and development of engineering knowledge, the differences and similarities among engineering fields, and the work ethic and skills required for engineering.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to first year students only.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ENG 003 – Introduction to Engineering Design (4 units)**

*Course Description:* Introduction to the engineering design process that incorporates the development of oral and written communication skills integral to the design process. Conducted in workshop format with hands-on engagement in the design process.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture 2 hour(s), Studio 2 hour(s), Project 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to lower division College of Engineering students; Pass Two restricted to lower division students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL).

**ENG 003Y – Introduction to Engineering Design (4 units)**

*Course Description:* Introduction to the engineering design process that incorporates the development of oral and written communication skills integral to the design process. Conducted in workshop format with hands-on engagement in the design process.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Web Virtual Lecture 2 hour(s), Studio 2 hour(s), Project 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to lower division College of Engineering students; Pass Two restricted to undergraduate College of Engineering students.

*Credit Limitation(s):* Not credit if student has taken ENG 003.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL).

**ENG 004 – Engineering Graphics in Design (3 units)**

*Course Description:* Engineering design, descriptive geometry, pictorial sketching, computer-aided graphics, and their application in the solution of engineering problems.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ENG 006 – Engineering Problem Solving (4 units)**

*Course Description:* Methodology for solving engineering problems.

Engineering computing and visualization based on MATLAB. Engineering examples and applications.

*Prerequisite(s):* (MAT 016A C- or better or MAT 017A C- or better or MAT 021A C- or better); (MAT 016B C- or better (can be concurrent) or MAT 017B C- or better (can be concurrent) or MAT 021B C- or better (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**ENG 008 – Introduction to Entrepreneurship (3 units)**

*Course Description:* Students from all majors will learn the processes involved in modern entrepreneurship and identify an opportunity for innovation. The 3 C's of the entrepreneurial mindset (developed by KEEN) will be covered: Curiosity, Connections, and Creating Values.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ENG 010 – The Science Behind the Technology in Our Lives (4 units)**

*Course Description:* Understanding of how the technology in our lives works using only basic concepts and rudimentary mathematics.

*Prerequisite(s):* High school algebra.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**ENG 011A – Issues in Engineering (1 unit)**

*Course Description:* Engineering profession and its role in society; engineering design and development process; introduction to the engineering grand challenges; and professional resources for students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ENG 011B – Issues in Engineering (1 unit)**

*Course Description:* Engineering disciplines; the engineering profession's methods, principles, and career opportunities; professional resources for students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Credit Limitation(s):* No credit for students who have completed ENG 001.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ENG 017 – Circuits I (4 units)**

*Course Description:* Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions.

*Prerequisite(s):* MAT 021C; C- or better recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ENG 017V – Circuits I (4 units)**

*Course Description:* Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions.

*Prerequisite(s):* MAT 021C.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ENG 020 – Introduction to Space Exploration: Understanding the Technological & Environmental Challenges (4 units)**

*Course Description:* Introductory overview of the space environment. Discussion of space exploration technology including propulsion, orbital mechanics, and spacecraft engineering.

*Prerequisite(s):* High school level Algebra, Geometry, General Science (Physics and Chemistry).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**ENG 035 – Statics (4 units)**

*Course Description:* Force systems and equilibrium conditions with emphasis on engineering problems.

*Prerequisite(s):* (PHY 009A C- or better or PHY 009HA C- or better); MAT 021D C- or better (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENG 045 – Properties of Materials (4 units)**

*Course Description:* Introduction to the properties of engineering materials and their relation to the internal structure of materials.

*Prerequisite(s):* (MAT 016C C- or better or MAT 021C C- or better); CHE 002A C- or better; PHY 009A C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENG 045H – Honors Properties of Materials (1 unit)**

*Course Description:* Examination of special materials science and engineering topics through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.

*Prerequisite(s):* ENG 045 (can be concurrent) or ENG 045Y (can be concurrent); enrollment in the Materials Science and Engineering Honors Program; ENG 045 or ENG 045Y required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open only to students in the Materials Science and Engineering Honors Program.

*Grade Mode:* Letter.

**ENG 045Y – Properties of Materials (4 units)**

*Course Description:* Introduction to the properties of engineering materials and their relation to the internal structure of materials.

*Prerequisite(s):* (MAT 016C C- or better or MAT 021C C- or better); CHE 002A C- or better; PHY 009A C- or better.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENG 098 – Directed Group Study (1-4 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Restricted to College of Engineering students only.

*Repeat Credit:* May be repeated 3 time(s) when content differs.

*Grade Mode:* Pass/No Pass only.

**ENG 100 – Electronic Circuits & Systems (3 units)**

*Course Description:* Introduction to analog and digital circuit and system design through hands on laboratory design projects.

*Prerequisite(s):* ENG 017; C- or better recommended.

*Learning Activities:* Laboratory 3 hour(s), Lecture 2 hour(s).

*Credit Limitation(s):* Students who have completed EEC 100 may receive only 1.5 units of credit.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ENG 102 – Dynamics (4 units)**

*Course Description:* Kinematics and kinetics of particles, systems of particles, and of rigid bodies; application of these topics are applied to engineering problems.

*Prerequisite(s):* ENG 035 C- or better; (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to College of Engineering students only.

*Credit Limitation(s):* Only 2 units of credit allowed to students who have previously taken ENG 036.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ENG 103 – Fluid Mechanics (4 units)**

*Course Description:* Fluid properties, fluid statics, continuity and linear momentum equations for control volumes, flow of incompressible fluids in pipes, dimensional analysis and boundary-layer flows.

*Prerequisite(s):* ENG 035 C- or better; PHY 009B C- or better; (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students in the College of Engineering and Hydrology majors.

*Credit Limitation(s):* Not open for credit to students who have completed ECH 150A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENG 104 – Mechanics of Materials (4 units)**

*Course Description:* Uniaxial loading and deformation. General concepts of stress-strain-temperature relations and yield criteria. Torsion of shafts. Bending of beams. Deflections due to bending. Introduction to stability and buckling.

*Prerequisite(s):* ENG 035 C- or better; (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Engineering majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**ENG 104L – Mechanics of Materials Laboratory (1 unit)**

*Course Description:* Experiments which illustrate the basic principles and verify the analysis procedures used in the mechanics of materials are performed using the basic tools and techniques of experimental stress analysis.

*Prerequisite(s):* ENG 104.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENG 105 – Thermodynamics (4 units)**

*Course Description:* Fundamentals of thermodynamics: heat energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Applications of thermodynamics to engineering systems. May be taught abroad.

*Prerequisite(s):* PHY 009B C- or better; (MAT 022B C- or better or MAT 027B C- or better).

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to College of Engineering students only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ENG 106 – Engineering Economics (4 units)**

*Course Description:* Analysis of problems in engineering economy; the selection of alternatives; replacement decisions. Compounding, tax, origins and cost of capital, economic life, and risk and uncertainty are applied to methods of selecting most economic alternatives.

*Prerequisite(s):* Upper division standing in Engineering.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**ENG 108 – Launching a Company (3 units)**

*Course Description:* Technological innovation and product development. Working as a team to turn ideas into companies through customer development.

*Prerequisite(s):* ENG 008 or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* No credit for students who have previously completed ENG 002 or ENG 080.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ENG 111 – Electric Machinery Fundamentals (4 units)**

*Course Description:* Principles of AC and DC electric motors and generators, their control systems and power sources. Selection of electric power equipment components based on their construction features and performance characteristics.

*Prerequisite(s):* ENG 017 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**ENG 121 – Fluid Power Actuators & Systems (4 units)**

*Course Description:* Hydraulic and pneumatic systems with emphasis on analysis and control of actuators. Design of hydraulic and pneumatic systems, specification and sizing of components, and selection of electro-hydraulics/electro-pneumatics, servo valves, and closed loop systems to solve basic control problems.

*Prerequisite(s):* ENG 100 C- or better; ENG 102 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**ENG 122 – Introduction to Mechanical Vibrations (4 units)**

*Course Description:* Free and forced vibrations in lumped-parameter systems with and without damping; vibrations in coupled systems; electromechanical analogs; use of energy conservation principles.

*Prerequisite(s):* ENG 102 C- or better; (ENG 006 C- or better or ENG 005 C- or better or ECS 030 C- or better); ability to program in MATLAB.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENG 160 – Environmental Physics & Society (3 units)**

*Course Description:* Impact of humankind on the environment are discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications are considered.

*Prerequisite(s):* (PHY 009D or PHY 010 or PHY 001B); MAT 016B; or the equivalent of MAT 016B.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* In the College of Engineering, students may receive only 1 unit of credit towards the Technical Electives requirement.

*Cross Listing:* PHY 160.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **ENG 180 – Engineering Analysis (4 units)**

*Course Description:* Solutions of systems of linear and nonlinear algebraic equations; approximation methods; solutions of ordinary differential equations; initial and boundary value problems; solutions of partial differential equations of Elliptic, parabolic, and hyperbolic types; Eigen value problems.

*Prerequisite(s):* (ENG 006 C- or better or EME 005 C- or better or ECS 030 C- or better or ECS 032A C- or better or ECS 036A C- or better); ((MAT 021D C- or better, (MAT 022B C- or better or MAT 027B C- or better)).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ENG 188 – Science & Technology of Sustainable Power Generation (4 units)**

*Course Description:* Focus on scientific understanding and development of power generation that is the basis of modern society. Concentration on power generation methods that are sustainable, in particular, discussion of the most recent innovations.

*Prerequisite(s):* PHY 007C or PHY 009C; upper division standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ENG 190 – Professional Responsibilities of Engineers (3 units)**

*Course Description:* Organization of the engineering profession; introduction to contracts, specifications, business law, patents, and liability; discussion of professional, ethical, societal, and political issues related to engineering.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division students in the College of Engineering.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ENG 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Learning Activities:* .

*Repeat Credit:* May be repeated 3 time(s) when content differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ENG 250 – Technology Management (3 units)**

*Course Description:* Management of the engineering and technology activity. Functions of design, planning, production, marketing, sales, and maintenance. Technological product life cycle. Research and development activity. Project planning and organization. Manufacturing issues. Case studies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

# **English (ENL)**

College of Letters & Science

## **ENL 003 – Introduction to Literature (4 units)**

This version has ended; see updated course, below.

*Course Description:* Introductory study of several genres of English literature, emphasizing both analysis of particular works and the range of forms and styles in English prose and poetry. Frequent writing assignments will be made.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 003 – Introduction to Literature (4 units)**

*Course Description:* Introductory study of several genres of English literature, emphasizing both analysis of particular works and the range of forms and styles in English prose and poetry. Frequent writing assignments.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR); or concurrent enrollment in ENL 003A or ENL 003AV.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

This course version is effective from, and including: Winter Quarter 2024.

## **ENL 003A – Writers' Workshop (2 units)**

*Course Description:* Focuses on the development of writing and revision strategies, exploring ways to understand a writing task; to develop appropriate content for a writing task; to revise content to reflect competence as a communicator.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in a lower division writing course required, preferably ENL 003; if necessary, based upon demand and academic advisor approval, students may concurrently enroll in an equivalent course instead; e.g., UWP 001 or NAS 005.

*Grade Mode:* Letter.

## **ENL 003V – Introduction to Literature (4 units)**

This version has ended; see updated course, below.

*Course Description:* Introductory study of several genres of English literature, emphasizing both analysis of particular works and the range of forms and styles in English prose and poetry. Frequent writing assignments will be made.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 003V – Introduction to Literature (4 units)**

*Course Description:* Introductory study of several genres of English literature, emphasizing both analysis of particular works and the range of forms and styles in English prose and poetry. Frequent writing assignments will be made.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR); or concurrent enrollment in ENL 003A or ENL 003AV.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

This course version is effective from, and including: Winter Quarter 2024.

## **ENL 005F – Introduction to Creative Writing: Fiction (4 units)**

*Course Description:* Elementary principles of writing fiction. Write both in prescribed forms and in experimental forms of their own choosing. No final examination.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 005NF – Introduction to Creative Writing: Non-Fiction (4 units)**

*Course Description:* Elementary principles of writing creative non-fiction. Work in prescribed literary forms (such as essay, meditation, biography, memoir, book review, documentary, or experimental non-fiction forms) and forms of students' choosing. No final examination.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 005P – Introduction to Creative Writing: Poetry (4 units)**

*Course Description:* Elementary principles of writing poetry. Write both in prescribed forms and in experimental forms of their own choosing. No final examination.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **ENL 010A – Literatures in English I: To 1700 (4 units)**

*Course Description:* Historical introduction to English language and literature from 800-1700. Linguistic borrowing, innovation, and change. Emergence of key literary genres. Colonial America as a new site of English literary production and consumption.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 010B – Literatures in English II: 1700-1900 (4 units)**

*Course Description:* Historical introduction to English language and literature from 1700-1900. Linguistic borrowing, innovation, colonization, and change. Emergence and development of key literary genres. America, Britain, Ireland, Scotland, and India as important sites of English literary production and consumption.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 010C – Literatures in English III: 1900 to Present (4 units)**

*Course Description:* Historical introduction to English language and literature from 1900-present. Linguistic borrowing, innovation, and change. Emergence and development of key literary genres. Formal experimentation. Modernism as transnational phenomenon.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 040 – Introductory Topics in Literature (4 units)**

*Course Description:* Study of a special topic. Literature written in English in any period or place or genre. Thematic, formal, or temporal focus.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 041 – Introductory Topics in Literature & Media (4 units)**

*Course Description:* Study of a topic centered on the relationships between literature and moving-image media.

*Prerequisite(s):* ENL 003 or (UWP 001 or UWP 001V or UWP 001Y); or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **ENL 042 – Approaches to Reading (4 units)**

*Course Description:* Close reading and interpretation of literature from a variety of traditional and contemporary approaches. Topics include traditional textual and historical approaches; new criticism; formalism; psychological criticism; feminism and gender; reader-response; materialist approaches. Frequent written assignments.

*Prerequisite(s):* ENL 003 or (UWP 001 or UWP 001V or UWP 001Y); or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 043 – Introductory Topics in Drama (4 units)**

*Course Description:* Close reading of, and topics relating to selected works of British and American drama from a range of historical periods.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 044 – Introductory Topics in Fiction (4 units)**

*Course Description:* Close reading of, and topics relating to, British and American Fiction: short stories, novellas, novels.  
*Prerequisite(s):* ENL 003 or (UWP 001 or UWP 001V or UWP 001Y); or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 045 – Introductory Topics in Poetry (4 units)**

*Course Description:* Topical study and close reading of selections from English and American poetry.

*Prerequisite(s):* ENL 003 or (UWP 001 or UWP 001V or UWP 001Y); or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 051 – Hot Bars, Supreme Lyrics, & Rhymes for Days: Hip Hop as Poetry (3 units)**

*Course Description:* Literary approaches to hip hop as poetry. Formal examination of rap lyrics in relation to technology, visual expression, dance, and knowledge production. Historical and cultural consideration of race, ethnicity, gender, urban culture, and politics.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**ENL 052 – Pop Culture Shakespeare (3 units)**

*Course Description:* Critical approaches to the study of Shakespeare's afterlife in contemporary American media. Focus on visual, audio, and kinesthetic modes of analysis and presentation. Relation of Shakespeare to contemporary society, politics, media, and economics.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL).

**ENL 053 – Youth in Revolt (3 units)**

*Course Description:* American literary and cultural representations of adolescence as a time of rebellious refusals and wild behaviors in relation to questions of gender and sexuality, psychological states, economic pressures, racial inequality, and methods of discipline and punishment.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

**ENL 054 – Literature, Health, & Medicine (3 units)**

*Course Description:* Literary and cultural representations of health and medicine in relation to issues of race, gender, sexuality, and disability. Narratives and reading practices that provide complex accounts of the social determinants of health, contested understandings of illness, and critical perspectives on biomedicine.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

**ENL 055 – Literary Animals (3 units)**

*Course Description:* Literary exploration of animals as spectacles, symbols, scientific objects, human companions, and speaking subjects through animal fables and allegories, tales for children, poems, realist narratives, essays, and experimental fictions.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**ENL 056 – Speculative Fictions (3 units)**

*Course Description:* Historical or thematic exploration of speculative genres such as science fiction, fantasy, utopia/dystopia, and/or horror. May include worldbuilding, intersections with scientific and other disciplinary knowledges, relation to social and political conditions.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**ENL 059 – Racial Imaginaries (3 units)**

*Course Description:* Critical vocabularies and frameworks for studying the cultural construction of race as a signifier of human difference. Theories of racial formation in poetry, fiction, and other imaginative genres. Rhetorical and media strategies that present and/or obscure the material sources and institutional histories of race and racism.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL).

**ENL 072 – Introduction to Games (4 units)**

*Course Description:* Introduction to the history, theory, and practice of play. Survey of both analog and digital games. Overview of gaming cultures, aesthetics, industries, and technologies.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Cross Listing:* CDM 072.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**ENL 092 – Internship in English (1-12 units)**

*Course Description:* Internships in fields where students can practice their skills. May be taught abroad.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; and consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**ENL 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; and consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ENL 098F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for lower division students.

*Prerequisite(s):* ENL 003 or (UWP 001 or UWP 001V or UWP 001Y); consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ENL 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Grade Mode:* Pass/No Pass only.

**ENL 100F – Creative Writing: Fiction (4 units)**

*Course Description:* Writing of fiction. No final examination.

*Prerequisite(s):* ENL 005F or ENL 005P; ENL 005NF; and consent of instructor.

*Learning Activities:* Discussion 4 hour(s).

*Enrollment Restriction(s):* Priority given to English (Creative Writing) majors.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**ENL 100FA – Creative Writing Advanced Fiction (4 units)**

*Course Description:* Development and evaluation of students' work in prose, primarily in the workshop format. Some reading and discussion of published novels and short stories. Conferences with individual students once per quarter.

*Prerequisite(s):* ENL 100F.

*Learning Activities:* Discussion 4 hour(s).

*Enrollment Restriction(s):* Priority given to English majors; admission by application only.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Letter.

**ENL 100NF – Creative Writing: Non-Fiction (4 units)**

*Course Description:* Writing of non-fiction. No final examination.

*Prerequisite(s):* ENL 005F or ENL 005P or ENL 005NF; and consent of instructor.

*Learning Activities:* Discussion 4 hour(s).

*Enrollment Restriction(s):* Priority given to English (Creative Writing) majors.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**ENL 100P – Creative Writing: Poetry (4 units)**

*Course Description:* Writing of poetry.

*Prerequisite(s):* ENL 005F or ENL 005P or ENL 005NF; and consent of instructor.

*Learning Activities:* Discussion 4 hour(s).

*Enrollment Restriction(s):* Priority given to English (Creative Writing) majors.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**ENL 100PA – Creative Writing Advanced Poetry (4 units)**

*Course Description:* Development and evaluation of students' work in poetry, primarily in the workshop format. Some reading and discussion of published works of poetry. Conferences with individual students once per quarter.

*Prerequisite(s):* ENL 100P.

*Learning Activities:* Discussion 4 hour(s).

*Enrollment Restriction(s):* Priority to English majors; admission by application only.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Letter.

**ENL 105 – History of the English Language (4 units)**

*Course Description:* History of the English language. Examination of

the language as recorded from Old English to present-day English.

Relationship of English to other languages; development of vocabulary, phonology, and grammatical patterns.

*Prerequisite(s):* ENL 003 or (UWP 001 or UWP 001V or UWP 001Y); or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 106 – English Grammar (4 units)**

*Course Description:* Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers; their development; and their usefulness in describing the conventions of English.

*Prerequisite(s):* ENL 003 or LIN 001 or UWP 001 or UWP 001V or UWP 001Y; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* LIN 106, UWP 106.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**ENL 106P – English Grammar Practicum (2 units)**

*Course Description:* Practice in teaching the principles of grammar to the kinds of audiences teachers encounter in California. Discussions with teachers who teach in these areas. Examination of pedagogical research on teaching grammar.

*Prerequisite(s):* ENL 106; LIN 106 (can be concurrent).

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**ENL 107 – Freedom of Expression (4 units)**

*Course Description:* Historical development of fundamental issues and contemporary controversies about freedom of expression, with emphasis on literary and artistic censorship.

*Prerequisite(s):* ENL 003 or (UWP 001 or UWP 001V or UWP 001Y); or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 110A – Introduction to Literary Theory (4 units)**

*Course Description:* Key theoretical terms, concepts, and thinkers from the Greeks to the modern era.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 110B – Introduction to Modern Literary & Critical Theory (4 units)**

*Course Description:* History of literary criticism in the modern era, with emphasis on the ties with the past and the special problems presented by modern literary theory.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 111 – Topics in Medieval Literature (4 units)**

*Course Description:* Historically or thematically focused intensive examination of selected topics in Medieval British literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 113A – Chaucer: Troilus & the "Minor" Poems (4 units)**

*Course Description:* Development of the poet's artistry and ideas from his first work to his masterpiece, "Troilus and Criseyde."

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 113B – Chaucer: The Canterbury Tales (4 units)**

*Course Description:* Literary analysis of the complete "Canterbury Tales." Courtly love, literary forms, medieval science and astrology, theology and dogma as they inform the reading of Chaucer's work.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 115 – Topics in 16th- & 17th-Century Literature (4 units)**

*Course Description:* Historically or thematically focused study of works of the Renaissance.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 117 – Shakespeare (4 units)**

*Course Description:* Historically, generically, or thematically focused study of Shakespeare's works.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 120 – Law & Literature (4 units)**

*Course Description:* Historically, thematically, or generically focused study of the relationship between law and literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**ENL 122 – Milton (4 units)**

*Course Description:* Selected major works, including Paradise Lost.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 123 – 18th-Century British Literature (4 units)**

*Course Description:* Historically or thematically focused study of 18th-century English literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 125 – Topics in Irish Literature (4 units)**

*Course Description:* Intensive study or treatment of special topics relating to the emergence, invention, and re-invention of Irish literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 130 – British Romantic Literature (4 units)**

*Course Description:* Historically or thematically focused study of works of Romantic English literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 133 – 19th-Century British Literature (4 units)**

*Course Description:* Historically or thematically focused study of works of 19th-century English literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 137 – British Literature, 1900-1945 (4 units)**

*Course Description:* Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 138 – British Literature, 1945 to Present (4 units)**

*Course Description:* Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1945 and the present. May be taught abroad.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 139 – Topics in Global Literatures & Cultures (4 units)**

*Course Description:* Historically or regionally focused study of world literatures in English (other than the national literatures of British Isles and the United States), particularly from post-colonial regions in Africa, the Caribbean, and Asia, and immigrant cultures in the English-speaking world.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 140 – Topics in Postcolonial Literatures & Cultures (4 units)**

*Course Description:* Study of postcolonial literature of Anglophone colonies. Specific emphases may include literature from and about Anglophone India, the Caribbean, the Middle East, South Asia, Africa, and/or South America.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 141 – Topics in Diasporic Literatures & Migration (4 units)**

*Course Description:* Study of literatures, histories, and cultures of one or more diasporic groups.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 142 – Early American Literature (4 units)**

*Course Description:* Historically or thematically focused study of American literature of the 17th and 18th centuries.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**ENL 143 – 19th-Century American Literature to the Civil War (4 units)**

*Course Description:* Historically or thematically focused study of works of 19th-century American literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**ENL 144 – Post-Civil War American Literature (4 units)**

*Course Description:* Historically or thematically focused study of works of post-Civil War American literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**ENL 145 – Reading Race, Class, & Gender (4 units)**

*Course Description:* Readings in literature and culture that present race, class, gender, sexuality, ability, and citizenship as inter-articulated signifiers of difference. Literature is contextualized alongside works of sociology, history, philosophy, and law. Inter-discursive nature of racial thought and policy, and on historical and rhetorical practices through which race acquires meaning.

*Prerequisite(s):* ENL 003 or COM 001 or COM 002 or COM 003 or COM 004 or NAS 005 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 146 – American Literature 1900-1945 (4 units)**

*Course Description:* Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**ENL 147 – American Literature, 1945 to the Present (4 units)**

*Course Description:* Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1945 and the present.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**ENL 149 – Topics in Literature (4 units)**

*Course Description:* Intensive examination of literature considered in topical terms, not necessarily historically. May be taught abroad.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 150A – British Drama to 1800 (4 units)**

*Course Description:* Historically or thematically focused study of works of English drama prior to 1800.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 150B – Drama from 1800 to the Present (4 units)**

*Course Description:* Historically or thematically focused study of works of British drama from 1800 to the present.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 153 – Topics in Drama (4 units)**

*Course Description:* Historical or thematic study of drama.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 154 – The Graphic Novel (4 units)**

*Course Description:* Thematically, historically, and formally focused study of the graphic novel genre. Contents may include any regional, national, or transnational group of graphic novels.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent courses.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**ENL 155A – 18th-Century British Novel (4 units)**

*Course Description:* Historically or thematically organized examination of the 18th-century British novel, with particular emphasis on its evolution, including the epistolary novel, the picaresque novel, and the Gothic novel: Richardson, Fielding, Sterne, Austen.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 155B – 19th-Century British Novel (4 units)**

*Course Description:* Historically or thematically organized examination of 19th-century British novelists, with emphasis on the historical novel, the social novel, and novels by women: Scott, Dickens, the Brontes, Eliot, Hardy.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 155C – 20th-Century British Novel (4 units)**

*Course Description:* Historically or thematically organized examination of the 20th-century British novel, with emphasis on impressionism; the revolt against naturalism; the experimental novel; the anti-modernist reaction: Conrad, Joyce, Woolf, Lawrence, Drabble, Rhys.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 156 – The Short Story (4 units)**

*Course Description:* The short story as a genre; its historical development, techniques, and formal character as a literary form. European as well as American writers.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 157 – Detective Fiction (4 units)**

*Course Description:* Historically, formally, and thematically focused study of novels and short stories in the detective fiction genre.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 158A – The American Novel to 1900 (4 units)**

*Course Description:* Historically or thematically organized examination of the rise and development of the American novel from its beginnings; Hawthorne, Melville, Twain, James, and others.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**ENL 158B – The American Novel from 1900 to the Present (4 units)**

*Course Description:* Historically or thematically organized examination of important American novelists from 1900 to the present: authors may include Willa Cather, Nathanael West, William Faulkner, Ralph Ellison, Zora Neale Hurston, Thomas Pynchon, Ishmael Reed, Maria Helena Viramontes, Rachel Kushner, and others.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Writing Experience (WE).

**ENL 159 – Topics in the Novel (4 units)**

*Course Description:* Examination of major novels arranged thematically. Topics might include Bildungsroman, stream-of-consciousness novel, Gothic novel, historical novel.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 160 – Film as Narrative (4 units)**

*Course Description:* Study of modern film (1930 to present) as a storytelling medium.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**ENL 162 – Film Theory & Criticism (4 units)**

*Course Description:* Film theory and criticism, with a study of ten major works of international film art.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**ENL 163 – Literary Study in the British Isles (4 units)**

*Course Description:* Literary Study in the British Isles: On-site study of the literature, film, and/or performance of the British Isles. Taught abroad.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Enrollment by application only through the Education Abroad Center.

*Repeat Credit:* May be repeated 2 time(s) when subject differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 164 – Writing Science (4 units)**

*Course Description:* Texts and writing practices in the production of scientific knowledge. Surveys the literary structure of scientific arguments; history of scientific genres; rhetoric and semiotics in scientific culture; graphical systems in the experimental laboratory; narratives of science, including science fiction.

*Prerequisite(s):* ENL 003; STS 001; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Cross Listing:* STS 164.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Scientific Literacy (SL); Writing Experience (WE).

**ENL 165 – Topics in Poetry (4 units)**

*Course Description:* Intensive examination of various topics expressed in poetry from all periods of English and American literature.

*Prerequisite(s):* (ENL 003 or UWP 001 or UWP 001V or UWP 001Y); ENL 045.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated when topic covers different poets & poems.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 166 – Love & Desire in Contemporary American Poetry (4 units)**

*Course Description:* Close reading of contemporary American poems on the theme of love and desire by poets of diverse ethnicities and of gay, lesbian, and heterosexual orientations.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**ENL 167 – 20th-Century African American Poetry (4 units)**

*Course Description:* African American poetry in the 20th-century, including oral and literary traditions. Authors covered may include Gwendolyn Brooks, Countee Cullen, Robert Hayden, and Langston Hughes.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V; UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**ENL 168 – 20th-Century American Poetry (4 units)**

*Course Description:* Historical Study of American poetry since 1900, with thematic and formal focus at the instructor's discretion.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**ENL 171A – The Bible as Literature: The Old Testament (4 units)**

*Course Description:* Selected readings from the Old Testament illustrating various literary forms. Emphasis on the Pentateuch, the Historical Books, and the Wisdom Books. May be taken independently of ENL 171B.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 171B – The Bible as Literature: Prophets & New Testament (4 units)**

*Course Description:* Selected readings from the Old Testament prophets and the New Testament. May be taken independently of ENL 171A.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ENL 172 – Video Games & Culture (4 units)**

*Course Description:* Critical approaches to the study of video games, focusing on formal, historical, and cultural modes of analysis. History of software and hardware in North American and global contexts. Relations of games to society, politics, economics, media, etc.

*Prerequisite(s):* CDM 072 or ENL 072 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Cross Listing:* CDM 172, STS 172.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

**ENL 173 – Science Fiction (4 units)**

*Course Description:* Literary modes and methods of science fiction.

Representative texts, authors, and themes of the genre, e.g., time travel, alternative universes, and utopias. Relations of science fiction to science, philosophy, and culture.

*Prerequisite(s):* ENL 003 or STS 001; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Cross Listing:* STS 173.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 177 – Study of an Individual Author (4 units)**

*Course Description:* In-depth study of an author's works; historical context; relation to predecessors and contemporaries; critical reception; influence.

*Prerequisite(s):* ENL 110A or ENL 110B.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when author differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 178 – Topics in Nations, Regions, & Other Cultural Geographies (4 units)**

*Course Description:* Study of a local, regional, national, transnational, or other geographical literary formation (e.g., Global South; Literatures of the U.S./Mexico border; Literatures of the Pacific; Indigenous North American literature) centering underrepresented racial and/or ethnic perspectives.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y or COM 001 or COM 002 or COM 003 or COM 004 or NAS 005.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 179 – Topics in Comparative Racial & Ethnic Literary Studies (4 units)**

*Course Description:* Writings by Black, Indigenous, and/or People-of-Color authors responding to specific American contexts of racialization such as slavery, imperial warfare, international and internal migration, naturalization law, religion, mass incarceration, and environmental injustice.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y or COM 001 or COM 002 or COM 003 or COM 004 or NAS 005; Or standing above freshman level.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Repeat Credit:* May be repeated up to 2 time(s) when instructor differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **ENL 180 – Children's Literature (4 units)**

*Course Description:* Historical backgrounds and development of types of children's literature, folklore and oral tradition, levels of interest, criticism and evaluation, illustration and bibliography.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 181A – African American Literature to 1900 (4 units)**

*Course Description:* African American literature from the colonial period to 1900. Particular attention to the rapid development of the African American literary culture from a primarily oral tradition to various literary genres, including the slave narrative.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **ENL 181B – African American Literature 1900-Present (4 units)**

*Course Description:* Major African American writers in the context of cultural history from 1900 to the present. Writers may include Richard Wright, Ann Petry, James Baldwin, Ralph Ellison, Paule Marshall, Toni Morrison, Alice Walker, Clarence Major.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **ENL 182 – Literature of California (4 units)**

This version has ended; see updated course, below.

*Course Description:* Focus is on the diverse contributions to the rise of California literature. Reading of poetry, fiction, and essays. Emphasis on 19th- and 20th-century naturalists, turn of the century novelists, the Beats, and writers of the last two decades.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **ENL 182 – Literature of California (4 units)**

*Course Description:* Focus is on the diverse contributions to the rise of California literature from the 19th century to today. Reading of poetry, fiction, and essays. Includes Native American, Latino/a, and other Californian writers.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ENL 183 – Young Adult Literature (4 units)**

*Course Description:* Theoretical, critical, and literary issues informing the study and teaching of American young adult literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **ENL 184 – Literature & the Environment (4 units)**

*Course Description:* Historical and/or thematic survey of topics in writing about the environment.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 185A – Literature by Women Before 1800 (4 units)**

*Course Description:* Women's Writing in English before 1800; organized by period, place, genre, or theme.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y or COM 001 or COM 002 or COM 003 or COM 004 or NAS 005.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 185B – Literature by Women from 1800-1900 (4 units)**

*Course Description:* Women's Writing in English from 1800 to 1900; organized by period, place, genre, or theme.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y or COM 001 or COM 002 or COM 003 or COM 004 or NAS 005.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 185C – Literature by Women after 1900 (4 units)**

*Course Description:* Women's Writing in English after 1900; organized by period, place, genre, or theme.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y or COM 001 or COM 002 or COM 003 or COM 004 or NAS 005.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 186 – Literature, Sexuality, & Gender (4 units)**

*Course Description:* Historically or thematically focused intensive examinations of gender and sexuality in British and American literature.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 187A – Topics in Literature & Media (4 units)**

*Course Description:* Group study of a topic centered on the relationships between literature and film or other moving-image media.

*Prerequisite(s):* ENL 110A or ENL 110B; and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

**ENL 188A – Topics in Literary & Critical Theory (4 units)**

*Course Description:* Intensive examination of theories addressing a particular problem, topic, or question.

*Prerequisite(s):* ENL 110A or ENL 110B; and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ENL 189 – Seminar in Literary Studies (4 units)**

*Course Description:* Intensive, focused study of literature at an advanced level. May be organized by topic, author, period, movement, or genre. High participation.

*Prerequisite(s):* ENL 110A or ENL 110B.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 192 – Internship in English (1-12 units)**

*Course Description:* Internships in fields where students can practice their skills. A maximum of 4 units is allowed toward the major in English. May be taught abroad.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**ENL 194H – Seminar for Honors Students (4 units)**

*Course Description:* Preparation for writing an honors thesis in ENL 195H. High level of participation expected.

*Prerequisite(s):* ENL 110A or ENL 110B; One advanced study course; admission to English Department Senior Honors Program in Literature, Criticism, and Theory.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 195H – Honors Thesis (4 units)**

*Course Description:* Preparation of a thesis, under the supervision of an instructor. Students satisfying requirements for the general major or the teaching emphasis write on a scholarly or critical subject; creative writing students submit a volume of poems or fiction.

*Prerequisite(s):* ENL 194H.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**ENL 197T – Tutoring in English (1-5 units)**

*Course Description:* Leading of small voluntary discussion groups designed to develop reading and writing skills and affiliated with one of the university's regular courses.

*Prerequisite(s):* Upper division standing and consent of Chairperson.

*Learning Activities:* Tutorial.

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

**ENL 197TC – Community Tutoring in English (1-5 units)**

*Course Description:* Field experience, with individuals or in classroom in instruction of English language, literature, and composition. Does not fulfill requirement for major.

*Prerequisite(s):* Upper division standing and a major in English; consent of Chairperson.

*Learning Activities:* Tutorial 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ENL 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* ENL 003 or ENL 005F or ENL 005P or UWP 001 or UWP 001V or UWP 001Y.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ENL 198F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for upper division students.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ENL 198S – Directed Group Study (4 units)**

*Course Description:* Group study closely tied to the texts and periods studied in ENL 163S. Investigations of historical sites, museums, galleries, and performances. May be taught abroad in London.

*Prerequisite(s):* ENL 163S (can be concurrent); and consent of instructor; ENL 163S required concurrently.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ENL 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ENL 199FA – Student Facilitated Course Development (1-4 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 098F/198F.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ENL 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* STU FAC. Under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* ENL 003 or UWP 001 or UWP 001V or UWP 001Y; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**ENL 200 – Introduction to Graduate Studies in English (4 units)**

*Course Description:* Introduction to literary scholarship with special attention to the elements of professionalism and to different modes of literary investigation.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 205 – Anglo-Saxon Language & Culture (4 units)**

*Course Description:* The language and culture of Anglo-Saxon England; readings in Old English prose and poetry.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 206 – Beowulf (4 units)**

*Course Description:* A study of the poem and the Heroic Age of Germanic literature.

*Prerequisite(s):* ENL 205; or the equivalent.

*Learning Activities:* Discussion 3 hour(s), Conference, Term Paper/Discussion.

*Grade Mode:* Letter.

**ENL 207 – Middle English (4 units)**

*Course Description:* Study of the phonology, morphology, syntax, and lexicon between 1100 and 1500 with investigation of the regional dialects; pertinent facts on both the internal and external linguistic history; intensive reading of texts.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**ENL 210 – Readings in English & American Literature (4 units)**

*Course Description:* Content varies according to specialty of instructor.

*Prerequisite(s):* Upper division course in area studied.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ENL 225 – Topics in Irish Literature (4 units)**

*Course Description:* Varied topics, including the 19th-century novel, contemporary Irish poetry, rise of the drama, or a study of a major author.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ENL 230 – Study of a Major Writer (4 units)**

*Course Description:* Artistic development of one major writer and his intellectual and literary milieu.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when writer differs.

*Grade Mode:* Letter.

**ENL 232 – Problems in English Literature (4 units)**

*Course Description:* Selected issues in the current study and critical assessment of a limited period or topic in English literature.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when period or topic differs.

*Grade Mode:* Letter.

**ENL 233 – Problems in American Literature (4 units)**

*Course Description:* Selected topics for intensive investigation.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when period or topic differs.

*Grade Mode:* Letter.

### **ENL 234 – Dramatic Literature (4 units)**

*Course Description:* Historical introduction to dramatic theory; the genres of tragedy, comedy, and tragicomedy.

*Learning Activities:* Lecture 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

### **ENL 235 – Theory of Fiction (4 units)**

*Course Description:* Theories of fiction as they relate to the professional writer's practice of the craft. For students in the Creative Writing Program.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

### **ENL 237 – Seminar for Writers (4 units)**

*Course Description:* Varied topics in the study of literature and literary culture craft and poetics from the perspective of the writer/practitioner.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 2 time(s) when focus differs.

*Grade Mode:* Letter.

### **ENL 238 – Special Topics in Literary Theory (4 units)**

*Course Description:* Advanced topics in literary theory and criticism.

Preparation and evaluation of research paper.

*Prerequisite(s):* ENL 237; or the equivalent.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic and/or reading list differs.

*Grade Mode:* Letter.

### **ENL 240 – Medieval Literature (4 units)**

*Course Description:* Studies of Medieval literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 242 – 16th-Century Literature (4 units)**

*Course Description:* Studies in 16th-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 244 – Shakespeare (4 units)**

*Course Description:* Studies in Shakespeare. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 246 – 17th-Century Literature (4 units)**

*Course Description:* Studies in 17th-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 248 – 18th-Century Literature (4 units)**

*Course Description:* Studies in 18th-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 250 – Romantic Literature (4 units)**

*Course Description:* Studies in Romantic literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 252 – Victorian Literature (4 units)**

*Course Description:* Studies in Victorian literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 254 – 20th-Century British Literature (4 units)**

*Course Description:* Studies in 20th-century British literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 256 – Early American Literature (4 units)**

*Course Description:* Studies in Early American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 258 – American Literature: 1800 to the Civil War (4 units)**

*Course Description:* Studies in American literature from 1800 to Civil War. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **ENL 260 – American Literature: Civil War to 1914 (4 units)**

*Course Description:* Studies in American literature from the Civil War to 1914. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ENL 262 – American Literature after 1914 (4 units)**

*Course Description:* Studies in American literature after 1914. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ENL 264 – Studies in Modern British & American Literature (4 units)**

*Course Description:* Studies in modern British and American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ENL 270 – Studies in Contemporary World Literature (4 units)**

*Course Description:* Emerging global, international or transnational techniques, theories, and individual works of contemporary world prose or poetry. Discussion, seminar reports, research papers.

*Prerequisite(s):* Graduate standing, consent of instructor, with preference given to those enrolled in the masters program in Creative Writing.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ENL 275 – Proseminar in Research Practices (2 units)**

*Course Description:* Study of various practical and technical skills needed to perform research in literary studies. Materials to be selected by the instructor. Evaluation based on student projects that involve hands-on application of skills taught in the proseminar.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Must have passed Departmental Preliminary Exam.

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

**ENL 280 – Seminar in Research Practices (4 units)**

*Course Description:* Study of various practical and technical skills needed to perform research in literary studies. Course materials to be selected by the instructor. Evaluation based on student projects that involve hands-on application of skills taught in the seminar.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Enrollment Restriction(s):* Must have passed Departmental Preliminary Exam.

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

**ENL 285 – Literature by Women (4 units)**

*Course Description:* Studies in literature by women and the theoretical approaches to literature by women. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated when topic and/or reading list differs.

*Grade Mode:* Letter.

**ENL 287 – Topics in Literature & Media (4 units)**

*Course Description:* Study of a topic centered on film or other moving-image media. Course materials to be selected by the instructor. Preparation and evaluation of research papers.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

**ENL 288 – Prospectus Workshop (4 units)**

*Course Description:* Training in writing the dissertation prospectus. Participation in group discussions of preparatory assignments and final proposal.

*Learning Activities:* Extensive Writing, Workshop 2 hour(s), Conference 1 hour(s).

*Enrollment Restriction(s):* Must have passed Departmental Preliminary Exam.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 289 – Article Writing Workshop (4 units)**

*Course Description:* Training in preparing an article for publication.

Participation in group discussions of article drafts.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Extensive Writing, Workshop 2 hour(s), Conference 1 hour(s).

*Enrollment Restriction(s):* Limited to 12 students; nomination for admission by Dissertation Director.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 290 – Creative Writing: Special Topic (4 units)**

*Course Description:* Writing that falls outside the generic confines of traditional genres (fiction, poetry, and nonfiction) or traditional workshop formats. Evaluation of written materials and individual student conferences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ENL 290F – Creative Writing: Fiction (4 units)**

*Course Description:* Writing of prose fiction. Evaluation of written materials and individual student conferences.

*Prerequisite(s):* Consent of instructor. Graduate standing, with preference given to those enrolled in master's program in Creative Writing.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ENL 290NF – Creative Writing: Non-Fiction (4 units)**

*Course Description:* Writing of literary non-fiction, with emphasis on autobiography, biography, memoir, the occasional or nature essay, or other non-fiction prose narratives.

*Prerequisite(s):* Consent of instructor. Graduate standing; with preference given to those enrolled in the master's program in Creative Writing.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ENL 290P – Creative Writing: Poetry (4 units)**

*Course Description:* Writing of poetry. Evaluation of written materials and individual student conferences.

*Prerequisite(s):* Consent of instructor. Graduate standing, with preference given to those enrolled in master's program in Creative Writing.

*Learning Activities:* Seminar 3 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ENL 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 299D – Special Study for the Doctoral Dissertation (1-12 units)**

*Course Description:* Special study for the doctoral dissertation.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 391 – Teaching Creative Writing (2 units)**

*Course Description:* Designed for new instructors of ENL 005F or ENL 005P; discussion of ways to facilitate creative writing workshops and to respond to student manuscripts.

*Prerequisite(s):* Graduate standing; appointment as Teaching Assistant in the English Department.

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s) for those teaching ENL 005 for the first time.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 393 – Teaching Literature & Composition (2 units)**

*Course Description:* Designed for new instructors of ENL 003 or the equivalent courses; discussion of problems related to teaching literature and composition to lower division students.

*Prerequisite(s):* Graduate standing; appointment as Teaching Assistant in the English Department.

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s) Course repeatable for those teaching ENL 003 for the first time.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENL 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Entomology (ENT)**

College of Agricultural & Environmental Sciences

**ENT 001 – Art, Science & the World of Insects (3 units)**

*Course Description:* Fusion of entomology and art to create an appreciation of insect biology, ecology, interactions with humans and importance in human culture. Multidisciplinary approaches in education and career paths in entomology and art will be highlighted.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**ENT 002 – Biodiversity (3 units)**

*Course Description:* Introduction to nature, scope and geographical distribution of biodiversity (diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity; domestication, aesthetics, ethics and valuation. Species richness and "success." Biodiversity through time; monitoring, evaluation and conservation. Biomes-global, continental and Californian.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 1 hour(s).

*Cross Listing:* EVE 002.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ENT 010 – Natural History of Insects (3 units)**

*Course Description:* Introduction to the insects detailing their great variety, structures and functions, habits, and their significance in relation to plants and animals including man. Designed for students not specializing in entomology.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have had ENT 100, but students who have taken this course may take ENT 100 for credit.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ENT 090X – Special Topics in Entomology (2 units)**

*Course Description:* Freshman seminar course for indepth examination of a special topic within the subject area.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/No Pass only.

**ENT 092 – Internship (1-12 units)**

*Course Description:* Work-learn experience on and off campus in all subject areas offered by the department, supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**ENT 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* .

*Grade Mode:* Letter.

**ENT 100 – General Entomology (4 units)**

This version has ended; see updated course, below.

*Course Description:* Biology, anatomy, physiology, development, classification, ecology and relation of insects to human welfare.

*Prerequisite(s):* BIS 002B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**ENT 100 – General Entomology (4 units)**

*Course Description:* Biology, anatomy, physiology, development, classification, ecology and relation of insects to human welfare.

*Prerequisite(s):* BIS 002B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**ENT 100L – General Entomology Laboratory (2 units)**

*Course Description:* Anatomy, development, population ecology, methods of collecting, classification and identification of insects of all orders and of major families.

*Prerequisite(s):* ENT 100 (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**ENT 101 – Functional Insect Morphology (3 units)**

*Course Description:* Study of the basic external and internal structures, organs and tissues of insects, with emphasis on functional systems.

Functional anatomy, histology and fine structures of important organs and tissues will be discussed.

*Prerequisite(s):* ENT 100.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ENT 102 – Insect Physiology (4 units)**

*Course Description:* Processes by which insects maintain themselves, reproduce, and adapt to environment. Insects as models for basic/applied research through detailed analysis of metabolic, physiological, and behavioral processes. Emphasis on analysis of methodology, fact, and theory.

*Prerequisite(s):* ENT 100; or course in physiology or invertebrate zoology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ENT 103 – Insects Systematics (3 units)**

*Course Description:* Principles and methods of systematics, with particular reference to insects. Emphasis on different theories of classification, and analysis of phylogenetic relationships.

*Prerequisite(s):* Introductory course in zoology or entomology.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ENT 104 – Behavioral Ecology of Insects (3 units)**

*Course Description:* Basic principles and mechanisms of insect behavior and ecology. An evolutionary approach to understanding behavioral ecology of insects.

*Prerequisite(s):* Introductory biology or zoology.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ENT 105 – Insect Ecology (4 units)**

*Course Description:* Introduction to insect ecology combining fundamental concepts and questions in ecology with ideas, hypotheses and insights from insects. Integrates aspects of individual, population, community and ecosystem ecology.

*Prerequisite(s):* BIS 002B (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ENT 107 – California Insect Diversity (5 units)**

*Course Description:* Survey of the diversity of insects from selected ecological zones in California with emphasis on collection, identification, and natural history.

*Prerequisite(s):* An introductory course in entomology.

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s), Fieldwork 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENT 108 – Evolution & Ecology of Arachnids (3 units)**

*Course Description:* Spider external morphology, functional anatomy, metabolism, neurobiology, development, predatory & reproductive behavior, ecology, phylogeny, systematics, zoogeography, and faunistics.

*Prerequisite(s):* BIS 002C or ENT 100

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ENT 108L – Evolution & Ecology of Arachnids Laboratory (1 unit)**

*Course Description:* Laboratory on spider natural history, identification, external morphology, and taxonomy, morphology and identification. Emphasis on the spiders of the California Floristic Province.

*Prerequisite(s):* (BIS 002C or ENT 100 or ENT 100L); ENT 108 (can be concurrent); ENT 108 required concurrently or consent of instructor.

*Learning Activities:* Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**ENT 109 – Field Taxonomy & Ecology (7 units)**

*Course Description:* Study of insects in their natural habitats; their identification and ecology.

*Prerequisite(s):* An introductory course in entomology or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 36 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENT 110 – Arthropod Pest Management (5 units)**

*Course Description:* Sustainable management & ecology of arthropod pests in agricultural systems. Techniques for effective, management of arthropod pests via in-depth knowledge about pest biology, life strategies, spatial ecology, and food web functions. Lab & field trip exercises in applied research in pest management, ecology, and evolution using digital technologies (apps, remote sensing, cloud-based decision support).

*Prerequisite(s):* (STA 013 or STA 013Y or STA 100 C- or better); BIS 002B C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ENT 111 – Chemical Ecology (3 units)**

*Course Description:* Fundamental concepts in chemical ecology, classic and recent examples of chemical-mediated species interactions; introduction to the methods and techniques used in the field of chemical ecology.

*Prerequisite(s):* BIS 002B C- or better; CHE 002A C- or better; CHE 002B C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ENT 117 – Longevity (4 units)**

*Course Description:* Nature, origin, determinants, and limits of longevity with particular reference to humans; emphasis on implications of findings from non-human model systems including natural history, ecology and evolution of life span; description of basic demographic techniques including life table methods.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper 1 hour(s).

*Cross Listing:* HDE 117.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ENT 119 – Apiculture (3 units)**

*Course Description:* Biology and behavior of honeybees; communication, orientation, social organization, foraging activities, honey production, pollination activities.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENT 120 – Pollination Biology (3 units)**

*Course Description:* Natural history, ecology, evolution and applications of pollination. Conceptual underpinnings and basic methodologies of pollination. Primary focus on animal-mediated pollination.

*Prerequisite(s):* BIS 002B C- or better; or consent of instructor. EVE 100 EVE 101 recommended.

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENT 123 – Plant-Virus-Vector Interaction (3 units)**

*Course Description:* Analysis of interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern approaches to the interdiction of viral movement.

*Prerequisite(s):* BIS 002A; BIS 101; PLB 105, PLP 120, and ENT 100 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PLB 123, PLP 123.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ENT 135 – Introduction to Biological Control (4 units)**

*Course Description:* Introduction to biological control.

*Prerequisite(s):* ENT 100 or ENT 110.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ENT 153 – Medical Entomology (3 units)**

*Course Description:* Basic biology and classification of medically important arthropods with special emphasis on the ecology of arthropodborne diseases and principles of their control. Relationships of arthropods to human health.

*Prerequisite(s):* BIS 002A; BIS 002B; or consent of instructor; upper division standing in one of the biological sciences.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ENT 156 – Biology of Parasitism (3 units)**

*Course Description:* Lectures on the biological and ecological aspects affecting host-parasite relationships using selected examples from protozoan and metazoan fauna.

*Prerequisite(s):* BIS 002A; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENT 156L – Biology of Parasitism Laboratory (1 unit)**

*Course Description:* Laboratory demonstrations using selected examples of protozoan and metazoan organisms along with various techniques used in parasitology to exemplify concepts presented in the lecture course.

*Prerequisite(s):* ENT 156 (can be concurrent); ENT 156 required concurrently or consent of instructor.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENT 158 – Forensic Entomology (3 units)**

*Course Description:* Arthropods, their general biology, succession, developmental cycles and population biology in matters of criminal prosecution and civil litigation. Emphasis on basic arthropod biology, ecological and developmental concepts and methods, development of reasoning abilities, implication, development of opinions and evidence.

*Prerequisite(s):* ENT 100; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**ENT 180A – Experimental Ecology & Evolution in the Field (4 units)**

*Course Description:* Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments.

*Prerequisite(s):* EVE 100 (can be concurrent); (ENT 105 (can be concurrent) or ESP 100 (can be concurrent) or EVE 101 (can be concurrent)); consent of instructor.

*Learning Activities:* Lecture/Lab 3 hour(s), Project 3 hour(s); Fieldwork.

*Cross Listing:* EVE 180A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **ENT 180B – Experimental Ecology & Evolution in the Field (4 units)**

*Course Description:* Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments.

*Prerequisite(s):* EVE 180A or ENT 180A.

*Learning Activities:* Lecture/Lab 3 hour(s), Project 3 hour(s); Fieldwork.

*Cross Listing:* EVE 180B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

## **ENT 192 – Internship (1-12 units)**

*Course Description:* Laboratory experience or fieldwork off and on campus in all subject areas offered in the Department of Entomology. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ENT 197T – Tutoring in Entomology (1-3 units)**

*Course Description:* Leading small discussion groups. Preview assignments and prepare guidelines for discussion.

*Learning Activities:* Discussion 1-3 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ENT 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **ENT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **ENT 212 – Molecular Biology of Insects & Insect Viruses (3 units)**

*Course Description:* Molecular biological analysis of insect systematics, physiology, and defense mechanisms. Molecular biology of insect viruses. Baculovirus expression vectors and post-translation modification of expressed polypeptides. Biological control of using neuropeptides and toxin genes in insect viruses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **ENT 214 – Vector-borne Infectious Diseases: Changing Patterns (2 units)**

Starting Winter Quarter 2024, this course is no longer offered.

*Course Description:* Vector-borne infectious diseases especially as they relate to changing patterns associated with climatic changes, trade and population movement.

*Prerequisite(s):* Open to graduate students, MPVM and MPH students, DVM and medical students with second- or third-year standing. Open to upper division undergraduate students with consent of instructor(s).

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* PMI 214.

*Grade Mode:* Letter.

## **ENT 225 – Terrestrial Field Ecology (4 units)**

*Course Description:* Field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results are stressed.

*Prerequisite(s):* Introductory ecology and introductory statistics or consent of instructor.

*Learning Activities:* Seminar 1 hour(s), Fieldwork 12 hour(s).

*Cross Listing:* ECL 225, PBG 225.

*Grade Mode:* Letter.

## **ENT 230 – Advanced Biological Control (4 units)**

*Course Description:* Principles and current issues in biological control of arthropod pests and weeds; laboratory devoted to identification and life history of the major groups of parasitic and predaceous arthropods.

*Prerequisite(s):* Graduate or upper division standing in biological science or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

## **ENT 253 – Advanced Medical Entomology (3 units)**

*Course Description:* An analysis of several anthropod-borne human diseases with emphasis on the relationships of the biology of the vector to the ecology of the disease. Discussion includes demonstration of vectors and techniques.

*Prerequisite(s):* One upper division ENT course (other than ENT 153) and one course in Microbiology; ENT 153 strongly recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **ENT 290 – Exploratory Topics in Entomology (2 units)**

*Course Description:* Interdisciplinary topics in entomology, including innovative applications of entomological concepts to other fields of research and human endeavor (e.g. medicine, technology, art, criminology).

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 8 unit(s) when topic differs.

*Grade Mode:* Letter.

## **ENT 291 – Current Topics in Medical & Veterinary Entomology (2 units)**

*Course Description:* Discussions of parasitology, ecology and epidemiology related to vectors of pathogens causing disease in humans and animals.

*Prerequisite(s):* ENT 153.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

## **ENT 292 – Current Topics in Insect Physiology & Behavior (2 units)**

*Course Description:* Analysis of contemporary advances in insect physiology, biochemistry and/or behavior. Interpretation and description of physiological and behavioral mechanisms and functions. Application of general principles to solution of problems in the laboratory and field.

*Prerequisite(s):* ENT 102 if topic is physiology, a course in behavior if topic is behavior, or either if topic bridges both.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 8 unit(s) when topic differs.

*Grade Mode:* Letter.

## **ENT 293N – Current Topics in Insect Biotechnology & Genomics (2 units)**

*Course Description:* Discussion of advances in insect biotechnology, including genetic engineering and genomics.

*Prerequisite(s):* ENT 212.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 6 unit(s) when topic differs.

*Grade Mode:* Letter.

## **ENT 294 – Current Topics in Insect Ecology, Evolution, & Systematics (2 units)**

*Course Description:* Discussions of advanced topics in ecology, evolution and systematics with emphasis on analysis of factors influencing the distribution, abundance, adaptations and evolutionary relationships of insects. Includes consideration of applications of basic theory; e.g. biological control.

*Prerequisite(s):* ENT 103; general course in ecology or evolution.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 8 unit(s) when topic differs.

*Grade Mode:* Letter.

## **ENT 295 – Current Topics in Agricultural Entomology & Bee Biology (2 units)**

*Course Description:* Discussion of advanced topics about the biology, ecology, behavior, and management of pest and beneficial insects.

*Prerequisite(s):* ENT 110 if topic relates to pests and beneficial predators; ENT 119 if topic is bee biology; either if topic bridges both.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 8 unit(s) when topic differs.

*Grade Mode:* Letter.

## **ENT 297N – Seminar in Entomology (1 unit)**

*Course Description:* Weekly Entomology seminar.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 9 unit(s) when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ENT 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ENT 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Environmental Horticulture (ENH)**

**College of Agricultural & Environmental Sciences**

## **ENH 006 – Introduction to Environmental Plants (4 units)**

*Course Description:* Classification, nomenclature and variation of environmental plants. The use of floral and vegetative characteristics and terminology to key unknown plants. Characteristics of plant groups and basics of climate, soils and plant selection. Identification of 150 common landscape plants.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **ENH 100 – Urban Forestry (4 units)**

*Course Description:* Principles and practices of planning and managing urban vegetation. Basics of tree appraisal, natural resource inventory, and development of long term urban forest management plans.

*Prerequisite(s):* ENH 001 or PLS 002 or BIS 002B.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ENH 101 – Trees of the Urban Forest (2 units)**

*Course Description:* Identification and evaluation of 200 tree species of the urban forest on campus, in the Arboretum, and in the city of Davis; appraised and aesthetic values, condition, and branch structure; contribution of trees to this ecosystem. Bicycle required.

*Prerequisite(s):* ENH 006; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **ENH 102 – Physiological Principles in Environmental Horticulture (4 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Physiological principles and processes essential to floriculture, nursery crop production, turfulture and landscape horticulture. Emphasis on the control of vegetative and reproductive development for a broad species range in greenhouse and extensive landscape environments.

*Prerequisite(s):* BIS 001C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ENH 105 – Taxonomy & Ecology of Environmental Plant Families (4 units)**

*Course Description:* Classification and identification of introduced and native species used in urban forests, with emphasis on floral and vegetative characteristics of the prominent families of angiosperms and gymnosperms, adaptations to environmental variations in western landscapes, and horticultural classification.

*Prerequisite(s):* ENH 006; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**ENH 120 – Management of Container Media (3 units)**

*Course Description:* Principles of soil science and practices related to management of container media are taught, emphasizing appropriate use of soils and amendments, irrigation, and fertilizers. Physical and chemical properties are tested and effects of management on crops are evaluated in the laboratory.

*Prerequisite(s):* SSC 010 or SSC 100.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

**ENH 125 – Greenhouse & Nursery Crop Production (5 units)**

*Course Description:* Principles and techniques for the production of ornamental greenhouse and nursery crops. Hands-on experience producing greenhouse crops. Optional weekend field trip.

*Prerequisite(s):* PLS 002.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ENH 133 – Woody Plants in the Landscape: Growth, Ecology & Management (4 units)**

*Course Description:* Principles and practices of managing trees and shrubs in the urban landscape and other managed environments. Topics include woody plant form; growth response and adaptation; tree management in relation to soil, moisture, climate; plant problems.

*Prerequisite(s):* PLS 002 or BIS 002C.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ENH 150 – Genetics & Plant Conservation: The Biodiversity Crisis (3 units)**

*Course Description:* Conservation of genetic diversity, measurement of diversity, threats to diversity and reasons for protection, the process of extinction, distribution of diversity, determination of what to conserve and means of conservation. Examples drawn largely from forest tree species.

*Prerequisite(s):* BIS 001C; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ENH 160 – Restoration Ecology (4 units)**

*Course Description:* Broad, interdisciplinary approach to effective restoration. Design and implementation of restoration projects based on principles of physiology, population, community, ecosystem and landscape ecology.

*Prerequisite(s):* SSC 112 C or better or ESP 100 C or better or ESM 144 C or better or PLS 162 C or better or PLS 163 C or better or PLS 130 C or better or PLS 144 C or better or PLS 147 C or better or PLS 160 C or better or ESP 121 C or better or ESP 127 C or better or ESP 155 C or better or EVE 101 C or better or EVE 104 C or better or EVE 117 C or better or EVE 119 C or better or EVE 181 C or better or PLB 117 C or better or ECL 200AN C or better or ECL 200BN C or better; or consent of instructor; or equivalent course in ecology/plant ecology.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ENH 160L – Restoration Ecology Laboratory (1 unit)**

*Course Description:* Companion field course to ENH 160. Series of part-day and all day visits to various field sites, involving site evaluations, guest field presentations by local restorationists, and actual restoration activities.

*Prerequisite(s):* ENH 160 (can be concurrent); consent of instructor.

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who completed ENH 160 prior to spring 2004.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**Environmental Policy & Management (ENV)****Graduate Studies****ENV 200A – Analysis of Environmental Management & Policy (4 units)**

*Course Description:* Introduction to rational decision making for public policy problems. Modeling natural/human system interactions, data gathering and hypothesis testing. Predicting outcomes of policy options.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**ENV 200B – Environmental Policy Evaluation (4 units)**

*Course Description:* Method and practice, philosophical basis, and political role of policy analysis. Reviews basic concepts from economic theory; how and why environmental problems emerge in a market economy; and tools necessary for solving environmental problems.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Standing.

*Cross Listing:* ECL 212B, ESP 212B.

*Grade Mode:* Letter.

**ENV 200C – Social Ecological Systems (4 units)**

Starting Winter Quarter 2024, this course is no longer offered.

*Course Description:* Introduction to the concept of social ecological systems with applications to the field of environmental policy. Develops critical analysis skills, understanding links between social and environmental systems, and an ability to understand resilience of social ecological systems in face of change.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Standing.

*Grade Mode:* Letter.

**ENV 200CN – Environmental Governance (4 units)**

*Course Description:* Theories of environmental governance and their practical applications in solving modern environmental problems. Application of governance theory to choice of real-world case studies of environmental problems.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**ENV 201 – Environmental Law (4 units)**

*Course Description:* Roles of legislatures, agencies, and courts in creating and interpreting law; legal strategies for addressing environmental problems; major environmental statutes; and the relationship between federal and state/local legal authority.

*Prerequisite(s):* Graduate standing; consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Environmental Policy & Management graduate students.

*Grade Mode:* Letter.

**ENV 202 – Policy Development & Implementation (4 units)**

*Course Description:* Environmental policy development and implementation processes: developing and enacting legislation, regulation development and review, and implementation of new laws. California state processes. Local, federal, and international policy. Business' role in climate policy. Theory, applied study, discussion with guest experts, and practical skills such as how to write for a policy audience.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass one restricted to Environmental Policy & Management students.

*Grade Mode:* Letter.

**ENV 203A – Environmental Policy Clinic (4 units)**

*Course Description:* Teams of students analyze environmental policy problems and natural resources issues from scientific, legal, and economic perspectives. Hands-on learning partnering with a client organization.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Open to graduate students in Environmental Policy & Management only.

*Grade Mode:* Letter.

**ENV 203B – Environmental Policy Clinic (4 units)**

*Course Description:* Teams of students analyze environmental policy problems and natural resources issues from scientific, legal, and economic perspectives. Hands-on learning partnering with a client organization. A continuation of ENV 203A.

*Prerequisite(s):* ENV 203A B- or better; or consent of instructor.

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Open to graduate students in Environmental Policy & Management only.

*Grade Mode:* Letter.

**ENV 290 – Seminar (1 unit)**

*Course Description:* Environmental justice and equity within the environmental field. Climate justice, energy, land use and urban planning, air pollution, politics and theory, and other environmental justice focused issues.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated for credit when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENV 292 – Graduate Internship (1-12 units)**

*Course Description:* Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 1-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENV 296 – Environmental Policy & Management Practicum (2-6 units)**

*Course Description:* Practicum experience integrating coursework into an applied professional setting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 0.50 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENV 297 – Professional Development Seminar (1 unit)**

*Course Description:* Weekly seminar inviting policy and management professionals to come and discuss their challenges and achievements.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1.50 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ENV 298 – Group Study (1-5 units)**

*Course Description:* Group Study.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**ENV 299 – Research (1-12 units)**

*Course Description:* Individual study under the direction of a faculty member.

*Learning Activities:* Variable 1-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Environmental Science & Management (ESM)

College of Agricultural & Environmental Sciences

## ESM 008 – Water Quality at Risk (3 units)

**Course Description:** Natural and human threats to water quality. Balance of science and policy in all aspects of attaining, maintaining, and managing water quality, water contamination. Decoding popular media coverage of water quality and water contamination.

**Learning Activities:** Lecture 2 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Not open to students who have successfully completed ERS 008. (Formerly ERS 008.)

**Cross Listing:** SAS 008.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

## ESM 092 – Internship (1-12 units)

**Course Description:** Work experience off and on campus in resource sciences. Internship supervised by a member of the faculty.

**Prerequisite(s):** Consent of instructor; lower division standing.

**Learning Activities:** Internship 3-36 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

## ESM 098 – Directed Group Study (1-5 units)

**Course Description:** Primarily for lower division students.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Variable 1-5 hour(s).

**Grade Mode:** Pass/No Pass only.

## ESM 098F – Student Facilitated Course Development (1-3 units)

**Course Description:** Student-facilitated (taught) course intended for lower division students.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Variable 1-3 hour(s).

**Grade Mode:** Pass/No Pass only.

## ESM 099 – Special Study for Undergraduates (1-5 units)

**Course Description:** Special study for undergraduates.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Variable.

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

## ESM 100 – Principles of Hydrologic Science (4 units)

**Course Description:** Topics include hydrology (surface and ground water), hydraulic flow through porous media, water in the soil-plant-atmosphere continuum, water quality, flow through open channels, and representative water-resource problems.

**Prerequisite(s):** CHE 002B; MAT 016B; (PHY 007A or PHY 009A).

**Learning Activities:** Lecture 4 hour(s).

**Enrollment Restriction(s):** Not open to students who have successfully completed ERS 100. (Formerly ERS 100.)

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## ESM 108 – Environmental Monitoring (3 units)

This version has ended; see updated course, below.

**Course Description:** Instrumentation and methods for environmental and ecological monitoring; GPS, sensors, datalogging, and GIS. Wide range of measurement techniques for environmental parameters.

**Prerequisite(s):** EVE 101; ESP 100; ETX 101; WFC 100; ERS 100; SSC 100; ENH 100; LDA 050; or the equivalent for any of these courses.

**Learning Activities:** Lecture/Discussion 2 hour(s), Laboratory 2 hour(s), Fieldwork.

**Enrollment Restriction(s):** Not open to students who have successfully completed ERS 108. (Formerly ERS 108.)

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## ESM 108 – Environmental Monitoring (3 units)

**Course Description:** Instrumentation and methods for environmental and ecological monitoring; GPS, sensors, datalogging, and GIS. Wide range of measurement techniques for environmental parameters.

**Prerequisite(s):** (ESP 100 or EVE 101); (SSC 100 or WFC 100 or ESM 100).

**Learning Activities:** Lecture/Discussion 2 hour(s), Laboratory 2 hour(s), Fieldwork.

**Enrollment Restriction(s):** Not open to students who have successfully completed ERS 108. (Formerly ERS 108.)

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL). This course version is effective from, and including: Winter Quarter 2024.

## ESM 110 – Irrigation Systems & Water Management (4 units)

**Course Description:** Soil and plant aspects of irrigation and drainage. Soil-water principles including water storage and movement, plant response to irrigation, water use by crops, irrigation systems (i.e., micro-irrigation, sprinkler irrigation and surface irrigation), and related salinity and water quality impacts.

**Prerequisite(s):** PHY 007A; SSC 100 recommended.

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s).

**Cross Listing:** ABT 110, HYD 110.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## ESM 118 – Evapotranspiration Principles, Measurement & Modeling (4 units)

**Course Description:** Estimation of evapotranspiration (ET) for irrigation management and water resources planning; including the basic principles and key factors controlling evaporation and ET rates, methods of measuring these factors in the field and remotely, and determination of likely water requirements for crops and various landscape conditions as needed for water resources planning.

**Prerequisite(s):** HYD 124 C or better; consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s).

**Cross Listing:** HYD 118; EBS 148.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**ESM 120 – Global Environmental Interactions (4 units)**

*Course Description:* Relationships among climate, hydrology, biogeochemical cycles, soils and vegetation distribution in diverse landscapes and biomes. Emphasis on physical, chemical, and biological processes affecting ecosystems from the poles to the equator, and human impacts on the environment.

*Prerequisite(s):* One college level chemistry course; one college level biology course.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 25 students per discussion section; not open to students who have successfully completed ERS 060 or 120. (Formerly ERS 060 & 120.)

*Grade Mode:* Letter.

**ESM 121 – Water Science & Management (3 units)**

*Course Description:* Role of water as an essential natural resource in contemporary society. Aspects of the scientific method, including descriptions of natural phenomena and underlying physical causes. Water for cities, agriculture, industry, wildlife and recreation; case studies of water management.

*Prerequisite(s):* PHY 010 or GEL 001.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have successfully completed ERS 121. (Formerly ERS 121.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**ESM 125 – River Conservation (4 units)**

*Course Description:* Law, policy, science, and practice used in managing rivers with the aim of balancing human societal needs and those of riparian and aquatic species.

*Prerequisite(s):* ESM 100 or ESM 108 or ESM 120 or ESM 121 or GEL 001 or GEL 050 or HYD 010 or HYD 141 or HYD 143 or SSC 100 or EVE 101 or ESP 100 or ESP 001 or ESP 110 or WFC 010 or WFC 051 or ECI 040 or ECI 100.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL).

**ESM 131 – Air as a Resource (3 units)**

*Course Description:* Degradation of the atmospheric resource, historical aspects and effects of air pollution examined. Evaluation of primary gaseous and particulate pollutants and discussion of their impact.

*Prerequisite(s):* (CHE 010 or CHE 002A); CHE 002B.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have successfully completed ERS 131. (Formerly ERS 131.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**ESM 141 – Role of Fire in Natural Ecosystems (4 units)**

*Course Description:* Fire regimes and roles in major North American vegetation types, especially in the west. Physics of fire, fire effects on organisms and ecosystem functioning, reconstructing fire histories, fire in resource management, and fire use by indigenous people.

*Prerequisite(s):* (BIS 002A or PLS 002); (BIS 002B or BIS 002C); basic biological, ecology/evolution concepts.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Not open to students who have successfully completed ERS 141. (Formerly ERS 141.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ESM 144 – Trees & Forests (4 units)**

*Course Description:* Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 144 or ENH 144 or ERS 144. (Formerly PLB 144 or ENH 144 or ERS 144.)

*Cross Listing:* PLS 144.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ESM 185 – Aerial Photo Interpretation & Remote Sensing (4 units)**

*Course Description:* Basics of remote sensing and photogrammetry, grids and map projections, aerial photo interpretation, sensors and platforms for aerial and space photography and non-photographic imaging systems, aerial thermography, microwave sensing, and introduction to remote sensing applications.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Enrollment Restriction(s):* Not open to students who have successfully completed ERS 185. (Formerly ERS 185.)

*Grade Mode:* Letter.

**ESM 186 – Environmental Remote Sensing (5 units)**

*Course Description:* Overview of satellite, airborne, and ground-based remote sensing, building on properties of electromagnetic radiation. Applications include hydrologic processes, weather and climate, ecology and land use, soils, geology, forestry, and agriculture. Computer based analysis and visualization of images and processing techniques.

*Prerequisite(s):* MAT 016B; (PHY 007C or PHY 009B); upper division standing; LDA 150 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Not open to students who have successfully completed HYD 186 or ERS 186. (Formerly HYD 186 & formerly ERS 186.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**ESM 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in resource sciences. Internship supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**ESM 194H – Senior Honor Thesis (2-6 units)**

*Course Description:* Independent study, guided research on an environmentally related subject of special interest to the student.

*Prerequisite(s):* Senior standing, overall GPA of 3.50 or higher and consent of master advisor.

*Learning Activities:* Independent Study 2-6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ESM 195 – Integrating Environmental Science & Management (2 units)**

*Course Description:* Practical aspects of environmental improvement through integrated analyses of contemporary issues or problems associated with advocacy, regulation, science and resource management from the perspectives of the physical and ecological sciences and current policy/management.

*Prerequisite(s):* Consent of instructor; senior status in Environmental Science Management major or other environmental science major (e.g. Environmental Resource Science; Environmental Biology Management; Environmental Toxicology; Environmental Policy Analysis Planning; Wildlife, Fish, Conservation Biology; Hydrologic Science).

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**ESM 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ESM 198F – Student Facilitated Course (1-3 units)**

*Course Description:* Student-facilitated (taught) course intended for upper division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing or consent of instructor.

*Grade Mode:* Pass/No Pass only.

**ESM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**ESM 199FA – Student Teaching Course Development (1-3 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will teach under 098F/198F.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Pass/No Pass only.

**ESM 199FB – Student Teaching Course Development (1-3 units)**

*Course Description:* Student facilitated. Under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-3 hour(s).

*Grade Mode:* Pass/No Pass only.

# **Environmental Science & Policy (ESP)**

**College of Agricultural & Environmental Sciences**

**ESP 001 – Environmental Analysis (4 units)**

*Course Description:* Analysis of the physical, biological, and social interactions which constitute environmental problems. Emphasis on analysis of environmental problems, the consequences of proposed solutions, and the interaction of environmental science and public policy in creating solutions.

*Prerequisite(s):* UWP 001 (can be concurrent) or UWP 001Y (can be concurrent) or UWP 001V (can be concurrent) or ENL 003 (can be concurrent); or equivalent; sophomore standing; ECN 001A and BIS 002B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**ESP 010 – Current Issues in the Environment (3 units)**

*Course Description:* Science behind environmental issues, and policies affecting our ability to solve domestic and international environmental problems. Resources, environmental quality, regulation, environmental perception and conservation. Integrative case studies.

*Prerequisite(s):* Elementary biology recommended.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ESP 001.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

**ESP 092 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the College of Agricultural & Environmental Sciences. Internship supervised by member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ESP 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ESP 100 – General Ecology (4 units)**

*Course Description:* Theoretical & experimental analysis of the distribution, growth & regulation of species populations; predator-prey & competitive interactions; and the organization of natural communities. Application of evolutionary & ecological principles to selected environmental problems.

*Prerequisite(s):* (BIS 002A, BIS 002B, BIS 002C); (MAT 016A or MAT 017A or MAT 021A); (MAT 016B or MAT 017B or MAT 021B); STA 013 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ESP 101 – Ecology, Nature, & Society (4 units)**

*Course Description:* Interdisciplinary study of diversity and change in human societies, using frameworks from anthropology, evolutionary ecology, history, archaeology, psychology, and other fields. Topics include population dynamics, subsistence transitions, family organization, disease, economics, warfare, politics, and resource conservation.

*Prerequisite(s):* ANT 001 or ANT 002 or ESP 030 or EVE 100 or BIS 101 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ANT 101.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**ESP 104 – Community Ecology (4 units)**

*Course Description:* Population growth and density dependence; predation; exploitative, interference and apparent competition; mutualism and facilitation; coexistence mechanisms; niches, spatial and temporal variation etc. Emphasis on quantitative understanding through models, concepts, and empirical evidence.

*Prerequisite(s):* ESP 100 or EVE 101.

*Learning Activities:* Lecture 3 hour(s); Discussion 1 hour(s).

*Cross Listing:* EVE 104.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**ESP 106 – Environmental Data Science (4 units)**

*Course Description:* Programming with environmental data using R.

Understanding data types, loops, branching and functions. Reproducible workflows and version control to import, organize, explore, analyze and visualize environmental data. Data science terminology and approaches. Common data sources used in environmental science and policy.

*Prerequisite(s):* STA 013 (can be concurrent) or STA 013 (can be concurrent) or STA 032 (can be concurrent) or STA 100 (can be concurrent).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ESP 110 – Principles of Environmental Science (4 units)**

*Course Description:* Application of physical and chemical principles, ecological concepts, and systems approach to policy analysis of atmospheric environments, freshwater and marine environments, land use, energy supplies and technology, and other resources.

*Prerequisite(s):* (PHY 001A or PHY 007A); (MAT 016B or MAT 017B or MAT 021B); BIS 002A or BIS 010 recommended; upper division standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**ESP 111 – Marine Environmental Issues (1 unit)**

*Course Description:* Examination of critical environmental issues occurring in coastal waters including the effects of climate change, overfishing, and other human impacts. Through readings and group discussions, students will develop an integrative understanding of the oceanographic and ecological processes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Cross Listing:* EVE 111.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ESP 116N – Oceanography (3 units)**

*Course Description:* Advanced oceanographic topics: Chemical, physical, geological, and biological processes; research methods and data analysis; marine resources, anthropogenic impacts, and climate change; integrated earth/ocean/atmosphere systems; weekly lab and one weekend field trip.

*Prerequisite(s):* GEL 001 or GEL 002 or GEL 016 or GEL 016V or GEL 050.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Fieldwork.

*Cross Listing:* GEL 116N.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ESP 121 – Population Ecology (4 units)**

*Course Description:* Development of exponential and logistic growth models for plant and animal populations, analysis of age structure, analysis of competition and predator-prey systems, and analysis of disease dynamics. Developing mathematical models and using them to make predictions and solve problems.

*Prerequisite(s):* BIS 002B; (MAT 016B or MAT 017B or MAT 021B or MAT 021BH).

*Learning Activities:* Lecture 3 hour(s), Laboratory 2.5 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **ESP 123 – Introduction to Field & Laboratory Methods in Ecology (4 units)**

**Course Description:** Introduction to methods used for collecting ecological data in field and laboratory situations. Methods used by population ecologists and community ecologists; emphasis on experimental design, scientific writing and data analysis.

**Prerequisite(s):** (ESP 100 or EVE 101); (STA 013 or STA 013Y or STA 100); or equivalent.

**Learning Activities:** Lecture 2 hour(s), Laboratory 2 hour(s), Fieldwork 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **ESP 124 – Marine & Coastal Field Ecology (3 units)**

**Course Description:** Ecology of marine populations and communities living in diverse habitats along the California coast. Hands-on learning using scientific process and tools of the biological trade to address ecological questions arising during field trips. Critical thinking through discussing scientific literature.

**Prerequisite(s):** Upper division standing or consent of instructor; introductory animal biology (BIS 001B) recommended; residence at or near Bodega Marine Lab required.

**Learning Activities:** Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

**Enrollment Restriction(s):** Enrollment restricted to application at <http://www.bml.ucdavis.edu>.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **ESP 127 – Plant Conservation Biology (4 units)**

**Course Description:** Principles governing the conservation of plant species and plant communities, including the roles of fire, exotic species, grazing, pollination, soils, and population genetics; analytic and practical techniques for plant conservation; and introduction to relevant legal, ethical, and policy issues.

**Prerequisite(s):** ESP 100 or EVE 101; or equivalent upper division general ecology.

**Learning Activities:** Lecture/Discussion 3 hour(s), Discussion 1 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **ESP 150A – Physical & Chemical Oceanography (4 units)**

**Course Description:** Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geochemical cycles.

**Prerequisite(s):** (ESP 116N or GEL 116N); (PHY 007B or PHY 009B); (MAT 016C or MAT 017C or MAT 021C); (CHE 002C or GEL 055); and consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Cross Listing:** GEL 150A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## **ESP 150B – Geological Oceanography (3 units)**

**Course Description:** Introduction to the origin and geologic evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geologic history of the ocean floor in terms of sea-floor spreading theory.

**Prerequisite(s):** GEL 050 or (GEL 116N or ESP 116N).

**Learning Activities:** Lecture 3 hour(s).

**Cross Listing:** GEL 150B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **ESP 150C – Biological Oceanography (4 units)**

**Course Description:** Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and plankton communities. Existing knowledge and contemporary issues in research. Segment devoted to human use. One weekend field trip required.

**Prerequisite(s):** BIS 002A; consent of instructor; a course in general ecology.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s), Fieldwork.

**Cross Listing:** GEL 150C.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **ESP 151 – Limnology (4 units)**

**Course Description:** Biology and productivity of inland waters with emphasis on the physical and chemical environment.

**Prerequisite(s):** BIS 002A; BIS 002B; (BIS 002C and ESP 100 or EVE 101 recommended.)

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **ESP 151L – Limnology Laboratory (3 units)**

**Course Description:** Limnological studies of lakes, streams, and reservoirs with interpretation of aquatic ecology.

**Prerequisite(s):** ESP 151 (can be concurrent); junior, senior, or graduate standing.

**Learning Activities:** Laboratory 6 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **ESP 152 – Coastal Oceanography (3 units)**

**Course Description:** Oceanography of coastal waters, including bays, river plumes, nearshore and estuaries; focus on transport patterns, how they are forced and implications for ecological and environmental problems. Pertinent for students in oceanography, ecology, environmental engineering, geology and hydrology.

**Prerequisite(s):** Upper division standing or consent of the instructor; physics (PHY 009B), calculus (MAT 021B) and exposure to physical and chemical oceanography (GEL 150A and ESP 150A) are recommended; residence at or near Bodega Marine Laboratory required.

**Learning Activities:** Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

**Enrollment Restriction(s):** Enrollment restricted to application at <http://www.bml.ucdavis.edu>.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

**ESP 155 – Wetland Ecology (4 units)**

*Course Description:* Introduction to wetland ecology. The structure and function of major wetland types and principles that are common to wetlands and that distinguish them from terrestrial and aquatic ecosystems.

*Prerequisite(s):* BIS 002A; or equivalent of BIS 002A; ESP 100 or EVE 101 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ESP 155L – Wetland Ecology Laboratory (3 units)**

*Course Description:* Modern and classic techniques in wetland field ecology. Emphasis on sampling procedures, vegetation analysis, laboratory analytical procedures, and examples of successful wetland restoration techniques.

*Prerequisite(s):* ESP 155 (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s), Fieldwork.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ESP 160 – The Policy Process (4 units)**

*Course Description:* Alternative models of public policymaking and application to case studies in the U.S. and California.

*Prerequisite(s):* POL 001; ECN 001A and STA 013 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ESP 161 – Environmental Law (4 units)**

*Course Description:* Introduction for non-Law School students to some of the principal issues in environmental law and the judicial interpretation of some important environmental statutes, e.g., NEPA.

*Prerequisite(s):* Upper division standing; one course in environmental science or political science recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**ESP 162 – Environmental Policy (4 units)**

*Course Description:* Compares economic with socio-cultural approaches to understanding the causes of environmental problems and strategies for addressing them. Includes different approaches to the policy process, policy instruments, and environmental behavior. Applies these principles to several problems.

*Prerequisite(s):* ECN 001A or ECN 001AY or ECN 001AV.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ESP 163 – Energy & Environmental Aspects of Transportation (4 units)**

*Course Description:* Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption in light of institutional and political constraints. Evaluation of vehicle emission models.

*Prerequisite(s):* Upper division standing in engineering or economics or environmental studies.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Cross Listing:* ECI 163.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

**ESP 165 – Climate Policy (3 units)**

*Course Description:* Models, data and assumptions behind competing arguments regarding societal response to the prospect of climate change at the state, national and international level from economic, ethical and policy science perspectives.

*Prerequisite(s):* ESP 001 or ECN 001A or ESP 001AY or ECN 001AV; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**ESP 166 – Ocean & Coastal Policy (3 units)**

*Course Description:* Overview of U.S. and International ocean and coastal policy, including energy, coastal land-use and water quality, protected areas and species.

*Prerequisite(s):* ESP 001; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ESP 167 – Energy Policy (4 units)**

*Course Description:* Survey of primary energy resources (fossil, renewable, nuclear), energy conversion methods, future energy demand scenarios, and environmental impacts of energy. Overview of energy policy in the U.S. Analysis of policy alternatives for addressing energy-related environmental and national security issues.

*Prerequisite(s):* (ECN 001A or ECN 001AY or ECN 001AV); (MAT 016B or MAT 017B or MAT 021B); or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**ESP 168A – Methods of Environmental Policy Analysis (5 units)**

*Course Description:* Evaluation of alternatives for solution of complex environmental problems; impact analysis, benefit cost analysis, distributional analysis, decision making under uncertainty, and multi-objective evaluation.

*Prerequisite(s):* (ESP 001 or ESP 010); (STA 013 or STA 013Y or STA 100); (ECN 001A or ECN 001AY or ECN 001AV); ECN 100 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ESP 168B – Methods of Environmental Policy**

### **Evaluation (4 units)**

*Course Description:* Continuation of ESP 168A. Emphasis on examination of the literature for applications of research & evaluation techniques to problems of transportation, air & water pollution, land use, and energy policy.

*Prerequisite(s):* ESP 168A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ESP 169 – Water Policy & Politics (3 units)**

*Course Description:* Governance of water, including issues of water pollution/quality and water supply. Politics of water decision-making and effectiveness of water policy. Broad focus on federal water policy, with case examples from nationally significant U.S. watersheds.

*Prerequisite(s):* ECN 001A or POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ESP 170 – Conservation Biology Policy (4 units)**

*Course Description:* Analysis of policies designed to conserve species and their habitats. Emphasis on how individual incentives affect the success of conservation policies. Valuation of endangered species and biodiversity. Criteria for deciding conservation priorities.

*Prerequisite(s):* One course in environmental science (e.g., ESP 001), conservation (e.g., WFC 011 or WFC 154), or government (e.g., POL 001) recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

## **ESP 171 – Urban & Regional Planning (4 units)**

*Course Description:* How cities plan for growth in ways that minimize environmental harm. Standard city planning tools (general plan, zoning ordinance) and innovative new approaches. Focus on planning requirements and practices in California. Relationships between local, regional, state, and federal policy.

*Prerequisite(s):* ESP 001 or ESP 161 or ESP 179 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **ESP 172 – Public Lands Management (4 units)**

*Course Description:* Investigation of alternative approaches to public lands management by Federal and state agencies. Role each agency's legislation plays in determining the range of resource allocations.

*Prerequisite(s):* POL 001 and ECN 001A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH).

## **ESP 173 – Land Use & Growth Controls (4 units)**

*Course Description:* Exposes students to the economic, political, and legal factors affecting land use and growth controls, and helps students critically evaluate written materials in terms of their arguments and supporting data. May be taught abroad.

*Prerequisite(s):* Upper division standing; one course in environmental policy.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ESP 174 – Environmental Justice Policy & Practice (4 units)**

*Course Description:* History and frameworks of environmental justice; environmental justice policy; methods of spatial analysis. Emphasis on California and the United States.

*Prerequisite(s):* ESP 001 or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

## **ESP 175 – Natural Resource Economics (4 units)**

*Course Description:* Economic concepts and policy issues associated with natural resources, renewable resources (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil).

*Prerequisite(s):* ARE 100A C- or better or ECN 100A C- or better or ECN 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to Managerial Economics (AMGE), Environmental Policy Analysis & Planning (AEPP) Majors, Agricultural & Resource Economics (GARE) Graduate Majors.

*Cross Listing:* ARE 175.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ESP 178 – Applied Research Methods (4 units)**

*Course Description:* Research methods for analysis of urban and regional land use, transportation, and environmental problems. Survey research and other data collection techniques; demographic analysis; basic forecasting, air quality, and transportation models. Collection, interpretation, and critical evaluation of data.

*Prerequisite(s):* STA 103 or STA 100 or STA 108 or SOC 106 or ARE 106; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

## **ESP 179 – Environmental Impact Assessment (4 units)**

*Course Description:* Introduction to the information resources and methods typically used in environmental impact analysis. Emphasis on how environmental information is applied to planning, environmental regulation, and public policymaking, with case studies from California land use and natural resource policy.

*Prerequisite(s):* ESP 001; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **ESP 179L – Environmental Impact Reporting Using Geographic Information (2 units)**

*Course Description:* Introduction to Geographic Information Systems (GIS) by using ArcView for assessment and environmental planning.

*Prerequisite(s):* ESP 179 (can be concurrent); ESP 179 required concurrently.

*Learning Activities:* Discussion/Laboratory 2 hour(s), Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ABT 180, ABT 181, or ASE 132.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ESP 190 – Workshops on Environmental Problems (1-8 units)**

*Course Description:* Workshops featuring empirical analyses of contemporary environmental problems by multidisciplinary student teams. Guided by faculty and lay professionals, the teams seek to develop an integrated view of a problem and outline a series of alternative solutions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 2-16 hour(s).

*Enrollment Restriction(s):* Open to all upper division and graduate students on application.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ESP 191A – Workshop on Food System Sustainability (3 units)**

*Course Description:* First in a two-quarter senior capstone course sequence. Identify projects addressing specific problems and opportunities of sustainable agriculture and food systems, form multidisciplinary teams, and identify and consult with key stakeholders to understand their needs and concerns.

*Prerequisite(s):* PLS 015; CRD 020; ARE 121; PLS 150; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Priority enrollment for seniors in the sustainable agriculture and food systems major; limited to 25 students per section.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ESP 191B – Workshop on Food System Sustainability (3 units)**

*Course Description:* Continuation of ESP 191A. Teams conduct analyses of a specific issue in sustainable agriculture or food systems, prepare a critical assessment of technological, economic, environmental, and social dimensions of options for action and present their results to stakeholders.

*Prerequisite(s):* ESP 191A.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Priority enrollment for seniors in the sustainable agriculture and food systems major; limited to 25 students per section.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ESP 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ESP 197T – Tutoring in Environmental Science & Policy (1-5 units)**

*Course Description:* Experience in teaching under guidance of faculty member.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 2-6 hour(s).

*Grade Mode:* Pass/No Pass only.

## **ESP 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **ESP 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **ESP 212A – Environmental Policy Process (4 units)**

*Course Description:* Introduction to selected theories of the policy process and applications to the field of environmental policy. Develops critical reading skills, understanding of policy theory, and an ability to apply multiple theories to the same phenomena.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Cross Listing:* ECL 212A.

*Grade Mode:* Letter.

## **ESP 212B – Environmental Policy Evaluation (4 units)**

*Course Description:* Method and practice, philosophical basis, and political role of policy analysis. Reviews basic concepts from economic theory; how and why environmental problems emerge in a market economy; and tools necessary for solving environmental problems.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Standing.

*Cross Listing:* ECL 212B, ENV 200B.

*Grade Mode:* Letter.

## **ESP 220 – Tropical Ecology (3 units)**

*Course Description:* Overview of present status of knowledge on structure and processes of major tropical ecosystems. Differences and similarities among tropical and temperate systems stressed.

*Prerequisite(s):* ESP 100; EVE 101; EVE 117; EVE 138 recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate and undergraduate students who meet requirement subject to consent of instructor.

*Grade Mode:* Letter.

**ESP 228 – Advanced Simulation Modeling (3 units)**

*Course Description:* Advanced techniques in simulation modeling; optimization and simulation, dynamic parameter estimation, linear models, error propagation, and sensitivity testing. Latter half of course introduces model evaluation in ecological and social system models.

*Prerequisite(s):* (STA 108 or ARE 106); (ESP 128 and ESP 128L).

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ESP 275 – Economic Analysis of Resource & Environmental Policies (4 units)**

*Course Description:* Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economic models. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain.

*Prerequisite(s):* ARE 204 or ECN 204.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* ARE 275.

*Grade Mode:* Letter.

**ESP 278 – Research Methods in Environmental Policy (3 units)**

*Course Description:* Introduction to scientific research in environmental policy. Major issues in the philosophy of the social sciences. How to design research that acknowledges theoretical assumptions and that is likely to produce evidence in an intersubjectively reliable fashion with explicit recognition of its uncertainties.

*Prerequisite(s):* ARE 106; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**ESP 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**ESP 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ESP 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-12 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Environmental Toxicology (ETX)**

College of Agricultural & Environmental Sciences

**ETX 010 – Introduction to Environmental Toxicology (3 units)**

*Course Description:* Hazardous substances, their effects on humans and their actions and movement in the environment. Emphasis on substances of current concern.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**ETX 020 – Introduction to Forensic Science (3 units)**

*Course Description:* Basic principles of forensic science, types of information on which investigations focus, how information is obtained and used in criminal investigations, types of scientific skills required to practice forensic science, guidance on training. Real cases discussed; demonstrations of methods provided.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

**ETX 030 – Chemical & Drug Use & Abuse (3 units)**

*Course Description:* Overview of chemical use and abuse in our society. Effects of chemicals (therapeutic drugs, pesticides, food additives, herbal remedies, environmental contaminants, and recreational drugs) on humans and other living systems.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ETX 092 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the College of Agricultural & Environmental Sciences. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 098 – Directed Group Study (1-5 units)**

*Course Description:* Group study on focused topics in Environmental Toxicology. Topic varies according to instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* P/NP only.

**ETX 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **ETX 101 – Principles of Environmental Toxicology (4 units)**

**Course Description:** Principles of toxicology with a focus on environmental, industrial, and natural chemicals. Topics include fate and effects of chemicals in organisms and the environment, air pollutants, insecticides, aquatic toxicology, endocrine disruptors, biomarkers and bioassays, and risk assessment.

**Prerequisite(s):** (CHE 008B or CHE 118B or CHE 128B); BIS 002A.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **ETX 102A – Environmental Fate of Toxicants (4 units)**

**Course Description:** Properties of toxic chemicals influencing their distribution and transformations; action of environmental forces affecting toxicant breakdown, movement, and accumulation; sources and occurrence of major classes of environmental toxicants.

**Prerequisite(s):** CHE 008B or CHE 118B or CHE 128B; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed ETX 112A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ETX 102B – Quantitative Analysis of Environmental Toxicants (5 units)**

**Course Description:** Sample preparation methods for trace analysis of environmental toxicants. Concept and techniques of advanced analytical instrumentation. Interpretation and use of analytical data.

**Prerequisite(s):** ETX 102A.

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed ETX 112B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Visual Literacy (VL).

## **ETX 103A – Biological Effects of Toxicants (4 units)**

**Course Description:** Biological effects of toxic substances in living organisms. Metabolism, cellular and tissue targets, mechanisms of action, and pathological effects.

**Prerequisite(s):** BIS 102; NPB 101 ETX 101 recommended.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken ETX 114A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **ETX 103B – Biological Effects of Toxicants: Experimental Approaches (5 units)**

**Course Description:** Experimental approaches for assessing the biological effects of toxicants.

**Prerequisite(s):** ETX 103A.

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken ETX 114B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

## **ETX 104 – Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants (4 units)**

**Course Description:** Cellular regulation from nutritional/toxicological perspective. Emphasis: role of biofactors on modulation of signal transduction pathways, role of specific organelles in organization/regulation of metabolic transformations, major cofactor functions, principles of pharmacology/toxicology important to understanding nutrient/toxicant metabolism.

**Prerequisite(s):** BIS 101; (BIS 103 or ABI 103).

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Cross Listing:** NUT 104.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL).

## **ETX 110 – Toxic Tragedies & Their Impact on Society (2 units)**

**Course Description:** Examination of toxic tragedies, their origins, consequences, and effects on toxic regulation.

**Prerequisite(s):** Upper division status or consent of instructor required.

**Learning Activities:** Lecture 2 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Writing Experience (WE).

## **ETX 111 – Introduction to Mass Spectrometry (3 units)**

**Course Description:** Introduction to mass spectrometry, including ionization techniques, mass analyzers, interpretation of mass spectra, and applications of mass spectrometry. Emphasis on fundamental concepts of mass spectrometry necessary to identify and quantify organic molecules.

**Prerequisite(s):** CHE 118C or CHE 128C.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **ETX 120 – Perspectives in Aquatic Toxicology (4 units)**

**Course Description:** Toxic substances, their fate in marine and freshwater systems, and their effects on aquatic organisms, populations, and ecosystems. Emphasis will be on substances and issues of current concern.

**Prerequisite(s):** CHE 008B; (CHE 118B or CHE 128B); BIS 002A; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ETX 127 – Environmental Stress & Development in Marine Organisms (10 units)**

*Course Description:* Taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods.

*Prerequisite(s):* ETX 101 or BIS 102 or BIS 104; and consent of instructor, or the equivalent; ETX 114A or NUT 114 recommended.

*Learning Activities:* Lecture 4 hour(s), Laboratory 12 hour(s), Discussion 2 hour(s).

*Cross Listing:* NUT 127.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ETX 128 – Food Toxicology (3 units)**

*Course Description:* Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards.

*Prerequisite(s):* BIS 102; BIS 103.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* FST 128.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **ETX 130 – Role & Applications of Toxicology in Modern Industry (3 units)**

*Course Description:* Role of toxicology in industry research and development, human health and environmental protection, hazard and risk evaluations, risk management and communications, product stewardship, and regulatory compliance. Scientific principles and methods of toxicology in chemical, energy, pharmaceutical, pesticide, biotechnology industries.

*Prerequisite(s):* ETX 101; ETX 103A recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **ETX 131 – Environmental Toxicology of Air Pollutants (3 units)**

*Course Description:* Field trip required. Toxicology of air pollutants in the ambient, indoor, and occupational environments. Health effects, sources, environmental fates, pulmonary responses, sampling and analyses, and air-quality criteria and standards. Field trip required.

*Prerequisite(s):* CHE 008B (can be concurrent); or the equivalent; BIS 102 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **ETX 135 – Health Risk Assessment of Toxicants (3 units)**

*Course Description:* Current practices of health risk assessment of environmental chemicals using toxicological principles and their application to regulatory control of these chemicals.

*Prerequisite(s):* ETX 101; ETX 114A recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ETX 138 – Legal Aspects of Environmental Toxicology (3 units)**

*Course Description:* Federal and California legislation concerning air and water pollution, pesticide use, food and feed additives, consumer protection, and occupational exposure to toxic substances; roles of federal regulatory agencies; alternatives to government control.

*Prerequisite(s):* Consent of instructor. ETX 010 or ETX 101 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

## **ETX 140 – Genes & the Environment (3 units)**

*Course Description:* Evaluation of evidence that human health and disease susceptibility result from complex interactions between genes and the environment. Critical thinking through problem solving using the scientific method with examples of cancer, metabolic, cardiovascular, and neurological health outcomes related to environmental and genetic risk factors and mechanisms.

*Prerequisite(s):* BIS 002A (can be concurrent) or MCB 010 (can be concurrent) or BIS 101 (can be concurrent); college-level coursework in environmental toxicology recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **ETX 146 – Exposure & Dose Assessment (3 units)**

*Course Description:* Exposure component of risk assessment; specifically, the presence and/or formation of toxic substances in environmental media, their movement within and between contaminated media, and the contacts of human populations with those media.

*Prerequisite(s):* ETX 112A; ETX 135 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **ETX 150 – Evolution in Human-Altered Environments (4 units)**

*Course Description:* Effects of recent human alterations to the natural environment on the evolutionary trajectories of diverse species, including our own.

*Prerequisite(s):* BIS 002B.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to upper division students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**ETX 180 – Chemistry & Toxicology of Metals (4 units)**

*Course Description:* Metal contaminants in the environment (air, water, and soil) and their effects on the health of the environment and humans. How the chemistry of metals ultimately controls their environmental fate and toxicity, application of numerical models, and discussion of case studies.

*Prerequisite(s):* ETX 102A or CHE 008B or CHE 118B or CHE 128B; or Consent of Instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**ETX 190 – Seminar (1 unit)**

*Course Description:* Selected topics presented by students, faculty, or outside speakers covering current research and instructional activities within environmental toxicology. Reports and discussion concerning oral and written presentations, literature sources, and career opportunities.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 190C – Research Group Conference (1 unit)**

*Course Description:* Weekly conference of advanced research methods and the interpretation of research results.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 190S – Environmental Toxicology Career Seminar (1 unit)**

*Course Description:* Careers in environmental toxicology; discussions with graduates from the Department of Environmental Toxicology and other experts in the field.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 194HA – Honors Research (3 units)**

*Course Description:* Specific research project conducted under the supervision of a faculty sponsor. Experience to include experimental design, learning new techniques, data analysis and interpretation of findings.

*Prerequisite(s):* Consent of instructor; senior standing; minimum GPA of 3.250.

*Learning Activities:* Discussion 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**ETX 194HB – Honors Research (3 units)**

*Course Description:* Specific research project conducted under the supervision of a faculty sponsor. Experience to include experimental design, learning new techniques, data analysis and interpretation of findings.

*Prerequisite(s):* Consent of instructor; senior standing; minimum GPA of 3.250.

*Learning Activities:* Discussion 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 194HC – Honors Research (3 units)**

*Course Description:* Continuation of ETX 194HA & ETA 194HB.

*Prerequisite(s):* Consent of instructor; senior standing, minimum GPA of 3.250.

*Learning Activities:* Laboratory 9 hour(s), Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 197T – Tutoring in Environmental Toxicology (1-5 units)**

*Course Description:* Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of staff.

*Prerequisite(s):* Consent of instructor; advanced standing in Environmental Toxicology, a related major, or the equivalent experience.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ETX 203 – Environmental Toxicants (4 units)**

*Course Description:* Toxic chemicals: selected topics illustrating their occurrence, structure, and the reactions underlying detection, toxicity, fate, and ecological importance.

*Prerequisite(s):* CHE 008B or CHE 128C; and consent of instructor, or the equivalent of CHE 128C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**ETX 214 – Mechanisms of Toxic Action (3 units)**

*Course Description:* Chemical, biochemical, and molecular mechanisms underlying the adverse effects of toxic chemicals. Students are required to write a grant proposal and participate in a grant review panel.

*Prerequisite(s):* BIS 102; BIS 103; and consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ETX 220 – Analysis of Toxicants (3 units)**

*Course Description:* Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection and quantitative determination of toxicants using chemical and instrumental techniques.

*Prerequisite(s):* Coursework in organic chemistry.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* FOR 220.

*Grade Mode:* Letter.

**ETX 220L – Analysis of Toxicants Laboratory (2 units)**

*Course Description:* Laboratory techniques for microanalysis of toxicants. Separation, detection, and quantitative determination of toxicants using chemical and instrumental methods.

*Prerequisite(s):* ETX 220 (can be concurrent); consent of instructor.

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

**ETX 234 – Current Topics in Neurotoxicology (3 units)**

*Course Description:* General principles of neurotoxicology, the cell and molecular mechanisms and health impacts of specific neurotoxicants and the contribution of neurotoxic compounds to complex eurodevelopmental disorders and neurodegenerative diseases.

*Prerequisite(s):* Core courses in one of the following graduate programs: Pharmacology Toxicology (PTX), Agricultural Environmental Chemistry (AGC), Biochemistry Molecular Biology (BMB), Cell Developmental Biology (CDB), Immunology (IMM), Molecular Cellular Integrative Physiology (MCP) or Neuroscience (NSC).

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper level undergraduate students must obtain permission from the course coordinator.

*Cross Listing:* VMB 234, MCP 234.

*Grade Mode:* Letter.

**ETX 240 – Ecotoxicology (3 units)**

*Course Description:* Principles of toxicology as applied to chemical action on natural populations, communities, and ecosystems. Physical, chemical, and biological characteristics which influence ecotoxic effects, modeling, and field research. Selected case histories are analyzed and presented in class.

*Prerequisite(s):* Consent of instructor; elementary course in toxicology and ecology or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ETX 250 – Reproductive Toxicology (3 units)**

*Course Description:* Application of toxicological principles in reproductive studies. Effects of toxicants on the male, female, and developing embryo/fetus. Critical evaluation of reproductive toxicity studies and development of mechanistic approaches to understanding how chemical exposure can adversely affect reproduction.

*Prerequisite(s):* PTX 203.

*Learning Activities:* Lecture 1.50 hour(s), Lecture/Discussion 1.50 hour(s).

*Grade Mode:* Letter.

**ETX 260 – Immunotoxicology (3 units)**

*Course Description:* Provides students with skills and knowledge for evaluating and applying research on the impact of environmental toxicants on immunological function in human and wildlife populations.

*Prerequisite(s):* Undergraduate or graduate introduction to immunology coursework recommended but not required; graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ETX 270 – Toxicology of Pesticides (3 units)**

*Course Description:* Classification and chemical properties of pesticides, their mode of action, metabolism and disposition, pesticide resistance, effects on human health and ecological health and methods of risk benefit analyses.

*Prerequisite(s):* ETX 101; one course each in (a) Organic Chemistry, (b) Biochemistry, (c) Toxicology (ETX 101 or equivalent), or with consent of instructor; graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**ETX 278 – Molecular Techniques (3 units)**

*Course Description:* Recombinant DNA technology and its applications.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* FOR 278.

*Grade Mode:* Letter.

**ETX 280 – Forensic DNA Analysis (3 units)**

*Course Description:* Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data.

*Prerequisite(s):* Coursework in genetics and molecular biology.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Graduate standing; consent of instructor required for all students not enrolled in the MS Forensics program.

*Cross Listing:* FOR 280.

*Grade Mode:* Letter.

**ETX 281 – Principles & Practice of Forensic Serology & DNA Analysis (3 units)**

*Course Description:* Comprehensive overview of forensic serology and DNA typing techniques and technologies. Strong emphasis on real-world applications, including preservation and tracking of biological evidence, detection and identification of bodily fluids, and methods to extract, quantify, and type human DNA.

*Prerequisite(s):* (FOR 278 or ETX 278) or (FOR 280 or ETX 280); or equivalent; consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of Forensic Science Program Director.

*Cross Listing:* FOR 281.

*Grade Mode:* Letter.

## **ETX 284 – Non-Human Forensic DNA; Theory & Casework Application (2 units)**

*Course Description:* Provides a comprehensive understanding of plant and animal forensic biology in terms of sample collection, preservation, analytical methods, and of the invaluable lines of inquiry these forensic evidence may permit.

*Prerequisite(s):* Consent of instructor required for all students not enrolled in the MS Forensics program; upper division Molecular Biology and Genetics or its equivalent.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Cross Listing:* FOR 284.

*Grade Mode:* Letter.

## **ETX 290 – Seminar (1 unit)**

*Course Description:* Current topics in environmental toxicology.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ETX 290C – Advanced Research Conference (1 unit)**

*Course Description:* Presentation and critical discussion of advanced research methods and interpretation of research results. Designed primarily for graduate students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ETX 297T – Tutoring in Environmental Toxicology (1-5 units)**

*Course Description:* Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of staff.

*Prerequisite(s):* Consent of instructor; graduate standing in Environmental Toxicology, a related major, or the equivalent experience.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 5 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ETX 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **ETX 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **ETX 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Epidemiology (EPI)**

Graduate Studies

## **EPI 202 – Quantitative Epidemiology I: Probability (5 units)**

*Course Description:* Foundations in probability for epidemiologists.

Emphasis on properties of and relationships between distributions and application of probability concepts to epidemiology. Includes a mathematical skills laboratory to assist in solution of epidemiologic problems.

*Prerequisite(s):* ((MAT 016A, MAT 016B) or (MAT 017A, MAT 017B) or (MAT 021A, MAT 021B)); STA 102; STA 108; or PHR 402 PHR 403 or equivalent of any listed course; concurrent or previous enrollment in a basic epidemiology course; e.g., EPI 205.

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

## **EPI 203 – Quantitative Epidemiology II: Statistical Inference (4 units)**

*Course Description:* Provides the mathematical statistics foundation for statistical models, methods, and data analysis.

*Prerequisite(s):* (EPI 202 or STA 130A or STA 131A or STA 133); EPI 205; a basic epidemiology course (EPI 205 or equivalent).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **EPI 204 – Quantitative Epidemiology III: Statistical Models (4 units)**

*Course Description:* Introduces statistical models, methods, and data analysis in the areas of generalized linear model and survival analysis methodology.

*Prerequisite(s):* (EPI 203 or STA 130B or STA 131B or STA 133); EPI 205; STA 108 recommended; a basic epidemiology course (EPI 205 or equivalent); consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **EPI 204A – Foundation of Statistical Models, Methods, & Data Analysis for Scientists (4 units)**

*Course Description:* Provides the mathematical statistics foundation for statistical models, methods, and data analysis.

*Prerequisite(s):* STA 130A or STA 131A or STA 133; EPI 228 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **EPI 204B – Statistical Models, Methods, & Data Analysis for Scientists (4 units)**

*Course Description:* Introduces statistical models, methods, and data analysis in the areas of generalized linear, survival, and correlated data methodology.

*Prerequisite(s):* EPI 204A; STA 108 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **EPI 205 – Principles of Epidemiology (4 units)**

*Course Description:* Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance.

*Prerequisite(s):* MPM 202; or consent of instructor; an introductory statistics course.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* MPM 205.

*Grade Mode:* Letter.

## **EPI 205B – Integration of Epidemiologic Concepts (2 units)**

*Course Description:* In-depth analysis and integration of basic epidemiologic concepts and approaches to epidemiologic research presented in MPM 405/EPI 205A, with more mathematical and theoretical basis and examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of diagnostic tests, study design, and surveillance.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **EPI 206 – Epidemiologic Study Design (4 units)**

*Course Description:* Builds on concepts presented in EPI 205. Concepts of epidemiologic study design (clinical trials, observational cohort studies, case control studies) introduced in EPI 205A are covered in more depth, using a problem-based format. Discussion of published epidemiologic studies.

*Prerequisite(s):* EPI 205; or consent of instructor.

*Learning Activities:* Lecture 30 hour(s), Discussion 9 hour(s), Laboratory 2 hour(s).

*Cross Listing:* MPM 206.

*Grade Mode:* Letter.

## **EPI 207 – Advanced Epidemiologic Methodology (4 units)**

*Course Description:* In-depth integration of advanced epidemiological concepts. Theory, methods, and applications for observational studies including random and systematic error, confounding, counterfactuals, causal inference, effect modification, internal and external validity, estimability, and interpretation of effect measures, and advanced study designs.

*Prerequisite(s):* EPI 206.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* SPH 207.

*Grade Mode:* Letter.

## **EPI 208 – Analysis & Interpretation of Epidemiologic Data (3 units)**

*Course Description:* Application of theory and concepts of statistics and epidemiology to analysis and interpretation of data typically found in veterinary and human epidemiologic research.

*Prerequisite(s):* EPI 204 (can be concurrent); EPI 207; (STA 144 or PHR 202); and entry level skill in standard statistical software (eg. SPSS, BMDP, SAS, Stata, MinTab, S-Plus).

*Learning Activities:* Lecture 16 hour(s), Laboratory 21 hour(s), Project.

*Grade Mode:* Letter.

## **EPI 209 – History of Epidemiology in Public Health (2 units)**

*Course Description:* Introduction to the history of epidemiology in solving major public health problems. Original historical articles will be read/discussed. Topics may include: infectious disease, accidents/adverse events, nutritional deficiencies, community vaccination trials, occupational exposures, cancer, birth defects, cardiovascular disease, and smoking.

*Learning Activities:* Lecture 0.50 hour(s), Discussion 1.50 hour(s).

*Cross Listing:* SPH 209.

*Grade Mode:* Letter.

## **EPI 220 – Problems in Epidemiologic Study Design (4 units)**

*Course Description:* Design and development of research protocols and funding applications for peer review. Application of research methods data collection and management and statistical analysis in research proposals. Methods of evaluating research proposals, mechanisms of funding, specifying human subjects considerations.

*Prerequisite(s):* MPM 405; STA 102; STA 106; or the equivalent; MPM 406 or the equivalent; PHR 207 required concurrently.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EPI 223 – Spatial Epidemiology (3 units)**

*Course Description:* Geographic Information Systems (GIS) and spatial statistics. Students are expected to complete a term project based on their graduate research.

*Prerequisite(s):* EPI 205A or MPM 205.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EPI 224 – Health & Ecological Risk Analysis (4 units)**

*Course Description:* Methodological approach to risk analysis for human and animal-related health and ecological issues. Basic principles of risk analysis, including perception, communication, assessment and management. Emphasis on the assessment of risk.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

## **EPI 225 – Advanced Topics in Epidemiology Methods (2 units)**

*Course Description:* An in-depth study of topics in epidemiology theory and methods, selected from: causal inference, confounding, study design, or other related areas, with year to year variation. Readings are assigned and students are expected to lead discussions on them.

*Prerequisite(s):* EPI 205B; EPI 206; EPI 207; or equivalents, with consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EPI 226 – Methods for Longitudinal & Repeated Measurement Data (3 units)**

*Course Description:* Mixed models for longitudinal data (LD)/repeated measurements; Mean and covariance models; General linear LD models; Random coefficients models; Linear mixed effects models for continuous outcome; Generalized linear mixed effects model for discrete outcome including binary, ordinal and count data.

*Prerequisite(s):* EPI 204; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EPI 227 – Meta Analysis (4 units)**

*Course Description:* Systematic review, standard and advanced statistical methods for meta-analysis and syntheses of knowledge and evidence. Quantitative analysis of published data, primarily in aggregate form. Students demonstrate skills in study design, protocol, analysis, and results reporting through presentation of drafted first author paper.

*Prerequisite(s):* A course in basic statistics or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **EPI 229 – Geographic Information Systems for Health Professionals (4 units)**

*Course Description:* Emphasis on basic geographic and data management principles. Focus on software proficiency in application to analyzing/solving health-related problems. For graduate and professional students in epidemiology, public health, preventive veterinary medicine, health informatics with interest in spatial techniques in research.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

## **EPI 230 – Introduction to Molecular Epidemiology (3 units)**

*Course Description:* Overview of the modern field of molecular epidemiology. Integrates molecular biology into traditional epidemiologic research by identifying pathways, molecules and genes that influence the risk of developing disease.

*Prerequisite(s):* EPI 205.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **EPI 231 – Infectious Disease Epidemiology (3 units)**

*Course Description:* Infectious disease epidemiology and prevention, with emphasis on human and veterinary diseases of global health importance. Major global health epidemics and challenges of infectious diseases, by mode of transmission.

*Prerequisite(s):* Introductory epidemiology course; e.g., EPI 205.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EPI 232 – Advanced Data Analysis with SAS (3 units)**

*Course Description:* Provide an overview of common advanced statistical methods as well as a treatment of how to use SAS to implement them. Learn the ideas of reproducible research and reporting of statistical analyses.

*Prerequisite(s):* EPI 202; EPI 203; EPI 204; or the equivalent, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EPI 240 – Principles of Injury Epidemiology (3 units)**

*Course Description:* Overview of the epidemiology of human injury, including general principles, surveillance methods, behavioral factors, environmental factors, treatment issues and engineering and legal interventions related to vehicular injuries, drownings, falls, fires and burns, poisonings, firearm injuries, and other intentional injuries.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **EPI 242 – Critical Thinking in Epidemiology (3 units)**

*Course Description:* Critical thinking in Epidemiology.

*Prerequisite(s):* EPI 205 B or better; EPI 206 B or better; EPI 207 (can be concurrent).

*Learning Activities:* Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to Epidemiology Graduate Group students or advanced medical students only; limited to 15 students.

*Grade Mode:* Letter.

## **EPI 251 – Environmental Epidemiology (3 units)**

*Course Description:* Examination of the human health effects and the risk of disease from community, occupational, and personal exposure to toxic substances.

*Prerequisite(s):* MPM 405 (can be concurrent); upper division undergraduates who have completed EST 126; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EPI 252 – Social Epidemiology (2 units)**

*Course Description:* Social determinants of health; psychosocial and physiological pathways; health and social inequality; gender and racial/ethnic disparities in health; social support, social cohesion and health; social gradient in behavioral risk factors; social ecological approaches to health intervention; interventions addressing social determinants.

*Prerequisite(s):* EPI 205A; and consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* SPH 252.

*Grade Mode:* Letter.

## **EPI 260 – Epidemiology of Chronic Diseases & Aging (3 units)**

*Course Description:* Overview of the epidemiology of chronic disease in old age. Topics include biology of aging, epidemiology of cardiovascular disease, neoplasms, osteoporosis and fractures, psychosocial factors and health in old age, dementias, functional status and prevention of disease.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **EPI 270 – Research Methods in Occupational Epidemiology (3 units)**

*Course Description:* Methods used in epidemiologic research on occupational hazards. Topics include design and analysis of cohort and case-control studies, sample size, measuring dose, choosing a control group, validation of employment and health data, interpreting negative studies, and analysis software.

*Prerequisite(s):* (EPI 205A or MPM 205); (MPM 202 or STA 102).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**EPI 272 – Cancer Epidemiology (2 units)**

*Course Description:* We will cover the underlying concepts essential to understanding cancer epidemiology, such as trends in incidence and survival, epidemiologic methods used to assess cancer etiology, prevention and control, and an introduction to the cancer initiation and progression multi-stage model.

*Prerequisite(s):* EPI 205A; EPI 205B; EPI 206 (can be concurrent); STA 102; must have basic understanding of epidemiologic and statistical concepts covered in the listed courses.

*Learning Activities:* Recitation 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**EPI 277 – Mathematical Models in Epidemiology (3 units)**

*Course Description:* Theory of epidemics and mathematical modeling concepts for infectious diseases to include discrete and continuous time models, their use to explore disease dynamics and investigate prevention and control strategies for human and veterinary infectious diseases.

*Prerequisite(s):* MPM 403; MPM 405; consent of instructor; although not required, students encouraged to refresh their knowledge of high school calculus and differential equations.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Cross Listing:* PHR 277.

*Grade Mode:* Letter.

**EPI 280 – Introduction to SAS Programming (3 units)**

*Course Description:* Introduction to SAS, an integrated software system for data retrieval and management, data manipulation and programming.

*Prerequisite(s):* Introductory statistics course; e.g., MPM 402, STA 102.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* SPH 280.

*Grade Mode:* Letter.

**EPI 290 – Seminars in Epidemiology (0.5 units)**

*Course Description:* Faculty and students will present and lead discussion of ongoing or published epidemiologic research.

*Learning Activities:* Seminar 0.50 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EPI 291 – Seminars in Human Health Services Research & Clinical Epidemiology (1 unit)**

*Course Description:* Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* GMD 291.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**EPI 298 – Group Study (1-5 units)**

*Course Description:* Group study in selected areas of epidemiology.

*Learning Activities:* Seminar 1-5 hour(s).

*Grade Mode:* Letter.

**EPI 299 – Research (1-12 units)**

*Course Description:* Research in selected areas of epidemiology.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Evolution & Ecology (EVE)****College of Biological Sciences****EVE 002 – Biodiversity (3 units)**

*Course Description:* Introduction to nature, scope and geographical distribution of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity; domestication, aesthetics, ethics and valuation. Species richness and "success." Biodiversity through time; monitoring, evaluation and conservation. Biomes - global, continental and Californian.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 1 hour(s).

*Cross Listing:* ENT 002.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**EVE 010 – Evolution for Non-Biologists (3 units)**

*Course Description:* Introduction to evolutionary biology for the general population.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**EVE 011 – Principles of Ecology (4 units)**

*Course Description:* Ecological principles with emphasis on humans and their interactions with the environment; how humans affect and depend on natural ecosystems; the future of the Earth's biosphere.

*Prerequisite(s):* Elementary biology recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Writing Experience (WE).

**EVE 012 – Life in the Sea (3 units)**

*Course Description:* Diversity of life in the sea; adaptations to physical/chemical ocean environment; marine science research methods; utilization of living marine resources by humans; factors and processes that influence diversity of sea life, including humans.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**EVE 013 – Sex in the Natural World (3 units)**

*Course Description:* Explores the diversity, mechanisms and evolution of sexual behaviors across the kingdoms of life.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

## **EVE 016 – Wild Davis: A California Naturalist Certification Course (4 units)**

*Course Description:* Natural history and urban ecology of Davis. Basics of ecological observation, community science and service, and California's unique natural communities. If fee is paid, completion of the course provides certification in the UC California Naturalist Program.

*Learning Activities:* Lecture 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **EVE 017 – Dining with Darwin: Evolutionary Insights Into Your Diet (3 units)**

*Course Description:* Crave salty, fatty, sugary foods? Want to know why? Evolution of cravings, metabolism and dentition, and of cooking our food. Relate Paleo, South Beach, and vegan diets to ancestral and global diets and current metabolism. For majors and nonmajors.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); World Cultures (WC).

## **EVE 020 – Darwinian Medicine (3 units)**

*Course Description:* Introduction for non-biologists to the evolved traits of humans and pathogens that influence human biological variation, health, and disease.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **EVE 092 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the Department of Evolution & Ecology. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **EVE 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EVE 099 – Special Study for Lower Division Students (1-5 units)**

*Course Description:* Special study for lower division students.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EVE 100 – Introduction to Evolution (4 units)**

*Course Description:* General survey of the origins of biological diversity and evolutionary mechanisms.

*Prerequisite(s):* (BIS 002A, BIS 002B, BIS 002C); (MAT 016A or MAT 017A or MAT 021A); (MAT 016B or MAT 017B or MAT 021B); STA 100 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **EVE 101 – Introduction to Ecology (4 units)**

*Course Description:* General survey of the principles of ecology.

*Prerequisite(s):* (BIS 002A, BIS 002B, BIS 002C); (MAT 016A or MAT 017A or MAT 021A); (MAT 016B or MAT 017B or MAT 021B); or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **EVE 101Q – Introduction to Computer Models in Ecology (1 unit)**

*Course Description:* Computational methods and mathematical models used to study ecological phenomena.

*Prerequisite(s):* EVE 101 (can be concurrent); EVE 101 required concurrently.

*Learning Activities:* Auto Tutorial 1.50 hour(s), Extensive Problem Solving 1.50 hour(s).

*Grade Mode:* Letter.

## **EVE 102 – Population & Quantitative Genetics (4 units)**

*Course Description:* Evolution as caused by random mating, genetic drift, natural selection, inbreeding, migration, and mutation in theory and actuality. The resemblance between relatives and consequences of selection for quantitative traits. Application of these ideas to topics such as the evolution of sex.

*Prerequisite(s):* BIS 101; (STA 100 or STA 102); EVE 100.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EVE 103 – Phylogeny, Speciation & Macroevolution (4 units)**

*Course Description:* Statistical inference of evolutionary patterns and processes above the species level. Topics include estimation of phylogenies and divergence times, character evolution, biogeographic history, and rates and patterns of lineage diversification, with an emphasis on the origin of species.

*Prerequisite(s):* EVE 100.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **EVE 104 – Community Ecology (4 units)**

*Course Description:* Population growth and density dependence; predation; exploitative, interference and apparent competition; mutualism and facilitation; coexistence mechanisms; niches, spatial and temporal variation etc. Emphasis on quantitative understanding through models, concepts, and empirical evidence.

*Prerequisite(s):* EVE 101 or ESP 100.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ESP 104.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **EVE 105 – Phylogenetic Analysis of Vertebrate Structure (4 units)**

*Course Description:* The structure of the classes and subclasses of vertebrates is described and interpreted in terms of phylogeny.

*Prerequisite(s):* (BIS 001A, BIS 001B) or (BIS 002B, BIS 002C).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EVE 106 – Mechanical Design in Organisms (3 units)**

*Course Description:* Explores fundamental principles in the form and function of organisms, examining how basic properties of size, shape, structure, and habitat constrain ways in which plants and animals interact and cope with their physical surroundings.

*Prerequisite(s):* Upper division standing or consent of instructor; introductory animal biology (BIS 001B or BIS 002B), invertebrate zoology (EVE 112), and/or ecology (EVE 101) are recommended; residence at or near Bodega Marine Lab required.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

*Enrollment Restriction(s):* Enrollment restricted to application at <http://www.bml.ucdavis.edu>.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **EVE 107 – Animal Communication (4 units)**

*Course Description:* How animals use songs, dances, colors, chemicals, electricity and vibrations to communicate. Mechanisms of signal production and detection (sensory systems), theory of information transfer and signal design, and the role of natural selection in shaping communication.

*Prerequisite(s):* BIS 002B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **EVE 108 – Systematics & Evolution of Angiosperms (5 units)**

*Course Description:* Diversity and classification of angiosperms (flowering plants) on a world scale, and current understanding of the origin of angiosperms and evolutionary relationships and trends within them based on morphological and molecular evidence.

*Prerequisite(s):* (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C).

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Cross Listing:* PLB 108.

*Grade Mode:* Letter.

## **EVE 109 – Molecular Ecology (4 units)**

*Course Description:* Use of molecular tools to answer fundamental questions in ecology and evolution of natural populations. Use of DNA and protein sequences to measure diversity and natural selection within and between populations and species and application to the fields of ecology and conservation. Hands-on manipulation and analysis of data in R.

*Prerequisite(s):* BIS 002B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EVE 110 – Running, Swimming & Flying (3 units)**

*Course Description:* Examines the bases of organism movement in terrestrial, aquatic, and aerial environments, emphasizing both the unifying principles underlying locomotion, as well as a range of strategies employed across diverse groups of organisms.

*Prerequisite(s):* Upper division standing or consent of instructor; introductory animal biology (BIS 001B or BIS 002B), invertebrate zoology (EVE 112), and/or ecology (EVE 101) are recommended; residence at or near Bodega Marine Lab required.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

*Enrollment Restriction(s):* Enrollment restricted to application at <http://www.bml.ucdavis.edu>.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **EVE 111 – Marine Environmental Issues (1 unit)**

*Course Description:* Examination of critical environmental issues occurring in coastal waters including the effects of climate change, overfishing, and other human impacts. Through readings and group discussions, students will develop an integrative understanding of the oceanographic and ecological processes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Cross Listing:* ESP 111.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **EVE 112 – Biology of Invertebrates (3 units)**

*Course Description:* Survey of the invertebrate phyla, emphasizing aquatic forms, and focusing on morphology, development, natural history, ecology, and phylogenetic relationships.

*Prerequisite(s):* BIS 001B or (BIS 002B, BIS 002C); courses in systematics, ecology, and evolution recommended.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **EVE 112L – Biology of Invertebrates Laboratory (2 units)**

*Course Description:* Field and laboratory experience with representative members of the major invertebrate phyla discussed in EVE 112. Emphasis on comparative morphology, natural history, ecology, and behavior of living invertebrates. Two field trips required.

*Prerequisite(s):* (BIS 001B or (BIS 002B, BIS 002C)), EVE 112 (can be concurrent); EVE 112 required concurrently.

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Enrollment limited to 50 students.

*Grade Mode:* Letter.

## **EVE 114 – Experimental Invertebrate Biology (3 units)**

*Course Description:* Biology, ecology, and evolution of local marine invertebrates with a focus on adaptations to environmental and biological factors encountered on the California coast. Hands-on field and laboratory learning with an emphasis on generating and testing hypotheses.

*Prerequisite(s):* Upper division standing or consent of instructor; introductory cell, animal and plant biology (BIS 001A and BIS 001B and BIS 001C, or BIS 002B), invertebrate zoology (EVE 112), ecology (EVE 101), and/or evolution (EVE 100) are recommended; residence at or near Bodega Marine Lab required.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

*Enrollment Restriction(s):* Enrollment restricted to application at <http://www.bml.ucdavis.edu>.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **EVE 115 – Marine Ecology (4 units)**

*Course Description:* Processes affecting the distribution, abundance, and diversity of plant and animal life in the sea. Introduction to marine habitat diversity and human impacts on marine ecosystems.

*Prerequisite(s):* EVE 101 or ESP 100 or BIS 002B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EVE 117 – Plant Ecology (4 units)**

*Course Description:* The study of the interactions between plants, plant populations or vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required.

*Prerequisite(s):* (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C); PLB 111 recommended.

*Learning Activities:* Lecture 3 hour(s), Fieldwork 3 hour(s).

*Cross Listing:* PLB 117.

*Grade Mode:* Letter.

## **EVE 119 – Population Biology of Invasive Plants & Weeds (3 units)**

*Course Description:* Origin and evolution of invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions between invasive species, native species, and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species.

*Prerequisite(s):* (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C); introductory statistics recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Cross Listing:* PLB 119.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EVE 120 – Global Change Ecology (3 units)**

*Course Description:* Treatment of historical evolution of the biosphere resulting from physical, chemical, and biological influences. Special focus upon changes caused by humans. Topics pertain to biodiversity, resources, conservation, and ecosystem services.

*Prerequisite(s):* EVE 100; EVE 101; or equivalents.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **EVE 131 – Human Genetic Variation & Evolution (3 units)**

*Course Description:* Introduction to genome-wide nucleotide sequence variation in human populations and computational methods for its analysis. Topics to include forensics, disease gene mapping, and studies of human evolutionary history. Misuses, such as eugenics, and ethical/legal issues will be discussed.

*Prerequisite(s):* BIS 001B or BIS 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EVE 138 – Ecology of Tropical Latitudes (5 units)**

*Course Description:* Biological, physical, and human-related aspects of the ecology of low latitudes. Distribution, numbers, and relationships of tropical organisms. Problems of development and conservation in the context of ecological and evolutionary theory.

*Prerequisite(s):* Consent of instructor. One course in Biological Sciences (BIS), Entomology (ENT), Wildlife, Fish, Conservation Biology (WFC), Geography (GEO), or tropical experience.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **EVE 140 – Paleobotany (4 units)**

*Course Description:* Introduction to plant fossil record, beginning with invasion of land in the Silurian, emphasizing origin and evolution of major groups and adaptations and changing composition and distribution of floras in relation to plate tectonics and climatic change.

*Prerequisite(s):* (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## EVE 141 – Principles of Systematics (3 units)

*Course Description:* Historical background, philosophical rationale, contemporary approaches, and working rules of biosystematics, including International Code of Zoological Nomenclature.

*Prerequisite(s):* BIS 001B or BIS 001C or BIS 002B; EVE 100 recommended.

*Learning Activities:* Lecture 2 hour(s), Independent Study.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## EVE 147 – Biogeography (4 units)

*Course Description:* Movements of terrestrial organisms. The role of geologic, climatic, and biologic changes in the geographic distribution of organisms.

*Prerequisite(s):* BIS 002B or (BIS 001A, BIS 001B).

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## EVE 149 – Evolution of Ecological Systems (4 units)

*Course Description:* Evolution as an organizing force in natural communities. Coadaptation in trophic and competitive relationships. Ecology of polymorphisms, clines, and speciation.

*Prerequisite(s):* (EVE 101 or ESP 100); EVE 100; or equivalent courses.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## EVE 150 – Evolution of Animal Development (3 units)

*Course Description:* Comparative analysis of animal development and the genetic basis of morphological diversification.

*Prerequisite(s):* BIS 101; EVE 100; EVE 100 (may be waived for graduate students with consent of instructor).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## EVE 161 – Microbial Phylogenomics; Genomic Perspectives on the Diversity & Diversification of Microbes (3 units)

*Course Description:* Use of DNA and genomic sequencing in studies of the diversity of microorganisms. Diversity of microbes, phylogenetics, genome sequencing, comparative genomics, phylogenomics, lateral gene transfer, molecular ecology, metagenomics, and studies of the human microbiome.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## EVE 175 – Computational Genetics (3 units)

*Course Description:* The use of computers to solve problems in genetics and evolution. Introduction to a general purpose computer language (Python), computational statistical methods, and applications such as QTL mapping, linkage detection, estimation of rates of evolution, and gene finding.

*Prerequisite(s):* BIS 101; (STA 100 or STA 102).

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## EVE 180A – Experimental Ecology & Evolution in the Field (4 units)

*Course Description:* Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments.

*Prerequisite(s):* EVE 100 (can be concurrent); (EVE 101 (can be concurrent) or ESP 100 (can be concurrent) or ENT 105 (can be concurrent)); consent of instructor.

*Learning Activities:* Lecture/Lab 3 hour(s), Project 3 hour(s); Fieldwork.

*Cross Listing:* ENT 180A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## EVE 180B – Experimental Ecology & Evolution in the Field (4 units)

*Course Description:* Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments.

*Prerequisite(s):* EVE 180A or ENT 180A.

*Learning Activities:* Lecture/Lab 3 hour(s), Project 3 hour(s); Fieldwork.

*Cross Listing:* ENT 180B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

## EVE 181 – Ecology & Evolution of Animal-Plant Interactions (4 units)

*Course Description:* Animal adaptations for eating plants, pollinating flowers, dispersing seeds. Plant adaptations to herbivore defense, attraction of mutualists; role of coevolutionary arms race, mutualists and cheaters in plant/animal speciation. Exploration through lectures, original scientific literature, discussions and term paper.

*Prerequisite(s):* BIS 002B; BIS 002C (can be concurrent).

*Learning Activities:* Lecture 1.50 hour(s), Lecture/Discussion 1.50 hour(s), Term Paper, Extensive Writing/Discussion.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Writing Experience (WE).

**EVE 189 – Introduction to Biological Research (1 unit)**

*Course Description:* Introduction to research methods in biology. Presentation and discussion of research by faculty, graduate, and undergraduate students.  
*Prerequisite(s):* Consent of instructor; upper division standing in Evolution Ecology or related biological science.  
*Learning Activities:* Discussion 1 hour(s).  
*Repeat Credit:* May be repeated 6 unit(s).  
*Grade Mode:* Pass/No Pass only.  
*General Education:* Science & Engineering (SE).

**EVE 190 – Undergraduate Seminar (2 units)**

*Course Description:* Student reports on current topics with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included.  
*Prerequisite(s):* Upper division standing in the biological sciences or a related discipline.  
*Learning Activities:* Seminar 2 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Pass/No Pass only.  
*General Education:* Science & Engineering (SE).

**EVE 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the Department of Evolution & Ecology. Internships supervised by a member of the faculty.  
*Prerequisite(s):* Consent of instructor; completion of 84 units.  
*Learning Activities:* Internship 3-36 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Pass/No Pass only.

**EVE 194HA – Research Honors (2 units)**

*Course Description:* Students pursue intensive research under the guidance of a faculty advisor. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis.  
*Prerequisite(s):* Students who have completed 135 units and qualify for the Honors Program (as defined by the current catalog).  
*Learning Activities:* Laboratory 6 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE); Writing Experience (WE).

**EVE 194HB – Research Honors (2 units)**

*Course Description:* Students pursue intensive research under the guidance of a faculty advisor. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis.  
*Prerequisite(s):* Students who have completed 135 units and qualify for the Honors Program (as defined by the current catalog).  
*Learning Activities:* Laboratory 6 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE); Writing Experience (WE).

**EVE 194HC – Research Honors (2 units)**

*Course Description:* Students pursue intensive research under the guidance of a faculty advisor. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis.  
*Prerequisite(s):* Students who have completed 135 units and qualify for the Honors Program (as defined by the current catalog).  
*Learning Activities:* Laboratory 6 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Science & Engineering (SE); Writing Experience (WE).

**EVE 197T – Tutoring in Biological Sciences 2B (1-2 units)**

*Course Description:* Assisting the instructor by tutoring students in a Biological Sciences 2B laboratory. Tutoring is voluntary and is supervised by a Laboratory Teaching Assistant and the Laboratory Coordinator.  
*Prerequisite(s):* BIS 001B B or better.  
*Learning Activities:* Tutorial 3 hour(s).  
*Repeat Credit:* May be repeated 3 time(s).  
*Grade Mode:* Pass/No Pass only.  
*General Education:* Science & Engineering (SE).

**EVE 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.

**EVE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.  
*General Education:* Science & Engineering (SE).

**EVE 210 – Molecular Phylogenetic Analysis (3 units)**

*Course Description:* Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses.  
*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Cross Listing:* NEM 210.  
*Grade Mode:* Letter.

**EVE 211 – Applied Phylogenetics (3 units)**

*Course Description:* Applications of phylogenetic methods to fields outside of systematics. Core lectures/labs in remedial phylogenetics, phylogeography, conservation and comparative morphology. Special topics vary yearly.  
*Prerequisite(s):* EVE 103 or EVE 210 or PBG 200C; or equivalent, graduate standing.  
*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).  
*Repeat Credit:* May be repeated 1 time(s).  
*Grade Mode:* Letter.

**EVE 220 – Species & Speciation (3 units)**

*Course Description:* Current status of species concepts, models of speciation, current research on speciation, and relevance of species to conservation biology.  
*Prerequisite(s):* EVE 100 or PHI 108; or the equivalent; HPS 130B recommended.  
*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).  
*Grade Mode:* Letter.

## **EVE 225 – Linear Mixed Modeling in Ecology & Evolution (4 units)**

*Course Description:* Analysis of clustered data requires hierarchical or mixed statistical models. Conceptual basis and practical application of linear (mixed) models. Examples drawn from evolutionary and behavioral ecology. Hands-on manipulation and analysis of data in R.

*Prerequisite(s):* PLS 205 or equivalent coursework or experience with basic linear modelling is strongly recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **EVE 231 – Principles of Biological Data Analysis (3 units)**

*Course Description:* Introduction to the principles of data analysis, experimental design, statistical modeling, inference, and hypothesis tests. Statistical methods of particular importance in biological applications will be emphasized. Examples will be presented from the fields of ecology and evolutionary genetics.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EVE 240 – Paleobotany & Angiosperm Evolution (4 units)**

*Course Description:* Critical analysis of the plant fossil record as a source of evidence on origin, evolution, and phylogeny of the angio-sperms, Cretaceous and Tertiary climates, geographic history of modern taxa, and origin of modern vegetation types.

*Prerequisite(s):* PLB 108 or PLB 116 or EVE 140.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **EVE 290C – Research Conference (1 unit)**

*Course Description:* Presentation and discussion of faculty and graduate student research in biology.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EVE 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EVE 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EVE 390 – Methods of Teaching (2 units)**

*Course Description:* Practical experience in the methods and problems of teaching. Includes analyses of texts and supporting material, discussion of teaching techniques and preparing and conducting of laboratory and discussion sections.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Exercise Biology (EXB)**

### **College of Biological Sciences**

### **EXB 090C – Research Conference (1 unit)**

*Course Description:* Research findings and methods in exercise biology. Presentation and discussion of research by faculty and students.

*Prerequisite(s):* EXB 099 (can be concurrent); Lower division standing in Exercise Biology or related biological science and consent of instructor; EXB 099 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

### **EXB 090X – Lower Division Seminar (1-2 units)**

*Course Description:* Gives freshman or sophomore level students the opportunity to study a special topic in the general area of Exercise Biology in a small class setting.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Lecture 1-2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

### **EXB 092 – Exercise Biology Internship (1-5 units)**

*Course Description:* Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision.

*Prerequisite(s):* Consent of instructor; enrollment dependent on availability of intern positions.

*Learning Activities:* Internship 3-15 hour(s).

*Credit Limitation(s):* No internship units will be counted towards the Exercise Biology major.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Pass/No Pass only.

### **EXB 097T – Tutoring in Exercise Biology (1-5 units)**

*Course Description:* Assisting the professor by tutoring students in exercise biology course-related projects.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Tutorial 3-15 hour(s).

*Credit Limitation(s):* No tutorial units will be counted towards the Exercise Biology major.

*Repeat Credit:* May be repeated 10 unit(s) including EXB 097TC, EXB 197T, EXB 197TC.

*Grade Mode:* Pass/No Pass only.

### **EXB 097TC – Tutoring Exercise Biology in the Community (1-5 units)**

*Course Description:* Tutoring in the community in exercise biology related projects under the guidance of the faculty.

*Prerequisite(s):* Consent of instructor and chairperson.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Pass/No Pass only.

### **EXB 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor and chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**EXB 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**EXB 101 – Exercise Physiology (4 units)**

*Course Description:* Physiology of Exercise; acute responses and adaptations to training. Neuromuscular function; bioenergetics; metabolic responses to acute exercise; adaptation to trainings; cardiorespiratory; and, applications to environmental physiology, and human health.

*Prerequisite(s):* NPB 101 or NPB 110C; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 102 – Introduction to Motor Learning & the Psychology of Sport & Exercise (4 units)**

*Course Description:* Theoretical and practical issues in motor learning, sport psychology, and exercise psychology are examined. Emphasis is placed on how motor skills are acquired and retained, and on the application of social psychology and human motivation studies to human performance.

*Prerequisite(s):* PSC 001 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed for students who have completed EXB 104; only 2 units of credit allowed for students who have completed EXB 105; not open for credit to students who have completed EXS 104 and EXS 105.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**EXB 104L – Exercise Biology Laboratory (3 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Principles and analytical procedures for assessing fundamental physiological, biomechanical, motor learning and motor control factors which underlie human movement and performance.

*Prerequisite(s):* EXB 101 (can be concurrent); EXB 102 (can be concurrent); EXB 103 (can be concurrent); courses may be taken concurrently.

*Learning Activities:* Laboratory 3 hour(s), Lecture 1 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 1 unit of credit allowed to students who have completed EXS 101L; only 1 unit of credit allowed to students who have completed EXS 103; not open for credit to students who have completed EXS 101L and EXS 103. (Former EXS 101L and EXS 103.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**EXB 106 – Human Gross Anatomy (4 units)**

*Course Description:* Detailed study of the gross anatomical structure of the human body, with emphasis on function and clinical relevance to students entering health care professions.

*Prerequisite(s):* BIS 002A; concurrent enrollment in EXB 106L or CHA 101L strongly recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Upper division students only; Pass One open to upper division Exercise Biology or Anthropology majors only; Pass Two open to Seniors in any major; open enrollment at the start of the quarter for upper division students in any major.

*Cross Listing:* CHA 101.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 106L – Human Gross Anatomy Laboratory (3 units)**

*Course Description:* Detailed study of prosected human cadavers in small group format with extensive hands-on experience.

*Prerequisite(s):* BIS 002A; EXB 106 (can be concurrent) or CHA 101 (can be concurrent); must have completed EXB 106 or CHA 101 or required concurrently.

*Learning Activities:* Laboratory 9 hour(s).

*Enrollment Restriction(s):* Upper division students only; Pass One open to upper division Exercise Biology or Anthropology majors only; Pass Two open to Seniors in any major; open enrollment at the start of the quarter for upper division students in any major; mandatory attendance on first day of lab.

*Cross Listing:* CHA 101L.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 110 – Exercise Metabolism (3 units)**

*Course Description:* Exercise metabolism, with emphasis on skeletal muscle and cardiac muscle metabolism during activity and inactivity. Basics of bioenergetics, substrate utilization, and cell signaling; mechanisms that regulate these properties, and differences between skeletal muscle and cardiac muscle metabolism.

*Prerequisite(s):* EXB 101 or NPB 101 or NPB 110C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 111 – Environmental Effects on Physical Performance (3 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* The effects of thermal, barometric and gravitational conditions on physiological function and physical performance of humans. Acute and chronic effects, emphasizing physiological adaptations and limitations, will be studied.

*Prerequisite(s):* EXB 101; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**EXB 112 – Clinical Exercise Physiology (4 units)**

*Course Description:* Physical activity as a therapeutic modality in normal and diseased populations (cardiovascular, pulmonary, diabetic). Effects of exercise and inactivity in terms of normal physiology, pathophysiology, and therapeutic benefit. Exercise fitness and disease assessment methods.

*Prerequisite(s):* NPB 101 or NPB 110C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 115 – Biomechanical Bases of Movement (3 units)**

*Course Description:* Biomechanical bases of human movement investigated; topics include musculo-skeletal mechanics, tissue mechanics, electromyography, and measurement and analysis techniques. Application made to sport, clinical, and work environments, including extensive analysis of locomotion.

*Prerequisite(s):* EXB 103; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 116 – Nutrition for Physically Active Persons (3 units)**

*Course Description:* The role of nutrition and exercise in modifying metabolism, body composition, performance and health of humans.

*Prerequisite(s):* EXB 101; NPB 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 117 – Exercise & Aging in Health & Disease (3 units)**

*Course Description:* Etiology of and standard therapy for various diseases associated with inactivity and aging; e.g., cardiovascular, pulmonary, diabetes, obesity, lipemias, etc. Exercise will then be considered as a protective and/or therapeutic modality.

*Prerequisite(s):* NPB 101 or NPB 110C; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 121 – Advanced Sport Psychology (3 units)**

*Course Description:* Advanced study and consideration of major theoretical and practical issues in sport psychology. Emphasis on practical application to sport and human performance.

*Prerequisite(s):* EXB 102; PSC 001 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**EXB 122 – Psychological Effects of Physical Activity (3 units)**

*Course Description:* Physical activity is evaluated in terms of its ability to enhance the quality of life. Topics studied include: individual factors (self concept, type A); special populations (elderly, cardiovascular); and mental health changes (depression, anxiety).

*Prerequisite(s):* PSC 001 or PSC 001Y.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Upper division standing.

*Grade Mode:* Letter.

**EXB 124 – Physiology of Maximal Human Performance (4 units)**

*Course Description:* Molecular mechanisms underlying adaptation to training. Learn how to exercise to maximize their own performance as well as learning how the frequency, intensity and timing of exercise and nutrition affect the molecular signals that underlie performance.

*Prerequisite(s):* EXB 101; or consent of instructor; BIS 101, BIS 102, and BIS 103 recommended.

*Learning Activities:* Lecture 3 hour(s), Practice 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 125 – Neuromuscular & Behavioral Aspects of Motor Control (3 units)**

*Course Description:* Factors which affect control of movement from neuropsychological, physiological, behavioral, and mechanical viewpoints. Topics include central vs. peripheral control mechanisms, open and closed loop theories, motor programming, cognitive learning strategies, and the effects of biochemical and biomechanical influences.

*Prerequisite(s):* EXB 101.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EXB 148 – Theory & Practice of Exercise Testing (1 unit)**

*Course Description:* Theory and practice of exercise testing applied to older adult populations. Physiological responses to and limitations of exercise testing. Application of exercise testing and training to healthy and diseased populations.

*Prerequisite(s):* EXB 112 (can be concurrent).

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**EXB 148L – Adult Fitness Testing Laboratory (1 unit)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Testing symptomatic and asymptomatic older adults for functional aerobic capacity, body composition, blood lipids, pulmonary function, and cardiovascular disease risk. Counseling adults in appropriate exercise programs and lifestyle modifications. Two quarters minimum; third quarter permitted. (Former course PHE 148L).

*Prerequisite(s):* EXB 148; EXB 148 required concurrently.

*Learning Activities:* Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**EXB 179 – Frontiers in Exercise Biology (3 units)**

*Course Description:* Lectures by leading authorities and discussion of the latest research in newly emerging areas in exercise biology. Offered every fourth year.

*Prerequisite(s):* EXB 101; EXB 102; EXB 103 (can be concurrent); EXB 104L recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EXB 189 – International Perspectives in Exercise Biology (4 units)**

*Course Description:* Compare and contrast exercise science issues between the US and an international location. Identify political, economic, cultural, technological and environmental issues that impact human exercise, physical activity, wellness, and sport from a global perspective.  
*Prerequisite(s):* EXB 010; or upper division standing in Exercise Biology; consent of instructor; students will be accepted based upon academic merit, personal experience, and academic discipline in order to provide multidisciplinary perspectives.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to 22 students.

*Grade Mode:* Letter.

## **EXB 190C – Research Conference (1 unit)**

*Course Description:* Research findings and methods in exercise biology.

Presentation and discussion of research by faculty and students.

*Prerequisite(s):* EXB 099 (can be concurrent); upper division standing in Exercise Biology or related biological science and consent of instructor; EXB 199 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **EXB 192 – Exercise Biology Internship (1-12 units)**

*Course Description:* Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under program faculty supervision. Written report required.

*Prerequisite(s):* Consent of instructor; enrollment dependent on availability of intern positions.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 15 unit(s) including EXB 092.

*Grade Mode:* Pass/No Pass only.

## **EXB 194H – Research Honors (2 units)**

*Course Description:* Completion of individual honors research project in Exercise Biology, under the guidance of an Exercise Biology faculty advisor, culminating in written honors thesis.

*Prerequisite(s):* Senior standing; minimum of 6 units of EXB 199; 3.500 GPA or greater in major courses; consent of honors thesis advisor.

*Learning Activities:* Independent Study 6 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EXB 197T – Tutoring in Exercise Biology (1-5 units)**

*Course Description:* Assisting the instructor by tutoring students in exercise biology course-related projects.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 3-15 hour(s).

*Credit Limitation(s):* No tutorial units will be counted towards the Exercise Biology major.

*Repeat Credit:* May be repeated 10 unit(s) including EXB 097T, EXB 097TC, EXB 197T.

*Grade Mode:* Pass/No Pass only.

## **EXB 197TC – Tutoring Exercise Biology in the Community (1-5 units)**

*Course Description:* Tutoring in the community in exercise biology related projects under the guidance of the faculty.

*Prerequisite(s):* Consent of instructor and chairperson.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated 10 unit(s) including EXB 097T, EXB 097TC, EXB 197T.

*Grade Mode:* Pass/No Pass only.

## **EXB 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor and chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **EXB 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

# **Exercise Science (EXS)**

**College of Letters & Science**

## **EXS 201 – Exercise Cardiorespiratory Physiology (3 units)**

*Course Description:* Advanced course on integrated responses of the cardiovascular and respiratory systems to exercise. Includes hemodynamic, neurohormonal, and autonomic aspects of cardiac and vascular function, principles of myocardial metabolism, and mechanisms underlying changes in pulmonary function and gas transport.

*Prerequisite(s):* Undergraduate course in systemic physiology, exercise physiology, and biochemistry (intermediary metabolism).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **Family Practice (FAP)**

**School of Medicine**

## **FAP 092C – Primary Care Clinic (2 units)**

*Course Description:* Students must apply and interview with the Board of Clinica Tepati or Imani Clinic. Field experience exposes lower division students to health care delivery, patient histories, physical examinations, health promotion, disease prevention, diagnosis, treatment of episodic, acute, chronic illness; appropriate referral and follow-up.

*Prerequisite(s):* Consent of instructor; enrollment at the UC Davis campus, for freshman and sophomore students.

*Learning Activities:* Clinical Activity 8 hour(s), Seminar 2 hour(s), Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **FAP 192C – Primary Care Clinics (1-2 units)**

*Course Description:* Students must apply and interview with the Board of Clinica Tepati or Imani Clinic. Field experience introduces students to health care delivery, patient histories and physical examinations, health promotions and disease prevention, diagnosis and treatment of episodic, acute and chronic illness, basic laboratory testing and appropriate referral and follow-up.

*Prerequisite(s):* Consent of instructor; enrollment at the UC Davis campus; upper division standing.

*Learning Activities:* Clinical Activity 6-8 hour(s), Seminar 2 hour(s), Lecture 1-2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **FAP 195 – Health Care to Underserved Populations (1 unit)**

*Course Description:* Discusses sociocultural perspectives of underserved populations in California impacting their health; roles of family/interpersonal relationships in making health care decisions; and clinician's perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine.

*Prerequisite(s):* Sociology, political science, or applied behavioral science background recommended, or registration in medical school.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **FAP 401 – Introductory Preceptorship in Family Practice (3-9 units)**

*Course Description:* Preceptorship in family practice offered as an introduction to clinical medicine. 20 hours or 40 hours per week in a family physician's office, doing patient interviews, historytaking, and performing physical exams.

*Prerequisite(s):* Completion of first-year of medical training.

*Learning Activities:* Clinical Activity 20-40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 405 – The Healer's Art (1 unit)**

*Course Description:* Learning to strengthen your humanity and remain open-hearted can make the difference between burnout and a fulfilling life. Learn tools for selfcare, healing, finding meaning, strengthening commitment and becoming a true physician.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 0.60 hour(s), Workshop 3 hour(s).

*Enrollment Restriction(s):* Limited to first-year medical students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **FAP 411 – Selected Studies of Systems for Chronic Illness Care (3 units)**

*Course Description:* Understanding of chronic illness, particularly diabetes, participate in patient care, alternative techniques.

*Prerequisite(s):* FAP 400A; FAP 400B; FAP 400C; medical students with consent of instructor.

*Learning Activities:* Clinical Activity 4 hour(s), Discussion 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430 – Family Medicine Clerkship (3-12 units)**

*Course Description:* Family medicine clerkship for third year medical students.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430FA – SJVP Longitudinal Family Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430FB – SJVP Longitudinal Family Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430FC – SJVP Longitudinal Family Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430FD – SJVP Longitudinal Family Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430R – Rural PRIME Family Medicine Longitudinal Clerkship (2 units)**

*Course Description:* Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430RA – Rural PRIME Family Medicine Longitudinal Clerkship (3 units)**

*Course Description:* Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430RB – Rural PRIME Family Medicine Longitudinal Clerkship (3 units)**

*Course Description:* Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430RC – Rural PRIME Family Medicine Longitudinal Clerkship (3 units)**

*Course Description:* Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430RD – Rural PRIME Family Medicine Longitudinal Clerkship (1 unit)**

*Course Description:* Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430TA – TeachMS Longitudinal Primary Care Clerkship (A) (4 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430TB – TeachMS Longitudinal Primary Care Clerkship (B) (6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 430TC – TeachMS Longitudinal Primary Care Clerkship (C) (2 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s), Lecture 2 hour(s), Workshop 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 431 – Introduction to Primary Care Continuity Clinic (1 unit)**

*Course Description:* Longitudinal component of the third-year primary care curriculum. Attend clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor; completion of the Pre-Clinical Curriculum.

*Learning Activities:* Clinical Activity 4 hour(s), Project 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 431A – Primary Care Continuity Clinic (1 unit)**

*Course Description:* Longitudinal component of the third-year primary care curriculum. Attend clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor; completion of the Pre-Clinical Curriculum.

*Learning Activities:* Clinical Activity 4 hour(s), Project 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 431B – Primary Care Continuity Clinic (1 unit)**

*Course Description:* Longitudinal component of the third-year primary care curriculum. Attend clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor; completion of the Pre-Clinical Curriculum.

*Learning Activities:* Clinical Activity 4 hour(s), Project 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 431C – Primary Care Continuity Clinic (1 unit)**

*Course Description:* Longitudinal component of the third-year primary care curriculum. Attend clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor; completion of the Pre-Clinical Curriculum.

*Learning Activities:* Clinical Activity 4 hour(s), Project 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**FAP 431D – Primary Care Continuity Clinic (1 unit)**

*Course Description:* Longitudinal component of the third-year primary care curriculum. Attend clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor; completion of the Pre-Clinical Curriculum.

*Learning Activities:* Clinical Activity 4 hour(s), Project 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**FAP 431KA – ACE-PC Continuity Clinic (6 units)**

*Course Description:* Longitudinal clinic component of the second year of the ACE-PC Program. Start with a four-week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**FAP 431KB – ACE-PC Continuity Clinic (0.5 units)**

*Course Description:* Longitudinal clinic component of the second year of the ACE-PC Program. Start with a four-week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**FAP 431KC – ACE-PC Continuity Clinic (0.5 units)**

*Course Description:* Longitudinal clinic component of the second year of the ACE-PC Program. Start with a four-week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**FAP 431KD – ACE-PC Continuity Clinic (0.5 units)**

*Course Description:* Longitudinal clinic component of the second year of the ACE-PC Program. Start with a four-week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**FAP 434 – Primary Care Clinics-Clínica Tepati (1-12 units)**

*Course Description:* Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations.

*Learning Activities:* Clinical Activity 32-36 hour(s), Seminar 0-2 hour(s), Lecture 1-2 hour(s).

*Enrollment Restriction(s):* Open to medical students in all four years of medical school.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**FAP 435 – Primary Care Clinics-Imani Clinic (1-12 units)**

*Course Description:* Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations.

*Learning Activities:* Clinical Activity 32-36 hour(s), Seminar 0-2 hour(s), Lecture 1-2 hour(s).

*Enrollment Restriction(s):* Open to medical students in all four years of medical school.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**FAP 436 – Continuity Clinic in Primary Care; Shifa Clinic (3-12 units)**

*Course Description:* Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations.

*Learning Activities:* Clinical Activity 32-36 hour(s), Seminar 0-2 hour(s), Lecture 1-2 hour(s), Variable.

*Enrollment Restriction(s):* Open to medical students in all four years of medical school.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**FAP 437 – Primary Care Clinics: Knights Landing (1-12 units)**

*Course Description:* Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations in the community of Knights Landing.

*Learning Activities:* Clinical Activity 3 hour(s), Lecture 1 hour(s).

*Enrollment Restriction(s):* Must complete an application and interview prior to registering.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**FAP 439D – Directed Clinical Studies in Family Medicine (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**FAP 439R – Directed Studies in Family Medicine (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Independent Study 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **FAP 444 – Advanced Preceptorship in Family Medicine (3-18 units)**

*Course Description:* Preceptorships with primary care physicians in a variety of settings. Acquisition skills to evaluate and develop a treatment plan for patients with common medical problems seen by primary care physicians in an out patient setting.

*Prerequisite(s):* Completion of third-year primary care plus clerkship or consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Enrollment Restriction(s):* Open to medical students only.

*Repeat Credit:* May be repeated 18 unit(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 450 – CAM in Family & Community Health (3-18 units)**

*Course Description:* Complementary and alternative medicine courses at away institutions that cover various aspects of integrative medicine, including but not limited to: botanicals, homeopathy, mind/body, naturopathy, nutrition, traditional Chinese medicine, osteopathy, and energy medicine. Intended to grant units for away rotations; not offered at the UC Davis Medical Center.

*Learning Activities:* Variable 20-40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 454 – Away Advanced Clinical Clerkship in Family Medicine (3-12 units)**

*Course Description:* Preceptorships with primary care physicians in a variety of settings. Acquisition skills to evaluate and develop a treatment plan for patients with common medical problems seen by primary care physicians in an out patient setting.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 460 – Geriatrics in Community Health (3-6 units)**

*Course Description:* Visits to community agencies including mental health teams, adult day health centers, a diagnostic and research center, and case management specialists. Observation and participation in MMSE's, patient-family conferences, interdisciplinary team meetings, neuropsychiatric testing and home visit evaluations.

*Prerequisite(s):* FAP 430.

*Learning Activities:* Fieldwork 24 hour(s), Clinical Activity 12 hour(s), Lecture 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 468 – International Preceptorship (3-12 units)**

*Course Description:* Preceptorship with a family practitioner in a foreign country (Arranged by student contact or with assistance of the Family and Community Medicine Department.) Participate in clinical activities, analyze and report characteristics of the practice.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 469 – Inpatient Acting Internship in Family Medicine (3-12 units)**

*Course Description:* Comprehensive primary medical care of inpatients on a family medicine hospital service. Available sites are university-based family medicine residency programs and programs within the UC Davis Network of Affiliated Family Medicine Residency Programs.

*Prerequisite(s):* Completion of third-year of medical school or consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Enrollment Restriction(s):* Open to medical students only.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 470 – Inpatient Clinical Elective in Family Medicine (3-12 units)**

*Course Description:* Comprehensive primary medical care of patients on a family medicine hospital service. Usually includes inpatient and outpatient experience.

*Prerequisite(s):* Completion of third-year of medical school or consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Enrollment Restriction(s):* Open to medical students only.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 475 – Combined Inpatient/Outpatient Clinical Elective in Family Medicine (3-12 units)**

*Course Description:* Combined inpatient and outpatient elective. Consists of comprehensive primary medical care of patients on a family medicine hospital service and in a family medicine outpatient clinic.

*Prerequisite(s):* Completion of third-year of medical school or consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Enrollment Restriction(s):* Open to Medical students only.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 479 – Away Inpatient Acting Internship in Family Medicine (3-12 units)**

*Course Description:* Comprehensive primary medical care of inpatients on a family medicine hospital service.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 488 – Selected Studies in Family Practice (1-9 units)**

*Course Description:* Assigned readings in family practice to increase understanding on selected topics relating to family medicine and primary health care delivery; visits to and written analysis of selected health care programs; and/or exposure to family practice with a community physician preceptor.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable 3-27 hour(s).

*Repeat Credit:* May be repeated 9 unit(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 490 – Health Care to Underserved Populations (1 unit)**

*Course Description:* Discusses sociocultural perspectives of underserved populations impacting health; roles of family/interpersonal relationships in making health care decisions; the nature of ethnic/racial/socioeconomic health care disparities; and clinicians' perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine.

*Prerequisite(s):* Sociology, Political Science, or Applied Behavioral Science background recommended, or registration in medical school.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **FAP 493 – Aging & Health (6 units)**

*Course Description:* Is disease and infirmity the inevitable consequence of aging? We will spend four weeks exploring this question by reviewing the biology of aging, physiologic changes seen in aged individuals and disease processes commonly found in elderly persons.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 12 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **FAP 495 – LGBTIQQA Healthcare Lecture Series (1 unit)**

*Course Description:* Increase the awareness of medical issues surrounding the LGBTIQQA community and arm students with knowledge of the health disparities the community faces. Provide better quality care to the LGBTIQQA patients cared for as physicians.

*Learning Activities:* Lecture 6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **FAP 496 – Advanced Transgender & Gender Nonbinary (TGNB) Health (6 units)**

*Course Description:* Focuses on cultural competency in caring for Transgender & Gender Nonbinary (TGNB) patients, including awareness of health disparities.

*Learning Activities:* Seminar.

*Grade Mode:* Pass/Fail only.

## **FAP 498 – Directed Group Study (1-5 units)**

*Course Description:* Explore in-depth various topics in primary care.

Extensive contact with and oversight by instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **FAP 499 – Research (1-12 units)**

*Course Description:* Research in various aspects of the health care delivery system.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* .

*Grade Mode:* Honors/Pass/Fail.

# **Fiber & Polymer Science (FPS)**

College of Agricultural & Environmental Sciences

## **FPS 100 – Principles of Polymer Materials Science (3 units)**

*Course Description:* Basic principles of polymer science are presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing.

*Prerequisite(s):* CHE 002A; CHE 002B; ((CHE 008A, CHE 008B) or (ENG 045 or ENG 045Y)); Introductory physics.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EMS 147.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **FPS 110 – Plastics in Society & the Environment (4 units)**

*Course Description:* Basic concepts and methodologies in the study of plastics. Formation, classification, structure, properties, processing, and formulation. Their application to societal needs, and their impact on society and the environment.

*Prerequisite(s):* CHE 010; or introductory course in physical sciences.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

## **FPS 150 – Polymer Syntheses & Reactions (3 units)**

*Course Description:* Organic and physical chemistry aspects of polymer syntheses and reactions including polymerization mechanisms, kinetics and thermodynamics for major types of organic high polymers.

*Prerequisite(s):* (CHE 128B or CHE 008B); CHE 107A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **FPS 161 – Structure & Properties of Fibers (3 units)**

*Course Description:* Structure, properties and reactions of natural- and man-made fibers; the relations between molecular structure of fibers and their physical properties; interactions of fibers and detergents.

*Prerequisite(s):* TXC 006; CHE 008B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **FPS 161L – Textile Chemical Analysis Laboratory (1 unit)**

*Course Description:* Laboratory methods and procedures employed in qualitative and quantitative analysis of textile fibers and auxiliaries.

*Prerequisite(s):* FPS 161 (can be concurrent).

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **FPS 180A – Introduction to Research in Fiber & Polymer Science (2 units)**

*Course Description:* Senior thesis on independent problems. Research begun in TXC 180A continued and completed in TXC 180B.

*Prerequisite(s):* Consent of instructor; senior standing in major related to Fiber and Polymer Science.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **FPS 180B – Introduction to Research in Fiber & Polymer Science (2 units)**

*Course Description:* Senior thesis on independent problems. Research begun in TXC 180A continued and completed in TXC 180B.

*Prerequisite(s):* Consent of instructor; senior standing in major related to Fiber and Polymer Science.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **FPS 192 – Internship in Fiber & Polymer Science (1-12 units)**

*Course Description:* Work experience off campus in a fiber and polymer science related area. Supervision by a member of the Textiles and Clothing faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **FPS 197T – Tutoring in Fiber & Polymer Science (1-5 units)**

*Course Description:* Tutoring of students in Fiber & Polymer Science courses. Assistance with discussion groups and laboratory sections under supervision of instructor.

*Prerequisite(s):* Consent of instructor; upper division fiber and polymer science related major.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated if tutoring in another Fiber & Polymer Science course.

*Grade Mode:* Pass/No Pass only.

## **FPS 198 – Directed Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **FPS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **FPS 250A – Special Topics in Polymer & Fiber Science (3 units)**

*Course Description:* Selected topics of current interest in polymer and fiber sciences. Topics vary each time course is offered.

*Prerequisite(s):* FPS 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EMS 250A.

*Grade Mode:* Letter.

## **FPS 250B – Special Topics in Polymer & Fiber Science (3 units)**

*Course Description:* Selected topics of current interest in polymer and fiber sciences. Topics vary each time course is offered.

*Prerequisite(s):* FPS 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EMS 250B.

*Grade Mode:* Letter.

## **FPS 250E – Special Topics in Polymer & Fiber Science (3 units)**

*Course Description:* Selected topics of current interest in polymer and fiber sciences. Topics vary each time course is offered.

*Prerequisite(s):* FPS 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EMS 250E.

*Grade Mode:* Letter.

## **FPS 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Independent Study 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FPS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant, training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **Film Studies (FMS)**

College of Letters & Science

## **FMS 045 – Vampires & Other Horrors in Film & Media (4 units)**

*Course Description:* History of representations of vampires and horror generally from the 19th-21st centuries. Emphasis on transnational history of the horror genre; psychologies of horror effects; issues of race, gender, and class; intersections with prejudice, medicine, modernity.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* GER 045.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 090X – Lower Division Seminar (4 units)

**Course Description:** Study of a special topic in Film Studies in a small class setting.

**Prerequisite(s):** Consent of instructor; lower division standing.

**Learning Activities:** Seminar 4 hour(s).

**Repeat Credit:** May be repeated when topic differs.

**Grade Mode:** Pass/No Pass only.

## FMS 120 – Italian-American Cinema (4 units)

**Course Description:** Exploration of representations of Italian-American identity in American (U.S.) cinema. Analysis of both Hollywood and independently produced films, especially as they represent ethnicity, gender, and social class of Italian Americans.

**Prerequisite(s):** FMS 001.

**Learning Activities:** Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken HUM 120.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 121 – New Italian Cinema (4 units)

**Course Description:** Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required.

**Prerequisite(s):** FMS 001; and upper division standing, or consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

**Cross Listing:** ITA 121.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 121S – New Italian Cinema (4 units)

**Course Description:** Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required. May be taught abroad.

**Prerequisite(s):** FMS 001; and upper division standing, or consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

**Cross Listing:** ITA 121S.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 127 – Film Theory (4 units)

**Course Description:** Survey of the conceptual frameworks used to study film (including semiotics, psychoanalysis, spectatorship, auteur, genre and narrative theories). Historical survey of major film theorists.

**Prerequisite(s):** FMS 001; or consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 129 – Russian Film (4 units)

**Course Description:** History of Russian film; film & social revolution, the cult of Stalin, dissident visions; film & the collapse of the Soviet empire; gender and the nation in Russian film. Taught in English; Russian films with English subtitles.

**Prerequisite(s):** Completion of Subject A requirement.

**Learning Activities:** Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

**Cross Listing:** RUS 129.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 142 – New German Cinema (4 units)

**Course Description:** German filmmakers of the 1960s-1980s such as Fassbinder, Herzog, Syberberg, Brückner, Schlöndorf, Kluge, Wenders. Knowledge of German is not required.

**Learning Activities:** Lecture/Discussion 3 hour(s), Extensive Writing.

**Repeat Credit:** May be repeated with consent of instructor.

**Cross Listing:** GER 142.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 176A – Classic Weimar Cinema (4 units)

**Course Description:** German Weimar (1919-1933) cinema. Fritz Lang, F.W. Murnau, and G.W. Pabst among others. Influence on world-wide (esp. Hollywood) film genres such as film noir, horror, science fiction, and melodrama.

**Prerequisite(s):** HUM 001.

**Learning Activities:** Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken HUM 176.

**Cross Listing:** GER 176A.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 176B – Postwar German Cinema (4 units)

**Course Description:** Exploration of German cinema from 1945 to 1980, when the Nazi past was a central theme. Includes study of postwar "rubble films," escapist "homeland films," and New German Cinema of the 1970s (including films by Fassbinder, Kluge, Syberberg, and Herzog).

**Prerequisite(s):** FMS 001.

**Learning Activities:** Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken HUM 177.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## FMS 190X – Upper Division Seminar (4 units)

**Course Description:** Study of a special topic in film studies in a small class setting.

**Prerequisite(s):** Upper division standing or consent of instructor.

**Learning Activities:** Seminar 4 hour(s).

**Repeat Credit:** May be repeated when topic differs.

**Grade Mode:** Pass/No Pass only.

# Fine Arts & Humanities (FAH)

College of Letters & Science

**FAH 098 – Directed Group Study (1-4 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**FAH 198 – Directed Group Study (1-4 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# Food Science & Technology (FST)

College of Agricultural & Environmental Sciences

**FST 001 – Principles of Food Science (3 units)**

*Course Description:* Food science fundamentals. Fresh and processed food technologies; world food problems; food composition; food microbiological and toxicological safety; food laws; evaluation of acceptability and nutritional value.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed any FST course, except FST 010.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**FST 003 – Introduction to Brewing & Beer (3 units)**

*Course Description:* Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken FST 003V.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**FST 003V – Introduction to Brewing & Beer (3 units)**

*Course Description:* Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1.50 hour(s), Project.

*Credit Limitation(s):* Not open for credit to students who have taken FST 003.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**FST 010 – Food Science, Folklore & Health (3 units)**

*Course Description:* Ancient and modern food folklore in relation to health and well-being. Food safety, organic food, herbalism, food preservation, and nutritional enhancement.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed FST 002.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Visual Literacy (VL); World Cultures (WC).

**FST 050 – Introduction to Food Preservation (3 units)**

*Course Description:* Introduction to modes of fresh food preservation including use of chemicals and microbes, heat and energy, control of water and atmosphere, and by indirect approaches such as packaging, hygienic design and sanitation.

*Prerequisite(s):* CHE 002A; BIS 002A (can be concurrent); (STA 013 (can be concurrent) or STA 013Y (can be concurrent) or STA 100 (can be concurrent)).

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Food Science majors; Pass Two open to all students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**FST 055 – Food in American Culture (4 units)**

*Course Description:* Relationship between food and culture; relationship between food and the social order; influences on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* AMS 055.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**FST 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**FST 100A – Food Chemistry (4 units)**

*Course Description:* Chemical aspects of food composition. Emphasis on the functional properties and chemical reactions of the major components of foods: carbohydrates, lipids, proteins, and water.

*Prerequisite(s):* (CHE 008B or CHE 118B or CHE 128B); BIS 002A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Food Science, Clinical Nutrition, and Nutrition Science majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **FST 100B – Food Properties (4 units)**

*Course Description:* Sensory quality, chemical and microbial safety, and nutritional properties of foods. Effects of food processing and preparation on these properties. Selected properties of food commodities.

*Prerequisite(s):* FST 100A; CHE 008B; and consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **FST 100C – Food Physical Chemistry (4 units)**

*Course Description:* Fundamentals of thermodynamics and kinetics related to food physical chemistry. Phase behavior, crystallization, water activity and food stability, solubility, aroma volatility, formation of glasses, gels and dispersions, biopolymers and rheology.

*Prerequisite(s):* FST 100A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **FST 101A – Food Chemistry Laboratory (3 units)**

*Course Description:* Study of basic chemical and physical properties that influence the reactivity and functional properties of components in food systems.

*Prerequisite(s):* FST 100A (can be concurrent).

*Learning Activities:* Discussion 1 hour(s), Lecture 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to Food Science and Clinical Nutrition majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **FST 101B – Food Properties Laboratory (2 units)**

*Course Description:* Study of properties of food described in FST 100B.

*Prerequisite(s):* FST 100B (can be concurrent); must be taken concurrently.

*Learning Activities:* Lecture/Lab 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **FST 102A – Malting & Brewing Science (4 units)**

*Course Description:* Technology of the malting, brewing and fermentation processes is integrated with the chemistry, biochemistry and microbiology that determine industrial practices and product quality.

*Prerequisite(s):* (BIS 102, BIS 103) or BIS 105; senior standing recommended.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken FST 102.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **FST 102B – Practical Malting & Brewing (4 units)**

*Course Description:* Provides practical working knowledge of analytical methods used in malting and brewing and experience with brewing materials and processes, by analysis of samples that illustrate the range of values experienced in practice and pilot scale brewing.

*Prerequisite(s):* FST 102A; CHE 002C.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Open to seniors only in Fermentation Science or Food Science and Technology.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **FST 103 – Physical & Chemical Methods for Food Analysis (4 units)**

*Course Description:* Theory and application of physical and chemical methods for determining the constituents of foods. Modern separation and instrumental analysis techniques are stressed.

*Prerequisite(s):* CHE 002C; CHE 008B; BIS 103; FST 100B.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

## **FST 104 – Food Microbiology (3 units)**

*Course Description:* Microorganisms in food safety, spoilage, and production. Food-borne disease agents and their control. Growth parameters of food spoilage agents. Destruction of microbes in food. Food fermentations. The development of microbes as a resource for the food industry.

*Prerequisite(s):* BIS 002A; BIS 103.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **FST 104L – Food Microbiology Laboratory (4 units)**

*Course Description:* Cultural and morphological characteristics of microorganisms involved in food spoilage, in foodborne disease, and food fermentation. Analysis of microbiological quality of foods. May be taught abroad.

*Prerequisite(s):* BIS 002A; BIS 103; FST 104.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Restricted to juniors and seniors in the Food Science major.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## FST 106 – Food Chemistry for Clinical Nutrition (5 units)

**Course Description:** Chemical and physical principles that influence functional properties, nutrient content, safety, and sensory aspects of food. Emphasis on the application of these concepts in clinical nutrition.  
**Prerequisite(s):** CHE 008B C- or better or CHE 118B C- or better or CHE 128B C- or better; concurrent with FST 100A recommended.  
**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

**Enrollment Restriction(s):** Only open to Clinical Nutrition majors.

**Credit Limitation(s):** Not open to students who have completed FST 101A and/or FST 101B.

**Cross Listing:** NUT 106.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## FST 107 – Food Sensory Science (4 units)

**Course Description:** Critical examination of techniques and theories of sensory measurement of food; measures of consumer perception and acceptance. An introduction to the sensory and cognitive systems associated with the perception of food.

**Prerequisite(s):** FST 117 (can be concurrent); (STA 013 or STA 013Y).

**Learning Activities:** Lecture 3 hour(s), Laboratory 3 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed FST 107A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

## FST 109 – Principles of Quality Assurance in Food Processing (3 units)

**Course Description:** Quality assurance systems for food industry with essential measurement & analysis techniques and discussion of QA management & control programs. Regulations and audit, as well as the processes for validation and verification of quality of food systems, are emphasized.

**Prerequisite(s):** STA 013 or STA 013Y.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## FST 110 – Food Processing (4 units)

**Course Description:** Application of the conservation of mass and energy to food processing. Elements of engineering thermodynamics, fluid mechanics, heat and mass transfer. Quantitative analysis through problem solving and simulation.

**Prerequisite(s):** PHY 007A; PHY 007B; PHY 007C (can be concurrent); (MAT 016C or MAT 017C or MAT 021C).

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Credit Limitation(s):** Not open for credit to students enrolled in College of Engineering.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## FST 110L – Food Processing Laboratory (2 units)

**Course Description:** Laboratory exercises to gain experience with common food processing operations at the bench and pilot plant scales.

**Prerequisite(s):** FST 110 (can be concurrent).

**Learning Activities:** Laboratory 3 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Open to Food Science majors only.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## FST 113 – Food Law & Regulations (3 units)

**Course Description:** Food law and regulatory landscape of the food industry. Regulatory aspects of food safety. Major U.S. food laws and regulations including labeling, standards, misbranding, adulteration, food fraud, environmental policies, as well as international law. Laws pertaining to specific food categories including milk, dairy, meat, poultry, eggs, seafood, produce, packaged foods, and alcohol.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s).

**Enrollment Restriction(s):** Upper division standing or consent of instructor.

**Grade Mode:** Letter.

**General Education:** Scientific Literacy (SL); Visual Literacy (VL).

## FST 114 – Fermented Foods (4 units)

**Course Description:** Physiology, biochemistry, and genetics of microorganisms important in food fermentations. How microorganisms are used in fermentations and how raw materials are converted into finished fermented foods and beverages.

**Prerequisite(s):** BIS 103; MIC 102; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Term Paper.

**Enrollment Restriction(s):** Pass One restricted to upper division or graduate level Food Science and Viticulture & Enology majors.

**Cross Listing:** VEN 114.

**Grade Mode:** Letter.

## FST 117 – Design & Analysis for Sensory Food Science (4 units)

**Course Description:** Methods of design and analysis for sensory food science. Experimental design strategies. Use of taste panels and consumer testing. Data analysis and computation including the relative merits and limitations of parametric and nonparametric approaches. Modifications for quality assurance.

**Prerequisite(s):** STA 013 or STA 013Y.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## FST 119 – Chemistry & Technology of Milk & Dairy Products (4 units)

**Course Description:** Composition, structure and properties of milk and products derived from milk. Relates chemical, microbiological, and technological principles to commercial practices in processing of milk and its products.

**Prerequisite(s):** BIS 002A; BIS 102; consent of instructor.

**Learning Activities:** Lecture 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**FST 123 – Introduction to Enzymology (3 units)**

*Course Description:* Principles of physical, chemical and catalytic properties of enzymes and their importance. Purification, characterization, and quantitative evaluation of reaction conditions on activity are stressed. Specificity and mechanism of action illustrated by use of selected enzymes. (Former course BCP 123.)

*Prerequisite(s):* FST 123L (can be concurrent); BIS 102; BIS 103.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**FST 123L – Enzymology Laboratory (2 units)**

*Course Description:* Laboratory procedures involved in detection, purification and characterization of enzymes. (Former course BCP 123L.)

*Prerequisite(s):* BIS 103; FST 123 (can be concurrent); FST 123 required concurrently.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**FST 127 – Sensory Evaluation of Foods (4 units)**

*Course Description:* Critical examination of methods of sensory measurement applied to food and beverage systems; descriptive analysis and consumer tests and their application to quality assurance, product development and optimization.

*Prerequisite(s):* FST 117.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

**FST 128 – Food Toxicology (3 units)**

*Course Description:* Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards.

*Prerequisite(s):* BIS 102; BIS 103.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ETX 128.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**FST 131 – Food Packaging (4 units)**

*Course Description:* Principles of food packaging. Functions of packaging. Properties of metal, glass, paper and plastic materials and packages. Design, fabrication, and applications of food packaging. Packaging of fresh and processed foods, including fruits and vegetables, dairy foods, beer and wine.

*Prerequisite(s):* CHE 008B; BIS 001B; PHY 007C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 50 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**FST 151Y – Food Freezing (1 unit)**

*Course Description:* Mechanisms of ice crystallization, interpretation of freezing diagrams, and modes of heat transfer. Food properties at sub-freezing temperatures, refrigeration requirements, and estimation of freezing times. Industrial systems used in freezing foods.

*Prerequisite(s):* FST 110A; or the equivalent.

*Learning Activities:* Discussion 1 hour(s), Web Virtual Lecture.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**FST 159 – New Food Product Ideas (3 units)**

*Course Description:* Create, refine, test and present viable ideas for new food products. Activities include trend monitoring, consumer research, idea generation, concept screening, and new product concept presentations.

*Prerequisite(s):* FST 050; BIS 002A; PHY 007A; PHY 007B; PHY 007C; CHE 002A; CHE 002B; CHE 002C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

**FST 160 – Food Product Development (4 units)**

*Course Description:* Product implementation stage of food product development including preliminary product description, prototype development, product testing, and formal presentation of a new product development.

*Prerequisite(s):* FST 050; FST 103; FST 104; FST 110.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL).

**FST 190 – Senior Seminar (1 unit)**

*Course Description:* Selected topics presented by students on recent advances in food science and technology. Reports and discussions concerning oral and written presentations, literature sources and career opportunities.

*Prerequisite(s):* Senior standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

**FST 192 – Internship for Advanced Undergraduates (1-12 units)**

*Course Description:* Work experience on or off campus in the practical application of food science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**FST 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **FST 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **FST 201 – Food Chemistry & Biochemistry (4 units)**

*Course Description:* Advanced topics in food chemistry and biochemistry, emphasizing the application of the basic principles of chemistry and biochemistry to food composition, properties, preservation and processing. Chemical structures, interactions, reaction mechanisms and experimental methods are stressed.

*Prerequisite(s):* Undergraduate courses in organic chemistry and biochemistry; undergraduate course in food chemistry is recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Food Science graduate level standing or consent of instructor.

*Grade Mode:* Letter.

## **FST 202 – Physical Chemistry of Foods (4 units)**

*Course Description:* Fundamental principles of chemistry and physics are applied to a study of changes in water binding properties and activity, changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing, dehydrating, and concentrating of food materials.

*Prerequisite(s):* CHE 107A; CHE 107B; BIS 102 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **FST 203 – Food Processing (4 units)**

*Course Description:* Principles of food engineering applied to food processing. Relationship of Newtonian and non-Newtonian fluid properties to heat and momentum transfer. Application of mass transfer in controlling kinetics and quality changes of foods.

*Prerequisite(s):* FST 110A; PHY 007C; CHE 107B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **FST 204 – Advanced Food Microbiology (4 units)**

*Course Description:* Principles and recent developments in food microbiology. Mechanisms of foodborne disease, pathogen detection, parameters of microbial growth and control in foods, intestinal microbiology including probiotics and prebiotics, and the microbiology of food and beverage fermentations.

*Prerequisite(s):* Undergraduate level coursework in microbiology, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **FST 205 – Industrial Microbiology (3 units)**

*Course Description:* Use of microorganisms for producing substances such as amino acids, peptides, enzymes, antibiotics and organic acids. Emphasis on metabolic regulation of pathways leading to fermentation products, on yeast fermentations, and on genetic manipulations (including recombinant DNA techniques) of industrial microorganisms.

*Prerequisite(s):* BIS 001A; BIS 102; BIS 103; MIC 130A and MIC 130B or BIS 101 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FST 207 – Advanced Sensory-Instrumental Analyses (3 units)**

*Course Description:* Basic principles of measurement of color, texture, and flavor of foods by sensory and instrumental methods. Advanced statistical analysis of relation of colorimetry, texturometry, and chemistry of volatile compounds to perception of appearance, texture, flavor.

*Prerequisite(s):* FST 107; and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **FST 210 – Proteins: Functional Activities & Interactions (3 units)**

*Course Description:* Relationships of structure of proteins to their biological functions. Structural proteins, complexing proteins, and catalytic proteins in plant and animal materials and products.

*Prerequisite(s):* BIS 103.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FST 211 – Lipids: Chemistry & Nutrition (3 units)**

*Course Description:* Chemistry of lipids as it pertains to research in food and nutrition. Relations between lipid structure and their physical properties in tissues and foods. Regulation of absorption, transport, and metabolism of lipids. Implications of dietary fats and health.

*Prerequisite(s):* BIS 103; CHE 107B; CHE 128B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FST 213 – Flavor Chemistry of Foods & Beverages (3 units)**

*Course Description:* Become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods.

Required to read and critically evaluate flavor chemistry literature.

*Prerequisite(s):* CHE 008B; VEN 123; (VEN 123L or FST 103); or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* VEN 213.

*Grade Mode:* Letter.

## **FST 217 – Advanced Food Sensory Science (3 units)**

*Course Description:* Advanced study of the techniques and theory of the sensory measurement of food as an analytical tool and as a measure of consumer perception and acceptance. Advanced examination of the sensory and cognitive systems associated with the perception of food.

*Prerequisite(s):* FST 107 (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FST 219 – Biochemistry, Microbiology & Technology of Cheeses of the World (4 units)**

*Course Description:* Compositional and physico-chemical aspects of milk and their implications on cheesemaking; enzymatic, microbiological and physical aspects of cheesemaking; cheese as a biological composite; designing cheese quality attributes; cheese aging. Cheese from all over the world tasted and discussed.

*Prerequisite(s):* FST 119; (BIS 103 or FST 100A); FST 123; BIS 103; CHE 107B; CHE 128B; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate level students or senior undergraduate students with appropriate background in biochemistry and microbiology.

*Grade Mode:* Letter.

## **FST 227 – Food Perception & the Chemical Senses (2 units)**

*Course Description:* Examination of the anatomy and physiology of the chemical senses (taste, smell, and the trigeminal senses) and how they are involved in the perception of food and food intake.

*Prerequisite(s):* FST 107B (can be concurrent); and consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **FST 228 – Sustainable Food Systems (3 units)**

*Course Description:* Environmental impacts of food systems. Methods for quantifying resource use and managing waste for food production and processing. Influence of policies, technologies, and consumer demand on advancing sustainable food systems.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **FST 230 – Food & Gut Microbiota (4 units)**

*Course Description:* Impact of specific food structures on the structure and function of the animal gut microbiota. How food is transformed by, and modulates, the gut microbiota to provide the host with nutrients and protection.

*Prerequisite(s):* Microbiology and molecular biology undergraduate coursework or consent of instructor.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s), Term Paper.

*Enrollment Restriction(s):* Upper division or graduate standing.

*Grade Mode:* Letter.

## **FST 259 – Design Thinking of Food (4 units)**

*Course Description:* Tools of design thinking as applied to high-impact, food-related challenges through a multi-disciplinary team based, experiential learning process. Application of the field of food studies to the social and cultural contexts of eating habits, food systems, and the design solutions that respond to these factors. Working with stakeholders to design innovative solutions to food system challenges.

*Learning Activities:* Lecture/Discussion 3 hour(s); Fieldwork.

*Enrollment Restriction(s):* Open to Graduate students only.

*Grade Mode:* Letter.

## **FST 290 – Seminar (1 unit)**

*Course Description:* Seminar.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FST 290C – Advanced Research Conference (1 unit)**

*Course Description:* Critical presentation and evaluation of original research by graduate students. Planning of research programs and proposals. Discussion led by individual major instructors for their research group.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FST 291 – Advanced Food Science Seminar (1 unit)**

*Course Description:* Oral presentation of student's original research, discussion, and critical evaluation.

*Prerequisite(s):* FST 290; completion of at least one quarter of FST 290.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FST 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FST 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FST 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Food Service Management (FSM)**

**College of Agricultural & Environmental Sciences**

## **FSM 120 – Principles of Quantity Food Production (4 units)**

*Course Description:* Fundamental principles of food service management, including quantity food preparation, institutional equipment, receiving and storage, service, menu planning, merchandising, and safety. Students earn food safety certification.

*Prerequisite(s):* FST 100B; (FST 101B or NUT 106).

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division Clinical Nutrition students only.

*Grade Mode:* Letter.

## **FSM 120L – Quantity Food Production Laboratory (2 units)**

*Course Description:* Laboratory experience in quantity food production and service.

*Prerequisite(s):* FSM 120.

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

## **FSM 122 – Food Service Systems Management (3 units)**

*Course Description:* Principles of quantity food production management: production schedules, portion control, financial management, layout and equipment planning, evaluation of alternative systems, and computer applications.

*Prerequisite(s):* ARE 112; FSM 120.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FSM 192 – Internship (1-12 units)**

*Course Description:* Work experience on or off campus in practical aspects of food service management, supervised by a faculty member.

*Prerequisite(s):* Consent of instructor; one upper division course in Food Service Management (FSM).

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **FSM 197T – Tutoring in Food Service Management (1-5 units)**

*Course Description:* Tutoring of students in food service management, assistance with discussion groups or laboratory sections; weekly conference with instructor in charge of course; written evaluations.

*Prerequisite(s):* Dietetics or related major; completion of the Food Service Management (FSM) course in which tutoring is done.

*Learning Activities:* Discussion/Laboratory 3-6 hour(s).

*Repeat Credit:* May be repeated when tutoring a different course.

*Grade Mode:* Pass/No Pass only.

## **FSM 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **FSM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

# **Forensic Science (FOR)**

## **Graduate Studies**

## **FOR 200 – Fundamental Concepts in Forensic Science (3 units)**

*Course Description:* Overview of Forensic Science. Problem definition, strategies for problem solving, analytical tools, and professional and ethical considerations.

*Learning Activities:* Lecture 2 hour(s), Fieldwork 0.25 hour(s), Lecture/Lab 0.25 hour(s), Seminar 0.50 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program.

*Grade Mode:* Letter.

## **FOR 201A – Forensic Science Fundamentals-A (3 units)**

*Course Description:* Professional responsibilities and ethics, physical evidence concepts, drug chemistry and toxicology, controlled substances and analytical chemistry and instrumentation as practiced in the forensic sciences. First of three courses that, in part, covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

*Prerequisite(s):* Consent of instructor; enrolled in the Forensic Science Graduate Program.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to Forensic Science Graduate Program students only.

*Grade Mode:* Letter.

## **FOR 201B – Forensic Science Fundamentals-B (3 units)**

*Course Description:* Forensic biology and DNA, microscopy and materials analysis and pattern evidence as practiced in the forensic sciences. Second in a series of three courses which covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

*Prerequisite(s):* Consent of instructor; enrolled in the Forensic Science Graduate Program.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to Forensic Science Graduate Program students only.

*Grade Mode:* Letter.

## **FOR 201C – Forensic Science Fundamentals-C (3 units)**

*Course Description:* Arson and explosives, quality assurance and accreditation, the law and science interface and court testimony as practiced in the forensic sciences. Third in a series of three courses that covers the curriculum requirements of the Forensic Education Program Accreditation Committee (FEPAC).

*Prerequisite(s):* Consent of instructor; enrolled in the Forensic Science Graduate Program.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FOR 205 – Microscopy & Microanalytical Methods in Forensic Science (3 units)**

*Course Description:* Introduction to optical and electron microscopy. Transmission, diffraction, reflection and absorption; polarized light and polarizing crystals; phase contrast. Radiography; image recording, SEM analysis of gunshot residues, paints, glass. EDS, XRF analysis, signal-to-noise ratios, minimum detectable levels and homogeneity.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program; a minimum, year each of the following chemistry, organic chemistry, calculus, & physics.

*Grade Mode:* Letter.

## **FOR 207 – Advanced Spectroscopy Methods in Forensic Science (3 units)**

*Course Description:* Discuss, evaluate and interpret advanced molecular spectra/structure, Infrared Spectroscopy, such as chemical applications of spectroscopic methods, vibrational, rotational spectra; electronic spectra, photoelectron spectroscopy generated by various analytical instruments used in forensic science community.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to Forensic Science Graduate program or consent of instructor.

*Grade Mode:* Letter.

## **FOR 208 – Forensic Toxicology (3 units)**

*Course Description:* Forensic toxicology as related to driving under the influence of drugs (DUID) investigations, detection, and evaluation through the use of standardized field sobriety tests and drug recognition protocols.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FOR 209 – Forensic Alcohol (3 units)**

*Course Description:* Analytical methods used in the determination and quantitation of ethanol in biological matrices commonly encountered in cases involving operating a motor vehicle.

*Prerequisite(s):* FOR 220 (can be concurrent); consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **FOR 210 – Personal Identification Methods In Forensic Science (3 units)**

*Course Description:* Methods for identifying individuals from evidence collected at crime scenes, suspects or victims, crime scene examination and analytical methods used to support such investigations. Topics include forensic anthropology and odontology; latent prints; shoe prints; facial reconstruction/recognition; eyewitness identifications; biometric systems.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of instructor.

*Grade Mode:* Letter.

## **FOR 212 – Scientific Evidence & Courtroom Testimony (3 units)**

*Course Description:* Explores the relationship between science and the criminal justice system. Admissibility of scientific testimony and documentary proof during the trial, concepts of relevancy, hearsay and opinion rule, examination of expert witnesses, impact of Kelley-Fry and Daubert decisions & court testimony.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students enrolled in the MS Forensic Science program or by the consent of the instructor.

*Grade Mode:* Letter.

## **FOR 215 – Forensic Fire & Arson Investigation (3 units)**

*Course Description:* Principles and techniques of scientific investigation of fires and related crimes; offer peer-reviewed protocols for processing fire and explosion scenes; discuss recognition, collection, analysis of physical evidence, and describe the scientific method for decision-making in fire/arson investigation.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. Forensic Science program or by consent of the Forensic Science Program Director.

*Grade Mode:* Letter.

## **FOR 218 – Technical Writing in Forensic Science (3 units)**

*Course Description:* How to write clear, credible forensic science reports and scientific articles, that (a) serve the ends of the justice system, (b) meet their readers' varying needs and (c) reflect well on the author.

*Prerequisite(s):* Consent of the instructor required for all students not enrolled in the Forensic Science program.

*Learning Activities:* Lecture 2 hour(s), Extensive Writing/Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing in the Forensic Science program.

*Grade Mode:* Letter.

## **FOR 220 – Analysis of Toxicants (3 units)**

*Course Description:* Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection and quantitative determination of toxicants using chemical and instrumental techniques.

*Prerequisite(s):* Coursework in organic chemistry.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ETX 220.

*Grade Mode:* Letter.

## **FOR 221L – Forensic Science Analytical Instrumentation (2 units)**

*Course Description:* Methodology and instruments used for the analysis of substances of interest in the discipline of Forensic Science. Practical experience with modern instrumental techniques & methodologies used in the advanced forensic science laboratory.

*Learning Activities:* Discussion/Laboratory 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Enrollment limited to students accepted in the Forensic Science Graduate program or subject to the approval of the instructor if the student has the appropriate chemistry, calculus and physics courses required of students in the graduate forensic science program.

*Grade Mode:* Letter.

## **FOR 240 – Homicide Crime Scene Investigation (3 units)**

*Course Description:* Processing and evaluating complex homicide scenes. Functions and activities of police agencies. Recognition, documentation, identification, and collection of evidence. Event sequence reconstruction. Evidence collection, preservation, report writing. Courtroom presentation.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Forensic Science Masters Program Students; enrollment is limited to 15 students per class.

*Grade Mode:* Letter.

## **FOR 263 – Forensic Computer Science Investigations (3 units)**

*Course Description:* Discuss the threats to the security of any kind of evidence that is captured, transmitted, or stored digitally and develop critical thinking and basic knowledge of computer forensic science issues in the evaluation of digital evidence.

*Prerequisite(s):* Consent of instructor; graduate student.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the Forensic Science Graduate program unless approved by instructor.

*Grade Mode:* Letter.

## **FOR 268 – Statistics in Forensic Science (3 units)**

*Course Description:* Statistics that are used by the forensic scientist, their limitations/applications in presenting evidential results in such areas as DNA-STR results, trace evidence correlation, fingerprint statistics, population sampling and the Bayes method.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of forensic program director.

*Grade Mode:* Letter.

## **FOR 276 – Population Genetics (3 units)**

*Course Description:* Principles, theories, and models of population genetics as they apply to forensic science.

*Prerequisite(s):* FOR 280; FOR 281; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open only to majors in Forensic Science Program unless by consent of the Chair Forensic Science Graduate group.

*Grade Mode:* Letter.

## **FOR 277 – Forensic Genetics; Next Generation Techniques & Applications (3 units)**

*Course Description:* Review organization/function of the human genome, recent developments, next generation sequencing techniques including the preparation of DNA samples, principles of the new generation sequencing assay formats and biochemical reactions. Includes quality control parameter, and bioinformatic approaches.

*Prerequisite(s):* Undergraduate courses in fundamental and applied principles of: genetics, biochemistry, and molecular biology, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to Forensic Science Graduate students (GFOR) or consent of instructor.

*Grade Mode:* Letter.

## **FOR 278 – Molecular Techniques (3 units)**

*Course Description:* Recombinant DNA technology and its applications.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ETX 278.

*Grade Mode:* Letter.

## **FOR 280 – Forensic DNA Analysis (3 units)**

*Course Description:* Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data.

*Prerequisite(s):* Coursework in genetics and molecular biology.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Graduate standing; consent of instructor required for all students not enrolled in the M.S. Forensics program.

*Cross Listing:* ETX 280.

*Grade Mode:* Letter.

## **FOR 281 – Principles & Practice of Forensic Serology & DNA Analysis (3 units)**

*Course Description:* Comprehensive overview of forensic serology and DNA typing techniques and technologies. Strong emphasis on real-world applications, including preservation and tracking of biological evidence, detection and identification of bodily fluids, and methods to extract, quantify, and type human DNA.

*Prerequisite(s):* (FOR 278 or ETX 278) or (FOR 280 or ETX 280); and consent of instructor, or equivalent of FOR 280/ETX 280.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of Forensic Science Program Director.

*Cross Listing:* ETX 281.

*Grade Mode:* Letter.

## **FOR 283 – Forensic Biology (3 units)**

*Course Description:* Overview to the foundational concepts in forensic biology: chemistry and molecular biology of biological evidence, genetic basis of biological uniqueness, evolutionary basis of species differences, patterns and dynamics of evidence deterioration, and the legal/ professional considerations associated with biological evidence.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science program or by consent of the Forensic Science Program Director.

*Grade Mode:* Letter.

## **FOR 284 – Non-Human Forensic DNA; Theory & Casework Application (2 units)**

*Course Description:* Provides a comprehensive understanding of plant and animal forensic biology in terms of sample collection, preservation, analytical methods, and of the invaluable lines of inquiry these forensic evidence may permit.

*Prerequisite(s):* Consent of instructor required for all students not enrolled in the M.S. Forensics program; upper division Molecular Biology and Genetics or its equivalent.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Cross Listing:* ETX 284.

*Grade Mode:* Letter.

## **FOR 289 – Survey in Forensic Science (3 units)**

*Course Description:* Analytical methods in contemporary forensic science. Clandestine laboratories in California, crime scene management, examination and analysis of human hair, forensic ballistics/trajectory reconstruction, shoe/tire print impressions, serial number restoration, forensic aspects of alcohol impairment, bloodstain pattern interpretation, microscopy of building materials, biological aspect of forensic science.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **FOR 290 – Seminar in Forensic Science (1 unit)**

*Course Description:* Students will be exposed to topical areas in Forensic Science by presentations conducted by expert guest speakers. The seminar will also serve as a medium whereby the exiting students will present the research conducted as part of their thesis requirement.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FOR 290C – Graduate Research Conference in Forensic Science (1 unit)**

*Course Description:* Individual and/or group conference on problems, progress and techniques in forensic science and research.

*Learning Activities:* Independent Study 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FOR 293 – Forensic Science Research Methodology (2 units)**

*Course Description:* Introduction to identification, formulation, and solution of meaningful scientific problems encountered in the Forensic Science area including experimental design and/or theoretical analysis of new and prevailing techniques, theories and hypotheses. Students will present and defend their thesis research/journal article proposals.

*Learning Activities:* Lecture 1.50 hour(s), Extensive Writing/Discussion 0.50 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the Graduate Forensic Science program or by consent of the instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **FOR 298 – Group Study in Forensic Science (1-5 units)**

*Course Description:* Group study in Forensic Science.

*Learning Activities:* Independent Study 1-5 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

## **FOR 299 – Research in Forensic Science (1-12 units)**

*Course Description:* Research in Forensic Science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 1-12 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the M.S. in Forensic Science Program.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **French (FRE)**

**College of Letters & Science**

### **FRE 001 – Elementary French (5 units)**

*Course Description:* Introduction to French grammar and development of all language skills in a cultural context with special emphasis on communication.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken FRE 001A; students who have successfully completed FRE 002 or FRE 003 in the 10th or higher grade in high school or who have successfully completed two or more years of high school in a French-speaking country or in a French-language high school may receive unit credit for this course on a P/NP grading basis only, although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

### **FRE 001A – Accelerated Intensive Elementary French (15 units)**

*Course Description:* Introduction to French grammar and development of all language skills in a cultural context with special emphasis on communication. Special 12-week, accelerated, intensive summer session course that combines the work of FRE 001, FRE 002, and FRE 003.

*Prerequisite(s):* Placement exam required.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed FRE 001, FRE 001S, FRE 002, FRE 002S, FRE 003, or FRE 003S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

### **FRE 002 – Elementary French (5 units)**

*Course Description:* Continuation of FRE 001.

*Prerequisite(s):* FRE 001.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken FRE 001A; students who have successfully completed two or more years of high school in a French-speaking country or in a French language high school may receive unit credit for this course on a P/NP grading basis only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**FRE 003 – Elementary French (5 units)**

*Course Description:* Continuation of FRE 002.

*Prerequisite(s):* FRE 002.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken FRE 001A; students who have successfully completed two or more years of high school in a French-speaking country or in a French-language high school may receive unit credit for this course on a P/NP grading basis only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**FRE 021 – Intermediate French (5 units)**

*Course Description:* Review of grammar and vocabulary acquired in the elementary sequence, as well as the study of new grammatical structures and a continuing enrichment of vocabulary through oral work in class, written exercises, readings and compositions.

*Prerequisite(s):* FRE 001A or FRE 003 or FRE 003S.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed FRE 021S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**FRE 022 – Intermediate French (5 units)**

*Course Description:* Continuation of FRE 021 or FRE 021S. Review of grammar and vocabulary, as well as the study of new grammatical structures and a continuing enrichment of vocabulary.

*Prerequisite(s):* FRE 021 or FRE 021S.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed FRE 022S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**FRE 023 – Intermediate French (5 units)**

*Course Description:* Continuation of FRE 022 or FRE 022S. Review of grammar and vocabulary, as well as the study of new grammatical structures and a continuing enrichment of vocabulary.

*Prerequisite(s):* FRE 022 or FRE 022S.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed FRE 023S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**FRE 050 – French Film (4 units)**

*Course Description:* Introduction to the tradition of French cinema from its invention by Méliès and the Lumière brothers through New Wave (especially the works of Truffaut and Godard) and more recent developments in French and Francophone film. Taught in English.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**FRE 051 – Major Works of French Literature in Translation (4 units)**

*Course Description:* Readings in English translation of key works of French and Francophone literature from the Middle Ages to the Present. Particular attention is given to the long-standing interest of French writers in issues of social, regional, gender, sexual, and ethnic identity.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 052 – France & the French-Speaking World (4 units)**

*Course Description:* Taught in English. Survey of the history and culture of France and the French-speaking world, especially Canada, the Caribbean and Africa. Study of social, historical and cultural issues that occupy the French-speaking world, with particular attention to mass media.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 053 – French as a World Language (4 units)**

*Course Description:* The linguistic status of French and its function in multilingual societies and international arenas. Linguistico-political landscape of communities in Euroasia, Africa, and the Americas.

Sociolinguistic concepts and emergence of French as a world language.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**FRE 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**FRE 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**FRE 100 – Composition in French (4 units)**

*Course Description:* Instruction and practice in expository writing in French, with emphasis on organization, correct syntax, and vocabulary building.

*Prerequisite(s):* FRE 023.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 101 – Introduction to French Poetry (4 units)**

*Course Description:* Analysis and evaluation of works representing the main types of French poetry. Study of French poetic conventions and versification.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 102 – Introduction to French Drama (4 units)**

*Course Description:* Analysis and evaluation of plays representing the main types of French drama, with emphasis on dramatic structure and techniques.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 103 – Introduction to French Prose (4 units)**

*Course Description:* Analysis and evaluation of works representing main types of French prose, with emphasis on narrative structure and techniques.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**FRE 105 – Advanced French Grammar (4 units)**

*Course Description:* Understanding of, and extensive practice with, various grammatical structures in French. Lexical-semantic, morphological, and syntactic analysis.

*Prerequisite(s):* FRE 023; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**FRE 107 – The Making of Modern France (4 units)**

*Course Description:* Introduction to French culture through a historical approach to topics such as the citizen and the state (politics, justice, social security), the nation and centralization, the rise of public education, colonization, class and social relationships.

*Prerequisite(s):* FRE 023; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**FRE 107A – Pre- & Early-Modern France (4 units)**

*Course Description:* Introduction to pre- and early-modern French culture through a historical approach to topics such as the feudal system, the rise of the monarchy, the Reformation and religious wars.

*Prerequisite(s):* FRE 023; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 107B – The Making of Modern France (4 units)**

*Course Description:* Introduction to French culture through a historical approach to topics such as the absolute monarchy, the role of the parlements, the French revolution, and the political regimes of the 19th century.

*Prerequisite(s):* FRE 023; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 108 – Modern French Culture (4 units)**

*Course Description:* Survey of modern French culture from the Dreyfus affair to the present day. Topics may include women and French culture, decolonialization and modernization, education, social welfare and immigration.

*Prerequisite(s):* FRE 023.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC); Writing Experience (WE).

**FRE 109 – French Phonetics (4 units)**

*Course Description:* Introduction to the sound-inventory of French and practice in phonetic transcription, with a focus on ways in which phonetic contrasts signal grammatical contrasts; spoken forms and spelling; formal differences between the "Standard" and other varieties across the French-speaking world.

*Prerequisite(s):* FRE 023; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**FRE 110 – Stylistics & Creative Composition (4 units)**

*Course Description:* Intensive course in creative composition using a variety of techniques and literary styles, patterned on Queneau's Exercices de style. Practice in such stylistic modifications as inversion, antithesis, changes in tense, mood, tonality, etc. The writing of poetry.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**FRE 115 – Medieval French Literature & Society (4 units)**

*Course Description:* Social and cultural life of medieval France as studied through its representation in such literary works as La Chanson de Roland, courtly love lyric, the Arthurian romances of Chrétien de Troyes, Aucassin et Nicolette, selected fabliaux and farces.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 116 – The French Renaissance (4 units)**

*Course Description:* Overview of major works and writers with particular attention to the historical context of the turbulent 16th century. Writers to be read may include Rabelais, Marot, Ronsard, Du Bellay, Labé, Marguerite de Navarre, Montaigne, and D'Aubigné.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 117A – Baroque & Preclassicism (4 units)**

*Course Description:* Literature and intellectual culture of the period between the Renaissance and French classicism.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 117B – The Classical Moment (4 units)**

*Course Description:* Literature, culture, and politics in the Age of Louis XIV.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 118A – Age of Reason & Revolution (4 units)**

*Course Description:* Literature and philosophy of the French Enlightenment. Readings from such authors as Bayle, Fontenelle, Montesquieu, Voltaire, Rousseau and Diderot.

*Prerequisite(s):* FRE 100.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**FRE 118B – Private Lives & Public Secrets: The Early French Novel (4 units)**

*Course Description:* History of the French roman from the Middle Ages to the Revolution with particular emphasis on the novels of the 18th century.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 119A – The Romantic Imaginary (4 units)**

*Course Description:* Major concepts and themes of French Romanticism, such as dream and the supernatural, impossible love, exoticism, revolution, individualism, nature, the mal du siècle, Romantic irony, the creative imagination, the cult of ruin.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 119B – Realism, History & the Novel (4 units)**

*Course Description:* Narrative and historical codes of French realist fiction, with emphasis on the representation of history in the realist novel, its depiction of social "realities" such as class and gender, and its relation to the historical situation of post-revolutionary society.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 119C – From Baudelaire to Surrealism (4 units)**

*Course Description:* Study of the main poets and poetic movements from the mid-19th to the early 20th century, including Baudelaire, the Symbolists, and the Surrealists.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 120 – Modern French Thought (4 units)**

*Course Description:* Overview of post-Second World War French intellectual currents from existentialism to structuralism and deconstructionism. Readings will include Sartre and de Beauvoir, Camus, Lévi-Strauss, Lacan, Barthes, Foucault, Derrida, Kristeva, Sollers, Cixous, and Irigaray.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 121 – 20th-Century French Novel (4 units)**

*Course Description:* Novels and theories of the novel, from Proust to the Nouveau Roman and beyond. Readings from among Gide, Sartre, de Beauvoir, Camus, Breton, Beckett, Robbe-Grillet, Sarraute, Simon, Barthes, Duras, Tournier, Perec, Modiano, Guibert, Toussaint.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 122 – French & Francophone Film (4 units)**

*Course Description:* French and Francophone film from the Lumière Brothers to the present. Topics may include analysis of film form and narrative, major filmmakers and filmic traditions, and film theory.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing, Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **FRE 124 – Post-Colonial & Francophone Literature (4 units)**

*Course Description:* Post-Independence Black African and/or Caribbean and/or North African literatures written in French. Selected topics include: identity & subjectivity, the role of the intellectual, women's voices, languages & oral literatures, cultural syncretism, theories of post-colonialism.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) with consent of major advisor & instructor; when content differs; for example, when the geographical focus (West Africa, North, African or Caribbean) or theme is substantially different from previous iterations.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **FRE 125 – French Literature & Other Arts (4 units)**

*Course Description:* Relationship between French literature and other arts—painting, music, cinema, architecture, opera—from different periods.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **FRE 127 – Paris: Modernity & Metropolitan Culture (4 units)**

*Course Description:* Representation of Paris in 19th- and 20th-century texts and its importance in defining the experience and art of modernity.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **FRE 128 – Topics in French Culture (4 units)**

*Course Description:* In-depth study of a particular topic in French culture.

Topics may include the Court of Louis XIV, the French Revolution and Immigration.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **FRE 130 – From Page to Stage: Theatre & Theatricality (4 units)**

*Course Description:* French theater as literature and performance.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **FRE 133 – Gender & Politics in French Literature & Culture (4 units)**

*Course Description:* Thematic, theoretical and political tendencies in contemporary French fiction. Barthes, Foucault, Duras, Guibert, considered in terms of their writing on identity and gender.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **FRE 140 – Study of a Major Writer (4 units)**

*Course Description:* Concentrated study of works of a single author.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when author/subject differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **FRE 141 – Selected Topics in French Literature (4 units)**

*Course Description:* Subjects and themes such as satiric and didactic poetry of the Middle Ages, poetry of the Pléiade, theater in the 18th century, pre-romantic poetry, autobiography, literature and film, etc.

*Prerequisite(s):* FRE 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **FRE 160 – Linguistic Study of French-Language in Context (4 units)**

*Course Description:* Introduction to the linguistic study of modern French, with focus pragmatics - the ways in which language is modified in the context of use. Topics include politeness, formality/informality, personal stance, and intimacy/distance.

*Prerequisite(s):* FRE 100.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

## **FRE 161 – Linguistic Study of French: Form & Meaning (4 units)**

*Course Description:* Introduction to the linguistic study of modern French, with focus on sentence construction and constituency, meaning and discourse functions.

*Prerequisite(s):* FRE 100 or LIN 001 or LIN 001Y.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**FRE 162 – History of the French Language (4 units)**

*Course Description:* Main periods in development of the French language, from Latin to contemporary popular aspects, with emphasis on relationship between socio-cultural patterns and evolution of the language.

*Prerequisite(s):* FRE 100 or LIN 001 or LIN 001Y.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**FRE 192 – Internship (1-12 units)**

*Course Description:* Practical application of the French language through work experience in government and/or business, culminating in an analytical term paper on a topic approved by the sponsoring instructor.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s), Term Paper.

*Grade Mode:* Pass/No Pass only.

**FRE 194H – Special Study for Honors Students (4 units)**

*Course Description:* Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in French literature, civilization, or language studies.

*Prerequisite(s):* Open only to French majors of senior standing who qualify for Honors Program.

*Learning Activities:* Independent Study 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 195H – Honors Thesis (4 units)**

*Course Description:* Writing of an honors thesis on a topic in French literature, civilization, or language studies under the direction of a faculty member.

*Prerequisite(s):* FRE 194H.

*Learning Activities:* Independent Study 4 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**FRE 197T – Tutoring in French (1-5 units)**

*Course Description:* Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses.

*Prerequisite(s):* Upper division standing; consent of Chairperson.

*Learning Activities:* Seminar 1-2 hour(s), Laboratory 1-2 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

**FRE 197TC – Tutoring in the Community (1-5 units)**

*Course Description:* Tutoring in public schools under the guidance of a regular teacher and supervision by a departmental faculty member.

*Prerequisite(s):* Upper division standing; consent of Chairperson.

*Learning Activities:* Seminar 1-2 hour(s), Laboratory 1-2 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

**FRE 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**FRE 198S – Directed Group Study (1-5 units)**

*Course Description:* Group study on focused topics in French literature and culture. Taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**FRE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**FRE 200 – Introduction to Graduate Study in French (2 units)**

*Course Description:* Introduction to a range of methodologies and critical practices in the field of French Studies, including literature, culture, and linguistics. Covers basic principles of bibliographic research in the humanities.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**FRE 201 – History of French (4 units)**

*Course Description:* Presentation of the main changes in the grammatical structures of French, from Latin to contemporary usage, involving textual analysis and sociolinguistic description.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**FRE 202 – Topics in French Civilization (4 units)**

*Course Description:* Interdisciplinary approach to the study of French and Francophone civilization from the Middle Ages to the present. Content varies by instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

**FRE 204 – Topics in Medieval Literature (4 units)**

*Course Description:* Study of Medieval French literature, focusing on a particular period, milieu, literary movement, genre, or theoretical approach.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **FRE 205A – 16th-Century Literature: The Humanists (4 units)**

*Course Description:* French humanism in its most varied forms. Although at different times Rabelais and Montaigne will be primarily studied, other leading intellectuals and religious writers will also receive attention.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **FRE 206A – 17th-Century Literature: Theater (4 units)**

*Course Description:* Works of Corneille, Racine, Molière, and minor dramatists. One or more authors may be covered.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

## **FRE 206B – 17th-Century Literature: Prose (4 units)**

*Course Description:* Works of authors such as Pascal, Descartes, Mme de Lafayette. One or more authors may be covered.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor as topics differ from quarter to quarter.

*Grade Mode:* Letter.

## **FRE 206C – 17th-Century Literature: Poetry (4 units)**

*Course Description:* Studies of the works of one or more poets of the period.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **FRE 207A – 18th-Century Literature: Philosophies (4 units)**

*Course Description:* Not a course in philosophy, but an examination of the role of philosophy in the design and context of literary works. Study of one or more authors.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **FRE 207B – 18th-Century Literature: Novel (4 units)**

*Course Description:* Rise of the novel. Study of narrative experiments in the context of the philosophical climate and new literary values. May treat one or more novelists of the period.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **FRE 208A – 19th-Century Literature: Fiction (4 units)**

*Course Description:* Study of the works of one or several novelists and/or short-story writers of the period.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

## **FRE 208B – 19th-Century Literature: Poetry (4 units)**

*Course Description:* Study of the works of one or several poets of the period.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

## **FRE 209A – 20th-Century: Prose (4 units)**

*Course Description:* Study of the works of one or several writers of the period.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

## **FRE 209B – 20th-Century: Theater (4 units)**

*Course Description:* Study of the works of one or several dramatists of the period.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **FRE 209C – 20th-Century: Poetry (4 units)**

*Course Description:* Study of the works of one or several poets of the period.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **FRE 210 – Studies in Narrative Fiction (4 units)**

*Course Description:* Studies in narrative fiction.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

**FRE 211 – Studies in Criticism (4 units)**

*Course Description:* Studies in criticism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

**FRE 212 – Studies in Theater (4 units)**

*Course Description:* Studies in the theater.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

**FRE 213 – Studies in Poetry (4 units)**

*Course Description:* Studies in poetry.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

**FRE 214 – Study of a Literary Movement (4 units)**

*Course Description:* Study of a literary movement.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

**FRE 215 – Topics in French & Francophone Film (4 units)**

*Course Description:* Aspects of French and Francophone film from the Lumière Brothers through the present. Topics may include a specific historical period of filmmaking, film theories and the analysis of film form and narrative, and major filmmakers and filmic traditions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**FRE 224 – Francophone Literatures (4 units)**

*Course Description:* Study of cultural productions (literature, film, visual arts) by Francophone peoples such as found in North Africa, West Africa, the Caribbean, South-East Asia, the Americas, and Metropolitan France.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor when topic differs.

*Grade Mode:* Letter.

**FRE 250A – French Linguistics I (4 units)**

*Course Description:* Theoretical approach to the forms and functions of French, with emphasis on phonology and morphology. Overview of current linguistic theories and their application to French. Offered in alternate years.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**FRE 250B – French Linguistics II (4 units)**

*Course Description:* Theoretical approach to the forms and functions of French, with emphasis on syntax and semantics. Overview of current linguistic theories and their application to French. Offered in alternate years.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**FRE 251 – Topics in the Linguistic Study of French (4 units)**

*Course Description:* Questions relevant to the linguistic study of French, such as language acquisition, sociolinguistics, or theoretical examination of structure. Intended for students in French Linguistics and those applying linguistic models to literature or teaching.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**FRE 291 – Foreign Language Learning in the Classroom (4 units)**

*Course Description:* Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Project.

*Enrollment Restriction(s):* Graduate standing.

*Cross Listing:* GER 291, SPA 291.

*Grade Mode:* Letter.

**FRE 297 – Individual Study (1-5 units)**

*Course Description:* Description:

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**FRE 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-5 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**FRE 299 – Research (1-12 units)***Course Description:* Description:*Prerequisite(s):* Consent of instructor.*Learning Activities:* Variable.*Enrollment Restriction(s):* Graduate standing.*Grade Mode:* Satisfactory/Unsatisfactory only.**FRE 299D – Dissertation Research (1-12 units)***Course Description:* Dissertation research.*Prerequisite(s):* Consent of instructor.*Learning Activities:* Variable 3-36 hour(s).*Enrollment Restriction(s):* Graduate standing.*Repeat Credit:* May be repeated.*Grade Mode:* Satisfactory/Unsatisfactory only.**FRE 300 – Teaching of a Modern Foreign Language (3 units)***Course Description:* Teaching of a modern foreign language.*Prerequisite(s):* Senior or graduate standing; a major or minor in a modern foreign language.*Learning Activities:* Lecture/Discussion 3 hour(s).*Grade Mode:* Letter.**FRE 390A – The Teaching of French in College (2 units)***Course Description:* Designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university.*Prerequisite(s):* Graduate standing or consent of instructor.*Learning Activities:* Lecture/Discussion 2 hour(s).*Repeat Credit:* May be repeated with consent of instructor.*Grade Mode:* Satisfactory/Unsatisfactory only.**FRE 390B – The Teaching of French in College (2 units)***Course Description:* Designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university.*Prerequisite(s):* Graduate standing or consent of instructor.*Learning Activities:* Lecture/Discussion 2 hour(s).*Grade Mode:* Satisfactory/Unsatisfactory only.**FRE 396 – Teaching Assistant Training Practicum (1-4 units)***Course Description:* Teaching assistant training.*Prerequisite(s):* Graduate standing.*Learning Activities:* Variable.*Repeat Credit:* May be repeated.*Grade Mode:* Pass/No Pass only.**Freshman Seminar (FRS)**

College of Letters &amp; Science

**FRS 001 – First-Year Seminar (1 unit)***Course Description:* Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter.*Learning Activities:* Seminar 1 hour(s).*Enrollment Restriction(s):* Open only to students who have completed fewer than 45 quarter units and transfer students in their first academic year at UC Davis.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.**FRS 002 – First-Year Seminar (2 units)***Course Description:* Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter.*Learning Activities:* Seminar 2 hour(s).*Enrollment Restriction(s):* Open only to students who have completed fewer than 45 quarter units and transfer students in their first academic year at UC Davis.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Letter.**FRS 003 – First-Year Seminar (1 unit)***Course Description:* Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter.*Learning Activities:* Seminar 1 hour(s).*Enrollment Restriction(s):* Open only to students who have completed fewer than 45 quarter units and transfer students in their first academic year at UC Davis.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Pass/No Pass only.**FRS 004 – First-Year Seminar (2 units)***Course Description:* Investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter.*Learning Activities:* Seminar 2 hour(s).*Enrollment Restriction(s):* Open only to students who have completed fewer than 45 quarter units and transfer students in their first academic year at UC Davis.*Repeat Credit:* May be repeated when topic differs.*Grade Mode:* Pass/No Pass only.**Future Undergraduate Science Educators (FSE)**

College of Biological Sciences

**FSE 301 – Developing Teaching Resources (2 units)**

*Course Description:* Development of curricular materials relevant to undergraduate science courses including complete learning outcomes, lesson plans, learning activities, assessments, data from implementation, and student or peer evaluation of material.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students admitted to the Future Undergraduate Science Educators (FUSE) Graduate Academic Certificate program only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**FSE 305 – Building a Teaching Portfolio (2 units)**

*Course Description:* Development of a professional and comprehensive teaching portfolio including a teaching philosophy statement, teaching resume/CV, cover letter, reflection on teaching and professional development experiences, sample curricular materials, student evaluations, and peer evaluation. Careers in higher education.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**FSE 310 – Effective Teaching of College Biology (3 units)**

*Course Description:* Undergraduate science education pedagogy. Evidence-based practices in undergraduate science course design, structure and facilitation of classroom learning, assessment, student engagement, inclusion of diverse learners, and the use of technology in enhancing learning.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

**FSE 391 – Scholarship of Teaching & Learning Seminar (2 units)**

*Course Description:* Research articles on the scholarship of teaching and learning. Current trends in undergraduate level pedagogical research methods and results.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**FSE 392 – Teaching Practicum in the Sciences (2-6 units)**

*Course Description:* Teaching practicum in a college-level science course. Planning and facilitation of class sessions in a college-level setting. Assessment of student learning under the guidance of a science faculty mentor. Teaching assignments must be approved by the instructor of record and the students' thesis advisor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 1-3 hour(s).

*Enrollment Restriction(s):* Open only to graduate students enrolled in the Future Undergraduate Science Educators (FUSE) Graduate Academic Certificate program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Gastroenterology (GAS)**

School of Medicine

**GAS 192 – Internship in Gastroenterology (1-12 units)**

*Course Description:* Supervised work experience in gastroenterology.

*Prerequisite(s):* Upper division standing; approval of project by preceptor prior to internship.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**GAS 299 – Research (1-12 units)**

*Course Description:* Research in gastroenterology.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GAS 460 – Gastroenterology Clinical Clerkship (3-18 units)**

*Course Description:* Work-up, manage, and follow-up new patients on active inpatient consulting service. Gastroenterology/Hepatology patients. Daily rounds with attending physician.

*Prerequisite(s):* Consent of instructor. Completion of third-year of medical school.

*Learning Activities:* Clinical Activity 30 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**GAS 480 – Insights in Gastroenterology (1-3 units)**

*Course Description:* To gain insight in clinical activities of Gastroenterology Division through attendance at any of the following: endoscopic procedures, ward rounds, outpatient clinic, and G.I. grand rounds.

*Prerequisite(s):* Consent of instructor; student in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**GAS 499 – Research (1-12 units)**

*Course Description:* Part-time participation in active clinical and basic research projects. Some will involve both patient care and relevant laboratory procedures. Basic research includes liver metabolism, cancer markers, porphyrias diet and cancer, folate metabolism.

*Prerequisite(s):* Consent of instructor; medical student status.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**Gender, Sexuality, & Women's Studies (GSW)**

College of Letters & Science

**GSW 050 – Introduction to Critical Gender Studies (4 units)**

*Course Description:* Introduction to interdisciplinary, critical gender studies. The emergence of women's, gender and feminist studies internationally, its links to women's movements, and its influence within the various arts, humanities and social science disciplines.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*General Education:* Arts & Humanities (AH) or Social Sciences (SS);

American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**GSW 070 – Theory & History of Sexualities (4 units)**

*Course Description:* Key issues in the social construction, organization, and reproduction of sexualities such as the intersection of sexual identity with gender, race, ethnicity, and class, and the relation between movements for sexual liberation and the regulation of the body.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken former course WMS 070.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**GSW 080 – Special Topics in Critical Gender Studies (4 units)**

*Course Description:* In-depth examination of a women and gender studies topic related to the research interest of the instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**GSW 090X – First Year Seminar (2 units)**

*Course Description:* Examination of a special topic in Gender, Sexuality, and Women's Studies through shared readings, discussions, and written assignments.

*Learning Activities:* Seminar 2 hours(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GSW 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. Learning Activities:

*Prerequisite(s):* Consent of instructor. *Enrollment Restrictions:* Credit Limitation(s): Cross Listing: Repeat Credit: General Education: Grade Mode: Passed/Not Passed only.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated for credit.

**GSW 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduate students.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Pass/Not Passed only.

**GSW 102 – Colonialism (4 units)**

*Course Description:* Changing configurations of gender, class, culture and sexuality in colonial pacification and anti-colonial resistance in diverse societies.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken former course WMS 102.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**GSW 103 – Introduction to Feminist Theory (4 units)**

*Course Description:* Introduction to the emergence of feminist theory and to key concepts in feminist theorizing. Examination of past and current debates over sexuality, race, identity politics, and the social construction of women's experience.

*Prerequisite(s):* GSW 050.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to GSW Majors only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**GSW 139 – Feminist Cultural Studies (4 units)**

*Course Description:* Histories, theories, and practices of feminist traditions within cultural studies.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* AMS 139.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

**GSW 148 – Science, Gender, & Social Justice (4 units)**

*Course Description:* Critical reading and reflection on the history and practice of Western science, scientific institutions and the changing role of science in relation to inequalities of class, race, gender and sexuality, and global struggles for equality and justice.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Course cannot be counted for credit if former course WMS 148 has been taken.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

**GSW 176 – Autobiography, Narrative, Memoir (4 units)**

*Course Description:* Life narrative writings by women. Transgressive voices exploring issues of race, class, sexuality, women's silence, and marginalization. Theories of autobiography, autoethnography, and memoir.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s); Discussion 1 hour(s); Term paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

**GSW 179 – Literature as Aesthetics of Resistance (4 units)**

*Course Description:* Literature by women and other marginal groups which embody dissent and subversion as a means of challenging the status quo to affect social transformation.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GSW 185 – Women & Islamic Discourses (4 units)**

*Course Description:* Introduction to debates/discourses about women and Islam. Transformations in debates/discourses in colonial and postcolonial periods in the Middle East & South Asia. Comparative study of debates/discourses on family, work, law, sexuality, religion, comportment, human rights, and feminist and religious movements.

*Prerequisite(s):* GSW 050; or comparable course.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* MSA 150.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**GSW 190 – Senior Seminar (4 units)**

*Course Description:* Capstone course for senior GSW majors, which focuses on current issues in feminism as they impact theory, public policy, and practice.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Open to GSW majors with senior standing only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

**GSW 192 – (GSW) Gender, Sexuality, & Women's Studies (1-12 units)**

*Course Description:* Supervised internship and study in positions or institutional settings dealing with gender-related problems or issues, for example, a women's center, affirmative action office, advertising agency, or social welfare agency. Final written report on internship experience required.

*Prerequisite(s):* Completion of 84 units; enrollment is dependent on the availability of intern positions with priority given to GSW majors; consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Pass/No Pass only.

**GSW 194HA – Senior Honors Project in Gender, Sexuality, & Women's Studies (4-6 units)**

*Course Description:* In consultation with an advisor, students complete a substantial research paper or significant creative project on a GSW topic.

*Prerequisite(s):* Senior standing; GSW major; advisor's approval; consent of instructor.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**GSW 194HB – Senior Honors Project in Gender, Sexuality, & Women's Studies (4-6 units)**

*Course Description:* In consultation with an advisor, students complete a substantial research paper or significant creative project on a GSW topic.

*Prerequisite(s):* Senior standing; GSW major; advisor's approval; consent of instructor.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**GSW 197T – Tutoring in Gender, Sexuality, & Women's Studies (1-4 units)**

*Course Description:* Leading small, voluntary discussion groups affiliated with a Gender, Sexuality, & Women's Studies course.

*Prerequisite(s):* Upper division standing; consent of instructor.

*Learning Activities:* Tutorial 3-12 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

**GSW 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed Group Study.

*Learning Activities:* Variable 1-5 hour(s).

*Enrollment Restriction(s):* Must be Upper Division Standing.

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Pass/Not Passed only.

**GSW 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special Study for Advanced Undergraduates.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Pass/Not Passed only.

**GSW 200A – Current Issues in Feminist Theory (4 units)**

*Course Description:* Current issues in feminist theory; techniques employed to build feminist theory in various fields.

*Learning Activities:* Seminar 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken former course WMS 200A.

*Grade Mode:* Letter.

**GSW 200B – Feminism & Research Methodology (4 units)**

*Course Description:* Application of feminist epistemology and ethics in the design of graduate research.

*Prerequisite(s):* Consent of instructor; students are required to have Bachelor's Level Competency in Gender Studies.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students only.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

**GSW 201 – Special Topics in Feminist Theory & Research (4 units)**

*Course Description:* In-depth exploration of a topic of feminist theory and research related to the interests of the instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated for credit when topic differs

*Grade Mode:* Letter.

**GSW 299 – Special Study for Graduate Students (1-12 units)**

*Course Description:* Special study for graduate students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-12 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GSW 299D – Dissertation Research & Writing (4 units)**

*Course Description:* Dissertation Research & Writing.

*Prerequisite(s):* GSW 200A; GSW 200B; consent of instructor; fulfillment of course requirements for DE in Feminist Theory Research; advancement to candidacy.

*Learning Activities:* Independent Study.

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GSW 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**General Medicine (GMD)**

School of Medicine

**GMD 192 – Internship in General Medicine (1-12 units)**

*Course Description:* Supervised work experience in general medicine.

*Prerequisite(s):* Upper division standing; approval of project by preceptor prior to internship.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**GMD 291 – Seminars in Human Health Services Research & Clinical Epidemiology (1 unit)**

*Course Description:* Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* EPI 291.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GMD 460 – General Medicine Consults (1-18 units)**

*Course Description:* Supervised opportunity to see entire spectrum of medical problems encountered by a general internist. Student spends time in General Medicine Clinic and on the General Medicine Consult Service. Consultation Service is particularly concerned with medical evaluation of surgical patients.

*Prerequisite(s):* Fourth-year medical students with consent of instructor; a general medicine clerkship.

*Learning Activities:* Clinical Activity 1-18 hour(s), Variable 1-18 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

**GMD 470 – Health Care Ethics (3-9 units)**

*Course Description:* Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Participation in ethics rounds.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* NRS 470.

*Grade Mode:* Honors/Pass/Fail.

**GMD 485 – Introduction to Health Care Ethics (1 unit)**

*Course Description:* Introduction to concepts and methods of healthcare ethics. Emphasis on problems and methods.

*Prerequisite(s):* Medical student in good standing.

*Learning Activities:* Lecture.

*Grade Mode:* Honors/Pass/Fail.

**GMD 499 – General Medicine Research (1-18 units)**

*Course Description:* Student will be involved in a clinical research problem within the areas, interest and expertise of members of Division of General Internal Medicine. Alternatively, the research effort will be directed toward investigation of a clinical problem of general medical interest.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Clinical Activity 8-40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**Genetics (GGG)**

College of Agricultural & Environmental Sciences

**GGG 201A – Advanced Genetic Analysis (5 units)**

*Course Description:* Fundamentals of genetic analysis and chromosome structure using model organisms including mutation, transmission, complementation, suppression, and enhancement as well as epigenetic phenomena at the whole organism and molecular levels.

*Prerequisite(s):* BIS 101; STA 100; or the equivalent, graduate standing.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

**GGG 201B – Genomics (5 units)**

*Course Description:* Prokaryotic and eukaryotic genomes. Experimental strategies and analytical challenges of modern genomics research and the theory and mechanics of data analysis. Structural, functional, and comparative genomics. Related issues in bioinformatics.

*Prerequisite(s):* GGG 201A; GGG 201C; or equivalents that provide a basic understanding of genetics and molecular biology.

*Learning Activities:* Lecture 3 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Class limited to 40 students; priority to Genetics Graduate Group students.

*Grade Mode:* Letter.

**GGG 201C – Molecular Genetic Mechanisms in Disease (4 units)**

*Course Description:* Exploration of how basic mechanisms of molecular biology contribute to health and disease. Diseases related to animals, plants, and microbes will highlight fundamental concepts in the assembly, function and regulation of DNA, RNA, and protein.

*Prerequisite(s):* BIS 101; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students in genetics, microbiology or biochemistry and molecular biology graduate groups.

*Grade Mode:* Letter.

## **GGG 201D – Quantitative & Population Genetics (5 units)**

*Course Description:* Basic concepts of quantitative and population genetics including gene and genotypic frequencies, multiple factor hypothesis, phenotypic and genotypic values, heritability, selection, genetic variation, the detection of quantitative trait loci and evolution in populations. Experimental and analytical methods.

*Prerequisite(s):* GGG 201A; or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

## **GGG 205 – Molecular Genetics Laboratory (5 units)**

*Course Description:* Students will conduct experiments in molecular genetics laboratories. Individual research problems will emphasize experimental design, experience with methodologies, and data interpretation.

*Prerequisite(s):* BIS 101 (can be concurrent); or the equivalent course; enrolled in Genetics Graduate Group.

*Learning Activities:* Laboratory 15 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GGG 211 – Concepts in Human Genetics & Genomics (3 units)**

*Course Description:* Human genomic organization; genetic structure of populations; positional cloning, application of linkage, association, and haplotypes; quantitative trait loci analyses; integrative genetic studies of gene expression; DNA repair mechanisms in genetic disease; mutation analyses; epigenetics; mitochondrial disease; gene manipulation and therapy.

*Prerequisite(s):* GGG 201A; or equivalent course; GGG 201B and GGG 201C or equivalent are recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students enrolled in the Human Genetics Focus Group; Pass Two restricted to graduate students enrolled in Genetics Graduate Group; after that, open enrollment for graduate students up to 12 students, then undergraduates.

*Grade Mode:* Letter.

## **GGG 220 – Genomics & Biotechnology of Plant Improvement (3 units)**

*Course Description:* Integration of modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits.

*Prerequisite(s):* BIS 101; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PLS 220.

*Grade Mode:* Letter.

## **GGG 225 – Gene & Cellular Therapies (3 units)**

*Course Description:* Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variation, genetic diseases, methods to manipulate gene expression, viral and non-viral delivery vectors, history and progress of gene therapy, case studies, and ethical issues.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* PHA 225.

*Grade Mode:* Letter.

## **GGG 250 – Functional Genomics: From Bench to Bedside (3 units)**

*Course Description:* Functional genomics (how genetic variation and epigenomics affect gene expression), with an emphasis on clinical relevance and applications. Topics include genetic variation and human disease, cancer therapeutics, and biomarker discovery.

*Prerequisite(s):* GGG 201C; MCB 214; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* No credit to students who have previously completed PHA 250.

*Cross Listing:* BCM 250.

*Grade Mode:* Letter.

## **GGG 280 – Genetics, Racism, & Inequality (2 units)**

*Course Description:* Issues of diversity, equity, and inclusion in the context of the science of genetics. Association between theories of race, genetic science, and racism. Impact of and responses to bias and lack of diversity in science.

*Prerequisite(s):* GGG 291 B or better (can be concurrent); or consent of Instructor.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students and upper-division undergraduates with a focus on genetics or molecular biology.

*Repeat Credit:* May be repeated for credit since every year the focus is on different aspects of DEI in genetics; can be taken again with no possible overlap with previous sessions.

*Grade Mode:* Letter.

## **GGG 290 – Seminar in Evolutionary, Developmental & Population Genetics (1 unit)**

*Course Description:* Topics of current interest in evolutionary, population, and developmental genetics.

*Learning Activities:* Seminar 1 hour(s); Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students; undergraduate students may enroll with consent of instructor.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GGG 290A – Graduate Student Conference in Genetics (1 unit)**

*Course Description:* Student-given seminars on topics in genetics, with critiques by instructor and peers.

*Learning Activities:* Conference 1 hour(s).

*Enrollment Restriction(s):* Restricted to Genetics Graduate Group students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GGG 291 – Seminar in History of Genetics (2 units)**

*Course Description:* The development of modern genetic theories beginning with Mendel.

*Prerequisite(s):* BIS 101.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**GGG 292 – Seminar in Genomics & Epigenomics (1 unit)**

*Course Description:* Topics of current interest in genomics and epigenomics.

*Learning Activities:* Seminar 1 hour(s); Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students; or consent of instructor.

*Repeat Credit:* May be repeated credit when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GGG 293 – Seminar in Animal Genetics (1-3 units)**

*Course Description:* Emphasis on recent advances in the field of animal genetics, ranging from quantitative genetics to molecular biology as it relates to animals.

*Prerequisite(s):* GGG 201A; or consent of instructor.

*Learning Activities:* Seminar 1-3 hour(s).

*Grade Mode:* Letter.

**GGG 294 – Seminar in Human Genetics (1 unit)**

*Course Description:* In-depth study of current topics in human genetics including genetic diversity, migration, phenotypic evolution and genetic associations with disease. Focus on population genetic theory. Topic changes yearly.

*Prerequisite(s):* GGG 201A; consent of instructor.

*Learning Activities:* Seminar 1 hour(s); Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students; or consent of instructor.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* S/U only.

**GGG 295 – Seminar in Molecular Genetics (1-3 units)**

*Course Description:* Topics of current interest related to the structure, modification and expression of genes.

*Prerequisite(s):* GGG 201A; or consent of instructor.

*Learning Activities:* Seminar 1 hour(s); Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students; or consent of instructor.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* S/U only.

**GGG 296 – Scientific Professionalism & Integrity (2 units)**

*Course Description:* Review of basic skills required of contemporary scientists. Topics include scientific conduct, manuscript preparation, grant writing, seminar presentations, and time management.

Emphasis on responsibilities of scientists to factually and thoughtfully communicate results.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Seminar 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**GGG 297 – Seminar in Plant Genetics (1-3 units)**

*Course Description:* Current topics in plant genetics examined in student-conducted seminars and discussion format. Integration of molecular, organismal and population genetics to address questions in plant biology will be emphasized.

*Prerequisite(s):* GGG 201A; or consent of instructor.

*Learning Activities:* Seminar 1 hour(s); Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Pass One restricted to graduate students; or consent of instructor.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* S/U only.

**GGG 298 – Group Study (1-5 units)**

*Course Description:* Group study of selected topics in genetics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GGG 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GGG 300 – Methods in Teaching Genetics (1-3 units)**

*Course Description:* Practical experience in the methods and problems of teaching genetics. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion or laboratory sections, formulating examinations under supervision of instructor.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture/Discussion, Variable.

*Repeat Credit:* May be repeated 3 time(s) or 9 units when teaching in different genetics related course.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Geography (GEO)**

**College of Letters & Science**

**GEO 200A – Research Trends in Geography (1 unit)**

*Course Description:* Major current research themes and trends in geography.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEO 200AN – Geographical Concepts (4 units)**

*Course Description:* Concepts and thematic content of the discipline, including contemporary research questions. A brief review of the history of geographic thought and practice is done at the beginning of the course.

*Prerequisite(s):* Graduate standing in Geography or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**GEO 200BN – Theory & Practice of Geography (4 units)**

*Course Description:* Development, application, and philosophical background of theory in discipline of geography and geographical knowledge production. Similarities and differences in theories employed in physical and human geography and cartography. Geographic contributions to interdisciplinary theory bridging biophysical sciences, social sciences, and humanities.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Grade Mode:* Letter.

**GEO 200CN – Quantitative Geography (4 units)**

*Course Description:* Provides an overview of quantitative approaches in spatial data analysis. Overview of different approaches used for inference, modeling, and prediction. Also learn how to write computer programs to implement these methods.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Grade Mode:* Letter.

**GEO 200DN – Socio-Spatial Analysis in Geography (4 units)**

*Course Description:* Introduction to methodologies of socio-spatial analysis in interviews, and ethnographic fieldwork. Students develop a critical understanding of different methodological and theoretical approaches, and their appropriate applications in overall research design.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Grade Mode:* Letter.

**GEO 200E – Advanced Research Design in Geography (2 units)**

*Course Description:* Helps Ph.D. students develop their research question, design their research plan and complete a full dissertation research proposal.

*Prerequisite(s):* GEO 200AN; GEO 200BN; GEO 200CN; GEO 200DN; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited to 15 students.

*Grade Mode:* Letter.

**GEO 201 – Sources & General Literature of Geography (4 units)**

*Course Description:* Designed for students preparing for higher degrees in geography.

*Prerequisite(s):* Consent of instructor. Graduate standing in geography.

*Learning Activities:* Discussion 4 hour(s).

*Repeat Credit:* May be repeated in one or more subfields: physical, cultural, economic, urban, historical, political, conservation, regional geography.

*Grade Mode:* Letter.

**GEO 210 – Topics in Biogeography (3 units)**

*Course Description:* Current topics in historical and ecological biogeography, including macroecology and areography, GIS and remote sensing, phylogeography, vegetation, plant and animal community and species geography. Systematics, climate change, and conservation will be addressed.

*Prerequisite(s):* EVE 147 or WFC 156 (can be concurrent); or equivalent.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Consent of instructor required for undergraduates.

*Grade Mode:* Letter.

**GEO 211 – Physical Geography Traditions & Methods (3 units)**

*Course Description:* Discussion of the physical science tradition in geography, including key concepts and current research in climatology, geomorphology, soils geography, biogeography, climate change, watershed science, and coastal studies. Research paradigms, programs, and methods as used by physical geographers will be discussed.

*Prerequisite(s):* Introductory course in physical geography.

*Learning Activities:* Discussion/Laboratory 2 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate-level standing in geography or related discipline.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

**GEO 212 – Water Resource Management (4 units)**

*Course Description:* Engineering, institutional, economic, and social basis for managing local and regional water resources. Examples in the context of California's water development and management. Uses of computer modeling to improve water management.

*Prerequisite(s):* ECI 114; ECI 142; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* ECI 267.

*Grade Mode:* Letter.

**GEO 214 – Seminar in Geographical Ecology (2 units)**

*Course Description:* Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics.

*Prerequisite(s):* EVE 100 or EVE 101; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* PBG 296.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEO 215 – What is Infrastructure; Critical Infrastructure Studies (3 units)**

*Course Description:* Introduction to interdisciplinary scholarship and design on expanding conceptions of infrastructure, that include social, technical, ecological, political and aesthetic dimensions of the medium. Focus on application of theory to case studies and thinking through landscape as infrastructure.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to graduate standing or consent of instructor.

*Cross Listing:* LDA 215.

*Grade Mode:* Letter.

**GEO 220 – Topics in Human Geography (4 units)**

*Course Description:* Examination of philosophy and theory in human geography with an emphasis on contemporary debates and concepts in social, cultural, humanistic, political, and economic geographies. Specific discussion of space, place, scale and landscape; material and imagined geographies.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Grade Mode:* Letter.

## **GEO 230 – Citizenship, Democracy, & Public Space (4 units)**

*Course Description:* Introduction to seminal works in political theory, philosophy, and the social sciences that focus on citizenship and the public sphere; development of critical perspective regarding restructuring of public space in a pluralistic and global culture; discussion of contemporary case studies.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Cross Listing:* LDA 200.

*Grade Mode:* Letter.

## **GEO 233 – Urban Planning & Design (4 units)**

*Course Description:* Regulation, design, and development of the built landscape, planning and land development processes, zoning and subdivision regulation, site planning, urban design goals and methods, public participation strategies, creatively designing landscapes to meet community and ecological goals.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited to graduate students.

*Cross Listing:* LDA 205.

*Grade Mode:* Letter.

## **GEO 236 – Transportation Planning & Policy (4 units)**

*Course Description:* Transportation planning process at the regional level, including the role of federal policy in shaping regional transportation planning, tools and techniques used in regional transportation planning, issues facing regional transportation planning agencies, pros and cons of potential solutions and strategies.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Credit Limitation(s):* Students taking this course previously as TTP 289 cannot repeat it for credit; taking other TTP 289 offerings does not preclude taking TTP 220 for credit.

*Cross Listing:* TTP 220.

*Grade Mode:* Letter.

## **GEO 240 – Community Development Theory (4 units)**

*Course Description:* Introduction to theories of community development and different concepts of community, poverty, and development.

Emphasis on building theory, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* CRD 240.

*Grade Mode:* Letter.

## **GEO 241 – The Economics of Community Development (4 units)**

*Course Description:* Economic theories and methods of planning for communities. Human resources, community services and infrastructure, industrialization and technological change, and regional growth. The community's role in the greater economy.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Cross Listing:* CRD 241.

*Grade Mode:* Letter.

## **GEO 245 – The Political Economy of Urban & Regional Development (4 units)**

*Course Description:* How global, political and economic restructuring and national and state policies are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and decline; regional development in California.

*Prerequisite(s):* CRD 157; CRD 244; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* CRD 245.

*Grade Mode:* Letter.

## **GEO 246 – The Political Economy of Transnational Migration (4 units)**

*Course Description:* Theoretical perspectives and empirical research on social, cultural, political, and economic processes of transnational migration to the U.S. Discussion of conventional theories will precede contemporary comparative perspectives on class, race, ethnicity, citizenship, and the ethnic economy.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* CRD 246.

*Grade Mode:* Letter.

## **GEO 248 – Social Policy, Welfare Theories & Communities (4 units)**

*Course Description:* Theories and comparative histories of modern welfare states and social policy in relation to legal/normative, organizational, and administrative aspects. Analysis of specific social issues within the U.S./California context.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Credit Limitation(s):* Not open for credit to students having completed CRD 248A and CRD 248B.

*Cross Listing:* CRD 248.

*Grade Mode:* Letter.

## **GEO 254 – Political Ecology of Community Development (4 units)**

*Course Description:* Community development from the perspective of geographical political ecology. Social and environmental outcomes of the dynamic relationship between communities and land-based resources, and between social groups. Cases of community conservation and development in developing and industrialized countries.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* CRD 244.

*Grade Mode:* Letter.

## **GEO 260 – Global Political Ecology (4 units)**

*Course Description:* Background, genesis, current debates in political ecology. Examination of political-economic and social-cultural causes of environmental change. Introduction to development theory, globalization, history of science and power/knowledge. Cases of social movements, justice, resistance, gender, race and class. Focus outside North America.

*Learning Activities:* Seminar 3 hour(s), Term Paper/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students only or consent of instructor.

*Grade Mode:* Letter.

## **GEO 279 – Exploring Data from Built Environment Using R (4 units)**

*Course Description:* Introduction to modern data science, specifically data acquisition, exploratory data, visualization, and beginning data analysis using R. Emphasizes computational reasoning and working with tabular and non-standard data. Focus will be on data generated in the built environment.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ECI 254.

*Grade Mode:* Letter.

## **GEO 280 – Field Studies in Geography (3 units)**

*Course Description:* A topic or sub-discipline of geography forms the theme for the course in any given offering, with a focus on current research on this topic, field methodologies, and data analysis in human and physical geography.

*Prerequisite(s):* Consent of instructor; undergraduate or graduate coursework in geography.

*Learning Activities:* Lecture 1 hour(s), Fieldwork 6 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

## **GEO 281 – Transportation Survey Methods (4 units)**

*Course Description:* Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling, experimental design, and survey design issues. Analysis methods, including factor, discriminant and cluster analysis.

*Prerequisite(s):* (STA 013 or STA 013Y); ECI 251 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ECI 255.

*Cross Listing:* TTP 200.

*Grade Mode:* Letter.

## **GEO 286 – Selected Topics in Environmental Remote Sensing (3 units)**

*Course Description:* In depth investigation of advanced topics in remote sensing applications, measurements, and theory.

*Prerequisite(s):* ERS 186; and consent of instructor, or equivalent required; ERS 186L recommended.

*Learning Activities:* Discussion 2 hour(s), Lecture 1 hour(s), Project.

*Repeat Credit:* May be repeated.

*Cross Listing:* HYD 286.

*Grade Mode:* Letter.

## **GEO 290 – Seminar in Geography (1-3 units)**

*Course Description:* Seminar focuses on specified topical areas within geography, which will vary quarter to quarter. Students expected to present an oral seminar on an aspect of the general topic under discussion.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1-3 hour(s).

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEO 291 – Seminar in Cultural Geography (4 units)**

*Course Description:* Seminar in cultural geography.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **GEO 293 – Graduate Internship (1-12 units)**

*Course Description:* Individually designed, supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEO 295 – Seminar in Urban Geography (4 units)**

*Course Description:* Seminar in urban geography.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **GEO 297 – Graduate Group in Geography (2 units)**

*Course Description:* Seminars by UC Davis faculty and prominent national and international scholars; research presentations by Graduate Group in Geography Ph.D. candidates.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 1 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEO 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEO 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEO 299D – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor; graduate student status in Geography.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Geology (GEL)**

**College of Letters & Science**

## **GEL 001 – The Earth (4 units)**

*Course Description:* Introduction to the study of the Earth. Earth's physical and chemical structure; internal and surface processes that mold the Earth; geological hazards and resources.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GEL 050; only 2 credits for students who have taken GEL 002.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 002 – Earth System Science (3 units)**

*Course Description:* Solid and fluid earth and its place in the solar system. How the solid earth interacts with the atmosphere, hydrosphere, biosphere, and extraterrestrial environment.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Only 2 units credit for students who have taken GEL 050; only 2 units credit for students who have taken GEL 001.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 002G – Earth System Science Discussion (1 unit)**

*Course Description:* Small group discussion and preparation of short papers for GEL 002.

*Prerequisite(s):* GEL 002 (can be concurrent); GEL 002 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 003 – History of Life (3 units)**

*Course Description:* The history of life during the three and onehalf billion years from its origin to the present day. Origin of life and processes of evolution; how to visualize and understand living organisms from their fossil remains.

*Prerequisite(s):* GEL 001 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 003G – History of Life: Discussion (1 unit)**

*Course Description:* Small group discussion and preparation of short papers for GEL 003. GE credit with concurrent enrollment in GEL 003: WE.

*Prerequisite(s):* GEL 003 (can be concurrent); GEL 003 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**GEL 003L – History of Life Laboratory (1 unit)**

*Course Description:* Exercises in understanding fossils as the clues to interpreting ancient life, including their functional morphology, paleoecology, and evolution.

*Prerequisite(s):* GEL 003 (can be concurrent); GEL 003 required concurrently.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 004 – Evolution: Science & World View (3 units)**

*Course Description:* Introduction to biological evolution. Emphasis on historical development, major lines of evidence and causes of evolution; relationships between evolution and Earth history; the impact of evolutionary thought on other disciplines.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL);

Writing Experience (WE).

**GEL 005 – Mass Extinctions: Past & Future (2 units)**

*Course Description:* The big five mass extinctions that occurred in deep-time, with comparisons to the extinctions that are occurring currently. Similarities and dissimilarities between the past and modern extinctions.

*Prerequisite(s):* Ability to interpret a table of data.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 009 – Geology Field Experience (1 unit)**

*Course Description:* Exposure to geologic features and earth processes in the field. Experiential instruction in earth-science concepts, spatial visualization, landscape evolution, deep time, critical thinking skills, and integrative scientific themes. One 4-5 day field trip.

*Prerequisite(s):* Consent of instructor; at least one previous GEL class, or concurrent enrollment.

*Learning Activities:* Fieldwork.

*Enrollment Restriction(s):* Pass One open to non-Geology Majors only.

*Repeat Credit:* May be repeated 1 time(s) when field trip destination differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**GEL 010 – Modern & Ancient Global Environmental Change (3 units)**

*Course Description:* Fundamental scientific concepts underlying issues such as global warming, pollution, and the future of nonsustainable resources presented in the context of anthropogenic processes as well as natural forcing of paleoenvironmental change throughout Earth's history.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

**GEL 012 – Evolution & Paleobiology of Dinosaurs (2 units)**

*Course Description:* Introduction to evolutionary biology, paleobiology, ecology and paleoecology, using dinosaurs as case studies.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 016 – The Oceans (3 units)**

*Course Description:* Introductory survey of the marine environment.

Oceanic physical phenomena, chemical constituents and chemistry of water, geological history, the seas biota and human utilization of marine resources.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GEL 116.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 016G – The Oceans: Discussion (2 units)**

*Course Description:* Scientific method applied to discovery of the processes, biota and history of the oceans. Group discussion and preparation of term paper.

*Prerequisite(s):* GEL 016 (can be concurrent) or GEL 016V (can be concurrent).

*Learning Activities:* Discussion/Laboratory 2 hour(s), Term Paper/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GEL 116G.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**GEL 016V – The Oceans (3 units)**

*Course Description:* Introductory survey of the marine environment.

Oceanic physical phenomena, chemical constituents and chemistry of water, geological history, the seas biota and human utilization of marine resources.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GEL 116.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 017 – Earthquakes & Other Earth Hazards (2 units)**

*Course Description:* Impact of earthquakes, tsunami, volcanoes, landslides, and floods on humans, structures, and the environment. Discussion of the causes and effects of disasters and catastrophes, and on prediction, preparation, and mitigation of natural hazards.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 018 – Energy & the Environment (3 units)**

*Course Description:* Conventional and alternative energy resources and their environmental impacts. Basic principles, historical development, current advantages and disadvantages, future prospects. Oil, natural gas, coal, nuclear, wind, geothermal, water, tidal, solar, hydrogen, and other sources of energy for the 21st century.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**GEL 018V – Energy & the Environment (3 units)**

*Course Description:* Conventional and alternative energy resources and their environmental impacts. Basic principles, historical development, current advantages and disadvantages, future prospects. Oil, natural gas, coal, nuclear, wind, geothermal, water, tidal, solar, hydrogen, and other sources of energy for the 21st century.

*Learning Activities:* Web Virtual Lecture 1.50 hour(s), Web Electronic Discussion 1.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**GEL 020 – Geology of California (2 units)**

*Course Description:* The geologic history of California, the origin of rocks and the environments in which they were formed, the structure of the rocks and the interpretation of their structural history, mineral resources, and appreciation of the California landscape. Offered in alternate years.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

**GEL 025 – Geology of National Parks (3 units)**

*Course Description:* Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Relationship of individual parks to geologic processes such as mountain building, volcanism, stream erosion, glacial action and landscape evolution.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

**GEL 025V – Geology of National Parks (3 units)**

*Course Description:* Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Relationship of individual parks to geologic processes such as mountain building, volcanism, stream erosion, glacial action and landscape evolution.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* No credit for students who have completed GEL 025.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 028 – Astrobiology (3 units)**

*Course Description:* Origin, evolution and distribution of life in our solar system and the Universe. Detecting habitable worlds, Drake equations, necessities and raw materials for life, philosophical implications of the search for life elsewhere.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 030 – Fractals, Chaos & Complexity (3 units)**

*Course Description:* Modern ideas about the unifying ideas of fractal geometry, chaos and complexity. Basic theory and applications with examples from physics, earth sciences, mathematics, population dynamics, ecology, history, economics, biology, computer science, art and architecture. Offered in alternate years.

*Prerequisite(s):* MAT 016A or MAT 017A or MAT 021A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* PHY 030.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 032 – Volcanoes (3 units)**

*Course Description:* Role of eruptions, and eruptive products of volcanoes in shaping the planet's surface, influencing its environment, and providing essential human resources.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 035 – Rivers (3 units)**

*Course Description:* Introduction to geomorphology, climate and geology of rivers and watersheds, with case examples from California. Assessment of impacts of logging, agriculture, mining, urbanization and water supply on river processes. Optional river field trips.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 036 – The Solar System (4 units)**

*Course Description:* Nature of the sun, moon, and planets as determined by recent manned and unmanned exploration of the solar system. Comparison of terrestrial, lunar, and planetary geological processes. Search for life on other planets. Origin and evolution of the solar system. (Former course GEL 113 & GEL 113G.)

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

**GEL 050 – Physical Geology (3 units)**

*Course Description:* The Earth, its materials, its internal and external processes, its development through time by sea-floor spreading and global plate tectonics.

*Prerequisite(s):* High school physics and chemistry.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Students with credit for GEL 001 or the equivalent may receive only 2 units for GEL 050.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 050L – Physical Geology Laboratory (2 units)**

*Course Description:* Introduction to classification and recognition of minerals and rocks and to interpretation of topographic and geologic maps and aerial photographs.

*Prerequisite(s):* GEL 050 (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Credit Limitation(s):* Students with credit for GEL 001L or the equivalent may receive only 1 unit for GEL 050L.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 053 – Introduction to Geobiology (3 units)**

*Course Description:* Introduction to interactions between Earth and life with an emphasis on how metabolism, cellular processes, evolution and ecology emerged within natural environments and have changed Earth's surface.

*Prerequisite(s):* GEL 001 or GEL 002 or GEL 050.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 055 – Introduction to Geochemistry (3 units)**

*Course Description:* Introduction to key geochemical principles in Earth & Planetary Sciences; chemical bonding, geochemical affinity of elements, redox & acid base equilibria in geological systems, radioactive decay, isotopic fractionation and paleoclimate records.

*Prerequisite(s):* (GEL 001 or GEL 002 or GEL 050); (CHE 002A or CHE 002AH); (CHE 002B or CHE 002BH).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**GEL 056 – Introduction to Geophysics (4 units)**

*Course Description:* Introduction to geophysical topics essential to all aspects of Earth and planetary sciences: theory of plate tectonics, gravitational field of planets, diffusion, rheology, seismology, and earthquakes.

*Prerequisite(s):* (GEL 001 or GEL 050); (PHY 007A or PHY 009A); (PHY 007B or PHY 009B).

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**GEL 060 – Earth Materials: Introduction (4 units)**

*Course Description:* Physical and chemical properties of Earth materials; structure, chemical composition, and identification of rock-forming minerals; mineral-rock associations, and their origin from silicate liquids, aqueous fluids, and solid state transformations.

*Prerequisite(s):* (CHE 002A or CHE 002AH or CHE 004A); (CHE 002B or CHE 002BH or CHE 004B); (MAT 016A or MAT 017A or MAT 021A); (GEL 001 or GEL 050); GEL 050L

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 062 – Optical Mineralogy (2 units)**

*Course Description:* Optical properties of inorganic crystals; techniques of mineral identification using the polarizing microscope; strategies for studying rocks in thin section.

*Prerequisite(s):* GEL 060 (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**GEL 081 – Learning in Science & Mathematics (2 units)**

*Course Description:* Exploration of how students learn and develop understanding in science and mathematics classrooms. Introduction to case studies and interview techniques and their use in K-6 classrooms to illuminate factors that affect student learning.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 2 hour(s).

*Enrollment Restriction(s):* Limited to 26 students per section.

*Cross Listing:* EDU 081.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS); Visual Literacy (VL); Writing Experience (WE).

**GEL 092 – Internship (1-12 units)**

*Course Description:* Work-learn experience on and off campus in all subject areas offered by the department. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**GEL 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when content differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**GEL 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**GEL 101 – Structural Geology (3 units)**

*Course Description:* Study of processes and products of rock deformation.

Introduction to structural geology through a survey of the features and geometries of faults and folds, techniques of strain analysis, and continuum mechanics of rock deformation.

*Prerequisite(s):* GEL 050; GEL 050L; (PHY 007A or PHY 009A); (MAT 016A or MAT 017A or MAT 021A); consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited to 35 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 101L – Structural Geology Lab (2 units)**

*Course Description:* Laboratory study of the processes and products of rock deformation. Introduction to the practice of structural geology through observations and analysis of rock deformation, including field measurement techniques and geologic mapping.

*Prerequisite(s):* GEL 050; GEL 050L; (PHY 007A or PHY 009A); GEL 101 (can be concurrent); consent of instructor.

*Learning Activities:* Laboratory 6 hour(s), Fieldwork 2 hour(s).

*Enrollment Restriction(s):* Limited to 15 students per session.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**GEL 103 – Field Geology (4 units)**

*Course Description:* Field mapping projects and writing geological reports.

Weekly classroom meetings devoted to preparation of maps, cross sections, stratigraphic sections, rock descriptions, and reports. Seven-eight days for field trips will occur on weekends during the quarter.

*Prerequisite(s):* GEL 101; GEL 101L.

*Learning Activities:* Lecture 1 hour(s), Fieldwork 6 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**GEL 105 – Earth Materials: Igneous Rocks (4 units)**

*Course Description:* Origin and occurrence of igneous rocks. Laboratory exercises emphasize the study of these rocks in hand specimen and thin section.

*Prerequisite(s):* GEL 060; (MAT 016A or MAT 017A or MAT 021A); CHE 002B (can be concurrent).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**GEL 106 – Earth Materials: Metamorphic Rocks (4 units)**

*Course Description:* Physical and chemical properties of metamorphic rocks; interpretation of metamorphic environments. Laboratory exercises emphasize the study of these rocks in hand specimen and thin section.

*Prerequisite(s):* GEL 105.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**GEL 107 – Earth History: Paleobiology (3 units)**

*Course Description:* Evolution and ecological structure of the biosphere from the origin of life to the present.

*Prerequisite(s):* GEL 003 or GEL 053 or BIS 002A or BIS 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 107L – Earth History: Paleobiology Laboratory (2 units)**

*Course Description:* Exercises in determining the ecological functions and evolution of individuals, populations, and communities of fossil organisms in field and laboratory.

*Prerequisite(s):* GEL 107 (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 108 – Earth History: Paleoclimates (3 units)**

*Course Description:* Geological and environmental factors controlling climate change, the greenhouse effect with a detailed analysis of the history of Earth's climate fluctuations over the last 600 million years. Past and present climate records are used to examine potential future climatic scenarios.

*Prerequisite(s):* (GEL 001 or GEL 050 or GEL 116N or ESP 116N); CHE 002A; consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**GEL 109 – Earth History: Sediments & Strata (3 units)**

*Course Description:* Sediment formation, transport, and deposition.

Interpretations of sedimentary processes across landscapes and through time in the context of environmental and geological problems.

Reconstruction of ancient environmental change from sedimentary rocks.

*Prerequisite(s):* GEL 001 or GEL 050.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **GEL 109L – Earth History: Sediments & Strata Laboratory (2 units)**

*Course Description:* Methods of stratigraphic and sedimentologic analysis of modern and ancient sediments. Identification of major sediment and sedimentary rock types. Outcrop and subsurface analysis of sedimentary basins. GE credit with concurrent enrollment in GEL 109. Includes four one-day field trips.

*Prerequisite(s):* GEL 050L; GEL 109 (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **GEL 110A – Summer Field Geology: Structures & Neotectonics (4 units)**

*Course Description:* Advanced application of geologic field methods to the study of deformed rocks and their interpretation in terms of tectonic processes. Includes development and interpretation of geologic maps, cross sections and stratigraphic sections. Six days/week for three weeks in an off-campus location.

*Prerequisite(s):* GEL 060; GEL 103; GEL 109.

*Learning Activities:* Fieldwork 40 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GEL 110.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **GEL 110B – Summer Field Geology: Volcanology (4 units)**

*Course Description:* Advanced application of geologic field methods to the study of volcanic and plutonic rocks and their interpretation in terms of igneous processes. Includes development and interpretation of geologic maps, cross sections, stratigraphic sections, and outcrop scale observations. Six days/week for three weeks in an off-campus location.

*Prerequisite(s):* GEL 105; GEL 109.

*Learning Activities:* Fieldwork 40 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GEL 110.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **GEL 110C – Summer Field Geology: Special Projects (4 units)**

*Course Description:* Advanced application of geologic field methods to a special project location and the interpretation of field observations in terms of its geologic processes and geologic history. Variable field location and specific activities. Six days/week for three weeks in an off-campus location.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Fieldwork 40 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **GEL 115 – Earth Science, History, & People (4 units)**

*Course Description:* Study of interplay between the Earth and its human inhabitants through history, including consideration of acute events such as earthquakes and eruptions as well as the geology of resources, topography, and water.

*Prerequisite(s):* GEL 001 or GEL 050.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

## **GEL 116N – Oceanography (3 units)**

*Course Description:* Advanced oceanographic topics: Chemical, physical, geological, and biological processes; research methods and data analysis; marine resources, anthropogenic impacts, and climate change; integrated earth/ocean/atmosphere systems; weekly lab and one weekend field trip.

*Prerequisite(s):* GEL 001 or GEL 002 or GEL 016 or GEL 016V or GEL 050.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Fieldwork.

*Cross Listing:* ESP 116N.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **GEL 120 – Origins: From the Big Bang to Today (3 units)**

*Course Description:* Long-term and large-scale perspectives on the origins of the universe, stars and planets, life, human evolution, the rise of civilization and the modern world. Multi-disciplinary approach to "Big History" involving cosmology, astronomy, geology, climatology, biology, anthropology, archeology and traditional history.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **GEL 130 – Non-Renewable Natural Resources (3 units)**

*Course Description:* Origin, occurrence, and distribution of non-renewable resources, including metallic, nonmetallic, and energy-producing materials. Problems of discovery, production, and management. Estimations and limitations of reserves, and their sociological, political, and economic effects.

*Prerequisite(s):* GEL 001 or GEL 050.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **GEL 131 – Risk: Natural Hazards & Related Phenomena (3 units)**

*Course Description:* Risk, prediction, prevention and response for earthquakes, volcanic eruptions, landslides, floods, storms, fires, impacts, global warming.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **GEL 132 – Introductory Inorganic Geochemistry (3 units)**

*Course Description:* Nucleosynthesis of chemical elements, physical and chemical properties of elements, ionic substitution, elemental partition, distribution and transport among planetary materials, basic thermodynamics and phase diagrams, isotopic geochronometers, stable isotope fractionation, mixing and dilution, advection and diffusion, geochemical cycles.

*Prerequisite(s):* GEL 060 (can be concurrent); CHE 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **GEL 133 – Environmental Geochemistry (3 units)**

*Course Description:* Introduction to Earth surface processes with a focus on topics of current environmental interest such as nuclear power and waste disposal, acid mine drainage, carbon sequestration, history of polar ice sheets and sea level change.

*Prerequisite(s):* CHE 002A; CHE 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **GEL 134 – Environmental Geology & Land Use Planning (3 units)**

*Course Description:* Geologic aspects of land use and development planning. Geologic problems concerning volcanic and earthquake hazards, land stability, floods, erosion, coastal hazards, non-renewable resource extraction, waste disposal, water resources.

*Prerequisite(s):* GEL 001 or GEL 050; consent of instructor.; one course in Geology (GEL).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **GEL 136 – Ecogeomorphology of Rivers & Streams (5 units)**

*Course Description:* Integrative multidisciplinary field analysis of streams. Class project examines hydrology, geomorphology, water quality and aquatic and riparian ecology of degraded and pristine stream systems. Includes cooperative two-week field survey in remote wilderness settings with students from diverse scientific backgrounds.

*Prerequisite(s):* Consent of instructor. Upper division or graduate standing in any physical science, biological science, or engineering.

*Learning Activities:* Lecture 1 hour(s), Discussion/Laboratory 2 hour(s), Fieldwork, Term Paper.

*Enrollment Restriction(s):* Restricted to advanced students in the physical sciences, biological sciences, or engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **GEL 138 – Introductory Volcanology (4 units)**

*Course Description:* Principles of physical and chemical volcanology. Taught in a volcanically active setting (e.g., Hawaii) with a strong field component.

*Prerequisite(s):* GEL 060; GEL 109; consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Fieldwork 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **GEL 139 – Rivers: Form, Function & Management (4 units)**

*Course Description:* Analysis of river form and processes, emphasis on fluvial geomorphology, and river and stream restoration; case studies to illustrate concepts and applications. Two weekend field trips required. Offered irregularly.

*Prerequisite(s):* GEL 050 or GEL 050L; MAT 016B or MAT 017B or MAT 021B recommended.

*Learning Activities:* Lecture 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **GEL 140 – Introduction to Process Geomorphology (4 units)**

*Course Description:* Quantitative description and interpretation of landscapes with emphasis on the relationships between physical processes, mass conservation, and landform evolution. Topics covered include physical & chemical weathering, hillslopes, debris flows, fluvial systems, alluvial fans, pedogenesis, eolian transport, glaciation and Quaternary geochronology.

*Prerequisite(s):* (GEL 001 or GEL 050); (MAT 016B or MAT 017B or MAT 021B).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **GEL 141 – Evolutionary History of Vertebrates (3 units)**

*Course Description:* Evolutionary history of vertebrates; fossil record and phylogeny; timing of major evolutionary events; appearance of major vertebrate groups; physical constraints in vertebrate evolution; paleobiogeography of vertebrates; effect of continental movement on vertebrate evolution; dinosaurs and other strange vertebrates. Offered in alternate years.

*Prerequisite(s):* GEL 003 or GEL 053 or BIS 002A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **GEL 141L – Evolutionary History of Vertebrates Laboratory (1 unit)**

*Course Description:* Augments lecture GEL 141 through handling of specimens enabling in-person examination of three dimensional features observed in vertebrate skeletons, both fossil and living. Offered in alternate years.

*Prerequisite(s):* GEL 141 (can be concurrent).

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **GEL 142 – Basin Analysis (3 units)**

*Course Description:* Analysis of sedimentary basins from initiation to maturity, including controls on sedimentary fill, subsidence analysis, sequence stratigraphy, core logs, and applications to petroleum exploration and hydrology. One two-day field trip. Offered irregularly.

*Prerequisite(s):* GEL 050; GEL 050L; GEL 109.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**GEL 143 – Advanced Igneous Petrology (5 units)**

*Course Description:* Physical and chemical properties of magmatic environments and processes of igneous rock formation. Laboratory study of representative igneous rocks. Offered irregularly.

*Prerequisite(s):* GEL 105; (MAT 016C or MAT 017C or MAT 021C); (CHE 002C or GEL 055).

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 144 – Historical Ecology (3 units)**

*Course Description:* Ancient ecosystems and the factors that caused them to change. Species, expansion, evolution of new modes of life, geologically induced variations in resource supply, and extinction provide historical perspective on the biosphere of future.

*Prerequisite(s):* Upper division course in environmental science or ecology, or an introductory course in paleobiology.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**GEL 145 – Advanced Metamorphic Petrology (5 units)**

*Course Description:* Metamorphic processes and the origin of metamorphic rocks. Laboratory study of representative rock suites. Offered irregularly.

*Prerequisite(s):* GEL 106; (HYD 134 or CHE 002C or GEL 055); (MAT 016C or MAT 017C or MAT 021C).

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 146 – Radiogenic Isotope Geochemistry & Cosmochemistry (3 units)**

*Course Description:* Basic principles of nuclear chemistry and physics applied to geology to determine the ages of terrestrial rocks, meteorites, archeological objects, age of the Earth, to trace geological/environmental processes, and explain formation of the chemical elements in the Universe. Offered irregularly.

*Prerequisite(s):* (CHE 002C or GEL 055); (PHY 007C or PHY 009C or GEL 056); (MAT 016C or MAT 017C or MAT 021C).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 147 – Geology of Ore Deposits (4 units)**

*Course Description:* Tectonic, lithologic and geochemical setting of major metallic ore deposit types emphasizing ore deposit genesis, water/rock interaction and the environmental effects of mining. Offered irregularly.

*Prerequisite(s):* (CHE 002C or GEL 055 or HYD 134); GEL 060; GEL 105.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 148 – Stable Isotopes & Geochemical Tracers (3 units)**

*Course Description:* Use of oxygen and hydrogen isotopes in defining hydrologic processes; carbon, nitrogen, and sulfur isotopes as indicators of exchange between the lithosphere, hydrosphere, atmosphere and biosphere. Radiogenic, cosmogenic, and noble gas isotope tracers. Offered irregularly.

*Prerequisite(s):* (CHE 002C or GEL 055 or HYD 134); GEL 050; GEL 050L; GEL 060.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 149 – Geothermal Systems (3 units)**

*Course Description:* Geology, geochemistry, and geophysics of geothermal systems, including electrical power generation and direct use applications. Includes one day field trip on a weekend during the quarter. Offered irregularly.

*Prerequisite(s):* GEL 050; GEL 050L; CHE 002B.

*Learning Activities:* Lecture 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 150A – Physical & Chemical Oceanography (4 units)**

*Course Description:* Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geochemical cycles.

*Prerequisite(s):* (ESP 116N or GEL 116N); (PHY 007B or PHY 009B); (MAT 016C or MAT 017C or MAT 021C); (CHE 002C or GEL 055); consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ESP 150A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 150B – Geological Oceanography (3 units)**

*Course Description:* Introduction to the origin and geologic evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geologic history of the ocean floor in terms of sea-floor spreading theory.

*Prerequisite(s):* GEL 050 or (GEL 116N or ESP 116N).

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ESP 150B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 150C – Biological Oceanography (4 units)**

*Course Description:* Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and plankton communities. Existing knowledge and contemporary issues in research. Segment devoted to human use. One weekend field trip required.

*Prerequisite(s):* BIS 002A; consent of instructor; a course in general ecology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Fieldwork.

*Cross Listing:* ESP 150C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**GEL 152 – Paleobiology of Protista (4 units)**

*Course Description:* Morphology, systematics, evolution, and ecology of single-celled organisms that are preserved in the fossil record. Offered irregularly.

*Prerequisite(s):* GEL 107 or BIS 002A; consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 156 – Hydrogeology & Contaminant Transport (5 units)**

*Course Description:* Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic systems. Groundwater geology and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping test and work with physical and computer models.

*Prerequisite(s):* HYD 144 or ECI 144; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Term Paper 1 hour(s).

*Cross Listing:* HYD 146.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**GEL 160 – Geological Data Analysis (3 units)**

*Course Description:* Introduction to quantitative methods in analyzing geological data including basic principles of statistics and probability, error analysis, hypothesis testing, inverse theory, time series analysis and directional data analyses.

*Prerequisite(s):* (MAT 016A (can be concurrent) or MAT 017A (can be concurrent) or MAT 021A (can be concurrent)); GEL 056; or prior introductory level programming in Python, Matlab, or R.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 161 – Geophysical Field Methods (3 units)**

*Course Description:* Geophysical methods applied to determining subsurface structure in tectonics, hydrogeology, geotechnical engineering, and hydrocarbon & mineral exploration. Theory, survey design & interpretation of gravity, electrical resistivity, electromagnetic, reflection & refraction seismology, and ground-penetrating radar measurements.

*Prerequisite(s):* (GEL 001 C- or better or GEL 050 C- or better); (MAT 016C C- or better or MAT 017C C- or better or MAT 021C C- or better); (PHY 007A C- or better or PHY 009A C- or better); (PHY 007B C- or better or PHY 009B C- or better); (GEL 056 C- or better or PHY 007C C- or better or PHY 009C C- or better).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL); Science & Engineering (SE); Scientific Literacy (SL).

**GEL 162 – Geophysics of the Solid Earth (3 units)**

*Course Description:* Theory and use of physics in the study of the solid earth. Gravity, magnetism, paleomagnetism, and heat flow. Application to the interpretation of the regional and large-scale structure of the earth and to plate tectonics. Offered irregularly.

*Prerequisite(s):* (MAT 016C or MAT 017C or MAT 021C); (GEL 056 or PHY 007C or PHY 009C).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 163 – Planetary Geology & Geophysics (3 units)**

*Course Description:* Principles of planetary science. Planetary dynamics, including orbital mechanics, tidal interactions and ring dynamics. Theory of planetary interiors, gravitational fields, rotational dynamics. Physics of planetary atmospheres. Geological processes, landforms and their modification. Methods of analysis from Earth-based observations and spacecraft.

*Prerequisite(s):* (GEL 001 or GEL 002 or GEL 028 or GEL 036 or GEL 050 or AST 010G or AST 010L or AST 010S or AST 025); (MAT 016A or MAT 017A or MAT 021A); (GEL 056 or PHY 007C or PHY 009C).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**GEL 175 – Advanced Field Geology (3 units)**

*Course Description:* Advanced field studies of selected geologic terrains, interpretation and discussion of field observations. Offered irregularly.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Fieldwork 6 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when instructors differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**GEL 181 – Teaching in Science & Mathematics (2 units)**

*Course Description:* Exploration of effective teaching practices based on examination of how middle school students learn math and science. Selected readings, discussion and field experience in middle school classrooms.

*Prerequisite(s):* Consent of instructor; major in mathematics, science, or engineering; or completion of a one-year sequence of science or calculus.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 2 hour(s).

*Enrollment Restriction(s):* Limited to 40 students per section.

*Cross Listing:* EDU 181.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**GEL 182 – Field Studies in Marine Geochemistry (2-8 units)**

*Course Description:* Marine geochemistry with the opportunity of going to sea or into the field on land. Techniques of sea-floor mapping using bottom photography, marine geochemical sampling, and method of data reduction and sample analysis. Analysis of data/samples collected. Offered irregularly.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1-3 hour(s), Fieldwork 6-40 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **GEL 183 – Teaching High School Mathematics & Science (3 units)**

**Course Description:** Exploration and creation of effective teaching practices based on examination of how high school students learn mathematics and science. Field experience in high school classrooms. **Prerequisite(s):** Major in mathematics, science, or engineering; or completion of a one-year sequence of science or calculus and consent of the instructor.

**Learning Activities:** Lecture/Discussion 2 hour(s), Fieldwork.

**Enrollment Restriction(s):** Limited to 40 students per section.

**Cross Listing:** EDU 183.

**Grade Mode:** Letter.

**General Education:** Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

## **GEL 185A – Conceptual Integrated Science for Non-Science Majors: The Physical World (2 units)**

**Course Description:** Conceptual, inquiry-based integrated science course. Topics in the Next Generation Science Standards. Elementary school level teaching practice. Physics, chemistry, and science inquiry.

**Learning Activities:** Lecture 1 hour(s), Discussion/Laboratory 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **GEL 185B – Conceptual Integrated Science for Non-Science Majors: Earth System Science (2 units)**

**Course Description:** Conceptual, inquiry-based integrated science course. Topics in the Next Generation Science Standards. Elementary school level teaching practice. Earth, space and environmental science, and science inquiry.

**Learning Activities:** Lecture 1 hour(s), Discussion/Laboratory 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

## **GEL 186 – Facilitating Learning in STEM Classrooms (1 unit)**

**Course Description:** STEM Learning Assistant Seminar. Theoretical and practical issues of effective teaching in discussion/labs: student-centered, active, cooperative learning environments, responsive teaching, and differentiated classroom instruction.

**Learning Activities:** Lecture/Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Social Sciences (SS).

## **GEL 190 – Seminar in Geology (1 unit)**

**Course Description:** Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. Written abstracts.

**Learning Activities:** Discussion 1 hour(s), Seminar 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE).

## **GEL 192 – Internship in Geology (1-12 units)**

**Course Description:** Supervised work experience in geology.

**Prerequisite(s):** Upper division standing; project approval prior to internship.

**Learning Activities:** Internship.

**Repeat Credit:** May be repeated 10 unit(s).

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE).

## **GEL 194A – Senior Thesis (3 units)**

**Course Description:** Guided independent study of a selected topic, leading to the writing of a senior thesis.

**Prerequisite(s):** Open to Geology majors who have completed 135 units and who do not qualify for the Honors Program.

**Learning Activities:** Variable.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

## **GEL 194B – Senior Thesis (3 units)**

**Course Description:** Guided independent study of a selected topic, leading to the writing of a senior thesis.

**Prerequisite(s):** Open to Geology majors who have completed 135 units and who do not qualify for the Honors Program.

**Learning Activities:** Variable.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

## **GEL 194HA – Senior Honors Project (3 units)**

**Course Description:** Guided independent study of a selected topic, leading to the writing of an honors thesis.

**Prerequisite(s):** Open to Geology majors who have completed 135 units and who qualify for the Honors Program.

**Learning Activities:** Independent Study 9 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

## **GEL 194HB – Senior Honors Project (3 units)**

**Course Description:** Guided independent study of a selected topic, leading to the writing of an honors thesis.

**Prerequisite(s):** Open to Geology majors who have completed 135 units and who qualify for the Honors Program.

**Learning Activities:** Independent Study 9 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

## **GEL 198 – Directed Group Study (1-5 units)**

**Course Description:** Group study focused on topics in Geology.

**Prerequisite(s):** Senior standing in Geology or consent of instructor.

**Learning Activities:** Variable 3-15 hour(s).

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE).

## **GEL 199 – Special Study for Advanced Undergraduates (1-5 units)**

**Course Description:** Special study for advanced undergraduates.

**Learning Activities:** Variable.

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE).

## **GEL 205 – Advanced Field Stratigraphy (3 units)**

**Course Description:** Fieldwork over spring break. Application of stratigraphic techniques to research problems. Collection, compilation, and interpretation of field data. Integration of data with models for deposition and interpretations of Earth history. Topics will vary. Offered irregularly.

**Prerequisite(s):** GEL 109; GEL 110; or consent of instructor; GEL 206 recommended.

**Learning Activities:** Lecture 1 hour(s), Fieldwork 2 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Letter.

**GEL 206 – Stratigraphic Analysis (3 units)**

*Course Description:* Topics in advanced methods of stratigraphic analysis, regional stratigraphy and sedimentation, and sedimentary basin analysis. Emphasis on techniques used to interpret stratigraphic record and on current issues in stratigraphy and sedimentation. Offered irregularly.

*Prerequisite(s):* GEL 109; GEL 109L; or consent of instructor; GEL 144 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**GEL 214 – Active Tectonics (3 units)**

*Course Description:* Active deformation associated with faults, landslides, and volcanoes. Geodetic measurement techniques such as triangulation, trilateration, leveling, Global Positioning System (GPS), and radar interferometry. GPS data acquisition and analysis. Inversion of geodetic data and mechanical models of crustal deformation. Offered irregularly.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**GEL 216 – Tectonics (3 units)**

*Course Description:* Nature and evolution of tectonic features of the Earth. Causes, consequences, and evolution of plate motion, with selected examples from the Earth's deformed belts. Offered irregularly.

*Prerequisite(s):* GEL 101; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**GEL 217 – Topics in Geophysics (3 units)**

*Course Description:* Discussion and evaluation of current research in a given area of geophysics. Topic will change from year to year. Offered in alternate years.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**GEL 218 – Analysis of Structures in Deformed Rocks (3 units)**

*Course Description:* Recent advances in the understanding and analysis of structures in brittlely and ductilely deformed rocks. Detailed investigation of the characteristics of the structures, models for their formation, and applications to inferring the kinematics of larger scale tectonics. Offered irregularly.

*Prerequisite(s):* GEL 101; GEL 101L; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**GEL 219 – Fracture & Flow of Rocks (3 units)**

*Course Description:* Origins of those structures in rocks associated with brittle and ductile deformation. Theoretical analysis, using continuum mechanics, and experimental evidence for the origin of the structures with emphasis on deformational processes in the earth. Offered irregularly.

*Prerequisite(s):* GEL 101; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**GEL 220 – Mechanics of Geologic Structures (3 units)**

*Course Description:* Development in tensor notation of the balance laws of continuum mechanics, and constitutive theories of elasticity, viscosity, and plasticity and their application to understanding development of geologic structures such as fractures, faults, dikes, folds, foliations, and boudinage. Offered irregularly.

*Prerequisite(s):* PHY 009A; MAT 021C; or consent of instructor; MAT 021D and (MAT 022A or MAT 027A or BIS 027A recommended.)

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**GEL 226 – Advanced Sedimentary Petrology (3 units)**

*Course Description:* Advanced petrography and geochemistry of sediments and sedimentary rocks. Geochemical, textural and mineralogical evolution of sedimentary rocks reflecting depositional or burial processes. Laboratory work emphasizes thin section study of rocks. Offered irregularly.

*Prerequisite(s):* GEL 144; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**GEL 227 – Stable Isotopes Biogeochemistry (4 units)**

*Course Description:* Discussion and application of stable isotope techniques for scientific research problems. Emphasizes carbon, oxygen, nitrogen, hydrogen and sulfur isotopes. Laboratory develops basic skills of cryogenic gas extraction and specific techniques for individual research using stable isotopes. Offered irregularly.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

**GEL 228 – Topics in Paleoceanography (3 units)**

*Course Description:* Critical discussion and review of selected topics in paleoceanography and paleoclimatology relating to the history of the processes controlling and affecting climate change and ocean circulation throughout the geologic record. Topics vary. Offered irregularly.

*Prerequisite(s):* GEL 108; GEL 150A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**GEL 230 – Geomorphology & River Management (3 units)**

*Course Description:* Impacts of management and land use activities on the geomorphology of rivers and streams. Evaluation and use of analytical tools for river assessment. Assessment of river and stream restoration strategies and emerging issues in river management.

*Prerequisite(s):* GEL 139; or equivalent; graduate standing.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**GEL 232 – Oceans & Climate Change (3 units)**

*Course Description:* Modern climate change and linkages between the ocean-atmosphere-cryosphere-terrestrial climate system. Importance of the ocean in forcing climate change, and the impacts of anthropogenic processes on the ocean. Topics vary. Offered irregularly.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

**GEL 235 – Surface Processes (3 units)**

*Course Description:* Recent advances in the analysis of landforms and their evolution. Detailed investigation of the tools used to document surface processes. Evaluation of concepts and processes that govern landscape evolution. Offered irregularly.

*Prerequisite(s):* GEL 050; GEL 050L; MAT 016B or MAT 017B or MAT 021B recommended.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**GEL 236 – Inverse Theory in Geology & Geophysics (3 units)**

*Course Description:* Inversion of data for model parameters. Evaluation of parameter uncertainties. Linear and nonlinear problems for discrete and continuous models. Bakus-Gilbert inversion. Offered irregularly.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**GEL 238 – Theoretical Seismology (3 units)**

*Course Description:* Elastodynamic wave equation. Greens functions and source representations. Ray theory. Plane and spherical waves and boundary conditions. Elastic wave propagation in stratified media.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Pass/Fail only.

**GEL 240 – Geophysics of the Earth (3 units)**

*Course Description:* Physics of the earth's crust, mantle, and core. Laplace's equation and spherical harmonic expression of gravity and magnetic fields. Elastic wave equation in geologic media. Body and surface seismic waves. Equations of state, thermal structure of the earth. Offered irregularly.

*Prerequisite(s):* PHY 009B; (MAT 022B or MAT 027B or BIS 027B).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**GEL 241 – Geomagnetism (3 units)**

*Course Description:* Nature and origin of the Earth's magnetic field. Present field and recent secular variation. Spherical harmonic analysis. Paleosecular variation. Polarity transitions and geomagnetic excursions. Statistics of polarity intervals. Dynamo theory. Planetary magnetism. Offered irregularly.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**GEL 242 – Paleomagnetism (3 units)**

*Course Description:* Principles and applications of paleomagnetism. Physical basis of rock and mineral magnetism. Field and laboratory techniques. Instrumentation. Analysis of paleomagnetic data. Statistical methods. Rock magnetic properties. Geological and geophysical applications. Offered irregularly.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**GEL 246 – Physical Chemistry of Metamorphic Processes (3 units)**

*Course Description:* Physicochemical principles of metamorphic mineral assemblages and methods of interpreting the paragenesis of metamorphic rocks. Offered irregularly.

*Prerequisite(s):* GEL 145; CHE 110A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**GEL 247 – Metamorphic Petrology Seminar (3 units)**

*Course Description:* Selected topics in metamorphic petrology (e.g., mass transport processes, tectonic settings, geothermometry, thermal structure of metamorphic belts, regional studies). Offered irregularly.

*Prerequisite(s):* GEL 145; or consent of instructor; GEL 246 recommended.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 250 – Advanced Geochemistry Seminar (3 units)**

*Course Description:* Critical review of selected topics in geochemistry including: ore genesis, hydrothermal and geothermal fluids, recent and ancient sediments, isotope geology, origin and chemistry of the oceans. Subject varies yearly depending on student interest.

*Prerequisite(s):* GEL 146; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**GEL 251 – Advanced Topics in Isotope Geochemistry & Cosmochemistry (3 units)**

*Course Description:* Astrophysical context on origin of Solar System, synthesis of chemical elements, condensation sequence, star and planet formation, cosmochronology, building blocks of planets, development on planets' layered structure, atmosphere and hydrosphere and the role of comets/asteroids for volatile delivery. Offered irregularly.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) when topics differs.

*Grade Mode:* Letter.

**GEL 253 – Current Topics in Igneous Petrology (3 units)**

*Course Description:* Topical seminar designed to help graduate students develop and maintain familiarity with current and past literature related to igneous rock petrogenesis.

*Prerequisite(s):* GEL 143; or consent of instructor; graduate standing in Geology.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEL 254 – Physical Chemistry of Igneous Processes (3 units)**

*Course Description:* Introduction of modern concepts in chemical thermodynamics and kinetics, and fluid dynamics of magmatic systems for graduate students in petrology. Offered irregularly.

*Prerequisite(s):* CHE 110A; GEL 143; and consent of instructor; GEL 143 or consent of instructor; CHE 110B and CHE 110C recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **GEL 255 – Experimental Petrology (3 units)**

*Course Description:* Introduction to techniques and methods of design and executing experiments on Earth-forming minerals and rocks. Problems and examples from igneous and metamorphic petrology will be utilized. Offered irregularly.

*Prerequisite(s):* GEL 143; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **GEL 260 – Paleontology (3 units)**

*Course Description:* Selected problems in paleontology. Subject to be studied will be decided at an organizational meeting. Offered irregularly.

*Prerequisite(s):* Graduate standing in geology or a biological science.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **GEL 261 – Paleobiology Graduate Seminar 1: Evolutionary Aspects (3 units)**

*Course Description:* Treat one or more of several topics in paleobiology from a phylogenetic perspective, including major patterns in evolution, building the tree of life, extinction & phylogeny, phylogeny of major phyla, and the relation between taxonomy & phylogeny.

*Prerequisite(s):* Graduate standing in Geology or a biological science; qualified undergraduates will be accepted on an exception-only basis.

*Learning Activities:* Lecture 1 hour(s), Seminar 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **GEL 262 – Paleobiology Graduate Seminar: Methodological Aspects (3 units)**

*Course Description:* One or more major methods used in the study of fossils: Morphometrics and three-dimensional reconstruction of fossils, phylogenetic methodology, the application of geochemical techniques, and electron microscopy.

*Learning Activities:* Lecture 1 hour(s), Seminar 2 hour(s).

*Repeat Credit:* May be repeated 4 time(s) when topic differs.

*Grade Mode:* Letter.

## **GEL 281N – Instrumental Techniques for Earth Scientists (3 units)**

*Course Description:* Laboratory research techniques for new graduate students in Geology. Demonstration of and exposure to appropriate techniques in research.

*Prerequisite(s):* (MAT 016A or MAT 017A or MAT 021A); (MAT 016B or MAT 017B or MAT 021B); (MAT 016C or MAT 017C or MAT 021C); ((PHY 007A or PHY 009A); (PHY 007B or PHY 009B); (PHY 007C or PHY 009C)); or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **GEL 285 – Field Studies in Marine Geochemistry (2-8 units)**

*Course Description:* Marine geochemistry with the opportunity of going to sea or into the field on land. Techniques of seafloor mapping using bottom photography, marine geochemical sampling, and method of data reduction and sample analysis. Analysis of data/samples collected.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1-3 hour(s), Fieldwork 6-40 hour(s).

*Grade Mode:* Letter.

## **GEL 290 – Seminar in Geology (1 unit)**

*Course Description:* Presentation and discussion of current topics in geology by visiting lecturers, staff, and students.

*Learning Activities:* Seminar 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEL 291 – Geology of the Sierra Nevada (1 unit)**

*Course Description:* Short oral presentations by students and faculty concerning results of their past work and plans for future work in the Sierra. A written abstract is required following the format required at professional meetings. Offered irregularly.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEL 292 – River Forum (1 unit)**

*Course Description:* Review and discussion of latest research and fundamental issues surrounding riverine systems, with emphasis on physical processes. Topics vary. Offered irregularly.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEL 293 – Geologic Event of the Week (1 unit)**

*Course Description:* Seminar/discussion group to review and discuss recent earthquakes, volcanic eruptions, and other significant geologic events. The focus is on understanding the available observations, the physical processes behind each event, the geological setting, and societal consequences. Offered irregularly.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 0.50 hour(s), Discussion 0.50 hour(s).

*Repeat Credit:* May be repeated 3 time(s) up to 3 units.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GEL 294 – Structure/Tectonics Forum (1 unit)**

*Course Description:* Seminar/discussion group to review and discuss latest research in structural geology and tectonics, and on-going research of participants. Topics will vary each quarter depending on the interests of the group. Occasional field trips to areas of current interest.

*Prerequisite(s):* Graduate student in geology or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 295 – Geophysics Forum (1 unit)**

*Course Description:* Seminar/discussion group to review and discuss latest research in geophysics, and on-going research of participants. Topics will change each quarter depending on the interests of the group. Offered irregularly.

*Prerequisite(s):* GEL 101; or consent of instructor.

*Learning Activities:* Seminar 0.50 hour(s), Discussion 0.50 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 296 – Advanced Problems in Tectonics (3 units)**

*Course Description:* Seminar dealing with current problems in tectonics of selected regions. Topics will change from year to year. Emphasis on study of recent literature. Offered irregularly.

*Prerequisite(s):* GEL 101; consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 297 – Geophysics Forum (1 unit)**

*Course Description:* Seminar/discussion group to review and discuss latest research in geophysics, and on-going research of participants. Topics will change each quarter depending on the interests of the group. Offered irregularly.

*Prerequisite(s):* Graduate student status in the Geology Department, or consent of instructor.

*Learning Activities:* Seminar 0.50 hour(s), Discussion 0.50 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**GEL 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 390 – Methods of Teaching Geology (2 units)**

*Course Description:* Introduction to graduate-level writing and undergraduate-level teaching skills in geology. Persuasive (proposal) writing workshop; discussions on campus teaching resources, presenting information, managing classroom dynamics, evaluating student performance. Participation in teaching program required for Ph.D. in Geology.

*Prerequisite(s):* Graduate student standing in Geology.

*Learning Activities:* Extensive Writing/Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 391 – Ethical Issues in Earth Science (1 unit)**

*Course Description:* Reading and discussion of ethical issues arising in the earth sciences. Topics include scientific misconduct, gender equity in science, authorship of scientific papers, establishing priorities in research, and related issues. Offered irregularly.

*Prerequisite(s):* Graduate standing in Geology or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GEL 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**German (GER)**

**College of Letters & Science**

**GER 001 – Elementary German (5 units)**

*Course Description:* Introduction to German grammar and development of all language skills in a cultural context with special emphasis on communication.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have taken GER 001A.

*Credit Limitation(s):* Students who have successfully completed GER 002 or GER 003 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only; although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**GER 001A – Accelerated Intensive Elementary German (15 units)**

*Course Description:* Special 12-week accelerated, intensive summer session course that combines the work of GER 001, GER 002, and GER 003. Introduction to German grammar and development of all language skills in a cultural context with emphasis on communication.

*Learning Activities:* Lecture/Discussion 12.50 hour(s).

*Credit Limitation(s):* Not open to students who have completed GER 001, GER 002, or GER 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**GER 002 – Elementary German (5 units)**

*Course Description:* Continuation of GER 001 in areas of grammar and basic language skills.

*Prerequisite(s):* GER 001.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GER 001A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**GER 003 – Elementary German (5 units)**

*Course Description:* Completion of grammar sequence and continuing practice of all language skills through cultural texts.

*Prerequisite(s):* GER 002.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken GER 001A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **GER 010 – German Fairy Tales from the Grimms to Disney (4 units)**

*Course Description:* Introduction to the genre of fairy tale with a focus on the Brothers Grimm and Hans Christian Andersen in their respective political/cultural contexts. Discusses filmic adaptations by Disney, the East German DEFA and Hollywood.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **GER 011 – Travel & the Modern World (4 units)**

*Course Description:* Examination of travel as an essential human activity and experience of global modernity and cross-cultural encounters from the 18th to the 21st century with an emphasis on German-speaking culture. Travelogues, literature, art, memoirs, and films in English translation.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Cross Listing:* COM 011.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **GER 020 – Intermediate German (4 units)**

*Course Description:* Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts.

*Prerequisite(s):* GER 003; can be concurrent with GER 006.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **GER 021 – Intermediate German (4 units)**

*Course Description:* Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts; addresses social relations and cultural practices in Germany; discusses history of Germany.

*Prerequisite(s):* GER 020.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **GER 022 – Intermediate German (4 units)**

*Course Description:* Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts.

*Prerequisite(s):* GER 021.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **GER 040 – Great German Short Stories (in English) (4 units)**

*Course Description:* Major German short stories from Goethe at the end of the 18th century to Thomas Mann at the beginning of the 20th century.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **GER 041 – Melodrama from Mozart to Lion King (4 units)**

*Course Description:* Melodrama as a major dramatic genre from Mozart's music dramas in the 18th century to films in the 21st century. Tragic psychological effects of death, war destruction, and the demonic, melodramatic expressions of political oppression, economic exploitation, and revolution, issues of race, gender, and class, capitalism and modernity, transnational and trans-generic adaptations.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **GER 045 – Vampires & Other Horrors in Film & Media (4 units)**

*Course Description:* History of representations of vampires and horror generally from the 19th-21st centuries. Emphasis on transnational history of the horror genre; psychologies of horror effects; issues of race, gender, and class; intersections with prejudice, medicine, modernity.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* FMS 045.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **GER 048 – Myth & Saga in the Germanic Cultures (4 units)**

*Course Description:* Knowledge of German not required. English translation from the Norse Eddas, the Volsung and Sigurd-Siegfried cycles, and the Gudrun lays; literary mythology in German Romanticism culminating in Wagner's "total art-work" concept and The Ring of the Nibelung cycle. May not be counted toward major in German.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **GER 049 – Freshman Colloquium (2 units)**

*Course Description:* Readings, discussion and written projects treating topics such as communist-capitalist tension in German literary culture; masculine "versus" feminine authorial consciousness; disintegration and reconstitution of language reflecting cultural transformation; exorcising post-Holocaust national guilt and individual frustration-Germany's new European "mission."

*Prerequisite(s):* Open only to students who have completed 40 or fewer quarter units of transferable college level work.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **GER 092 – Field Work in German (1-12 units)**

*Course Description:* Total immersion program in Germany or a German speaking setting in the U.S. to further develop students' proficiency in the German language.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Enrollment Restriction(s):* Restricted to lower division standing.

*Grade Mode:* Pass/No Pass only.

**GER 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**GER 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**GER 101A – Survey of German Literature, 800-1800 (4 units)**

*Course Description:* German literature from the Middle Ages to Classicism (800-1800) with an overview of major movements and authors.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 101B – Survey of German Literature, 1800-Present (4 units)**

*Course Description:* German literature from the Age of Romanticism (1800) to the present with an overview of major movements and authors.

*Prerequisite(s):* GER 022.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GER 103 – Writing Skills in German (4 units)**

*Course Description:* Practice in different kinds of writing, such as abstracts, correspondence, lecture summaries, analysis of or response to short literary texts.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**GER 104 – Translation (4 units)**

*Course Description:* Exercises in German-to-English, English-to-German translation using texts from the areas of culture and commerce.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have completed GER 104A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 105 – The Modern German Language (4 units)**

*Course Description:* Introduction to the linguistic analysis of contemporary German, including its phonology, morphology, syntax and semantics, as well as sociolinguistic considerations.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**GER 109A – Business German (4 units)**

*Course Description:* Specialized language course using business-oriented information and publications as the basis for discussions, roleplay, reports, compositions and translations.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

**GER 109B – Advanced Business German (4 units)**

*Course Description:* Specialized advanced language course providing in-depth study of major business topics with the help of authentic texts and videos.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**GER 112 – Topics in German Literature (4 units)**

*Course Description:* Knowledge of German not required. Investigation of significant themes and issues within their European context.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**GER 113 – Goethe's Faust (4 units)**

*Course Description:* Knowledge of German not required. Intensive study of Goethe's Faust in its entirety. Discussions and readings in English; reading the text in the original is encouraged.

*Learning Activities:* Discussion 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 114 – From Marlene Dietrich to Run, Lola Run: German Women & Film (4 units)**

*Course Description:* Knowledge of German not required. Women in German film from the Weimar Republic to present, with special emphasis on conceptualizations of gender, historical and political context, aesthetic and filmic innovations.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 115 – German Literature Since 1945 (4 units)**

*Course Description:* Knowledge of German not required. Major writers of the post-war generation of Austria, Switzerland and Germany: novelists, such as Böll, Grass, Johnson, Walser, Handke; playwrights such as Frisch, Dürrenmatt and Hochhuth; and poets, such as Celan, Enzensberger, and Aichinger.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **GER 116 – Readings in Jewish Writing & Thought in German Culture (4 units)**

*Course Description:* Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German-speaking world; what it means to be "other" in the mainstream culture.

*Prerequisite(s):* RST 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* No credit will be given to those students who have completed HUM 121.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Cross Listing:* JST 116.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **GER 117 – After the Catastrophe: Jews & Jewish Life in Post-1945 Germany (4 units)**

*Course Description:* Jews and Jewish life in post-1945 Germany, with special attention given to literature, historical debates, photography, film, as well as websites and other new media.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **GER 118A – Vienna at the Turn of the 20th Century (The End of the Habsburg Empire) (4 units)**

*Course Description:* Knowledge of German not required. Cultural ferment in Vienna, capital of the multinational Habsburg empire, at the turn of the century, with consideration of innovations in literature, music, graphic arts, architecture philosophy and psychology, heralding European modernism.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s), Extensive Writing 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **GER 118B – Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism (4 units)**

*Course Description:* Knowledge of German not required. Expressionism in graphic arts, literature, film, New Objectivity, Brecht, and Bauhaus considered in the context of the failure of the German experiment in democracy, the Weimar Republic of 1919-33.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s), Extensive Writing 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **GER 118C – Germany Under the Third Reich (4 units)**

*Course Description:* No knowledge of German required. Interdisciplinary study of German society and culture during the Third Reich (1933-45); readings in aesthetics, history, and philosophy; study of Fascist culture in literature, film, architecture, and the graphic arts; focus on everyday life in Hitler's Germany.

*Prerequisite(s):* Background in Modern European History; GER 118B recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

*General Education:* World Cultures (WC); Writing Experience (WE).

## **GER 118E – Contemporary German Culture (4 units)**

*Course Description:* Political, economic, social and cultural scene of Germany today.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **GER 119 – From German Fiction to German Film (4 units)**

*Course Description:* Examines a number of film adaptations of major German prose works and plays to ascertain the types of changes involved in the shift in medium and the positive and negative effects achieved by such transferences.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

## **GER 120 – Survey of German Culture (4 units)**

*Course Description:* Major developments in German arts, philosophical thought, social institutions, and political history.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **GER 121 – The Medieval Period in German Literature (4 units)**

*Course Description:* Literary-philosophical profile of the Mittelhochdeutsche Blütezeit in terms of the significant epics, romances, and lyric poetry. Readings in German.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **GER 122 – Reformation & Baroque (4 units)**

*Course Description:* Exemplary literary works of the 16th and 17th centuries tracing the principal lines of development and showing the reflection in literature of the social, as well as religious, scenes.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 123 – Literature of the Classical Age (4 units)**

*Course Description:* Critical assessment of principal works of Goethe and Schiller within the historical and philosophical context of their times.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 124 – Major Movements in German Literature (4 units)**

*Course Description:* Significant movements and schools in German literary history (e.g., the medieval troubadours, Storm and Stress, the romanticists, the George Circle, the expressionists), with emphasis on the broader cultural dynamics and ideologies as these apply to individual literary works.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**GER 125 – Short Fiction: 1880-1914 (4 units)**

*Course Description:* Reading of short German fiction from the fin-de-siècle period and representative of various prose styles and cultural currents.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 126 – Modern German Literature (4 units)**

*Course Description:* Selections from significant works of major contemporary writers, such as Hesse, Mann, Kafka, Rilke, Brecht, Grass.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) with consent of advisor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 127 – Major Writers in German (4 units)**

*Course Description:* Examination of representative works by a major writer, set in the broader cultural context of the relevant period or movement.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 129 – Postwar Women Writers (4 units)**

*Course Description:* Major writers in both Germanies, Austria, and Switzerland since 1945. Topics include the concept of a feminist aesthetics, East vs. West German writers, and the status of minority women writers in Germany (Jewish, Turkish-German, Afro-German).

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 131 – German Lyric Poetry (4 units)**

*Course Description:* Study of the genre of lyric poetry from the late Middle Ages through Renaissance, Baroque, Classical, Romantic, and Modern periods in correlation with other literary forms and the social climate of each period.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 132 – The German Novelle (4 units)**

*Course Description:* Inquiry into the art of the "Novelle" through analysis of the materials and formal devices of representative authors from Goethe to Kafka.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 133 – The German Drama (4 units)**

*Course Description:* Readings in the works of Germany's leading dramatists from the 18th century to the present day, such as Lessing, Goethe, Schiller, Kleist, Büchner, Hauptmann, Brecht.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 134 – Topics in German Intellectual History (4 units)**

*Course Description:* Topics in German intellectual history with materials from a number of periods, genres, and disciplines.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 141 – The Holocaust & its Literary Representation (4 units)**

*Course Description:* Knowledge of German not required. Aesthetic representation and metaphorical transformation of the Holocaust in its human and historical perspectives.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 142 – New German Cinema (4 units)**

*Course Description:* Knowledge of German not required. German filmmakers of the 1960s-1980s such as Fassbinder, Herzog, Syberberg, Brückner, Schlöndorf, Kluge, Wenders.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated with consent of instructor and when content differs.

*Cross Listing:* FMS 142.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 143 – Language Through Media (4 units)**

*Course Description:* Study of contemporary German-language news media (press, video, film, CD-ROM, Internet) for insight into political and cultural developments in the German-speaking countries.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 144 – Marx, Nietzsche, Freud (4 units)**

*Course Description:* Study of major texts of Marx, Nietzsche, and Freud, selected with an eye to their impact on 20th-century economics, ethics, and attitudes toward eros. Particular focus on conceptions of the self and the individual's relation to society.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* HUM 144.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**GER 160 – Love in the Middle Ages (4 units)**

*Course Description:* Analysis of the phenomenon of love in selected medieval lyrical poems and romances of the 12th- and 13th-century Blütezeit. Origins of courtly love, love & individualism, love & the Church, love & adultery.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 165E – Nazi & Fascist Cinema: Film & other Visual Media (4 units)**

*Course Description:* Analysis of nefarious and noxious cultural products in history: films made under the Nazis and other fascists, 1933-1945.

Questions at heart of humanistic studies: relationship of culture to propaganda, politics, and even unfathomable crime.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing.

*Cross Listing:* CDM 165E.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 168 – Multiculturalism in German Literature (4 units)**

*Course Description:* Examples of German literature from the High Middle Ages to the present that explore the "encounter with the other" (people of color, different beliefs and cultures, and inner-German minorities).

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 176A – Classic Weimar Cinema (4 units)**

*Course Description:* German Weimar (1919-1933) cinema; Fritz Lang, F.W. Murnau, and G.W. Pabst among others. Influence on worldwide (especially Hollywood) film genres such as film noir, horror, science fiction, and melodrama.

*Prerequisite(s):* HUM 001.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed HUM 176.

*Cross Listing:* FMS 176A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**GER 185 – The Age of Bismarck (4 units)**

*Course Description:* Notable literary repercussions of the zenith of Germany's international status at the time of Bismarck's Chancellorship. The poetry of Storm, the prose of Fontane, the drama of Hauptmann.

*Prerequisite(s):* GER 022; or consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GER 192 – Field Work in German (1-12 units)**

*Course Description:* Total immersion program in Germany or a German speaking setting in the U.S. to further develop student proficiency in the German language.

*Prerequisite(s):* GER 109A; or consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 2 time(s) or up to 12 units of credit with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**GER 194HA – Honors Program (3 units)**

*Course Description:* Research of an integrative nature (in either "General" or "Area Studies Emphasis" fields of major), guided by thesis advisor chosen by student.

*Prerequisite(s):* Open only to majors with a 3.500 minimum GPA in at least 135 graduation units.

*Learning Activities:* Independent Study 2 hour(s), Term Paper.

*Grade Mode:* Pass/No Pass only.

**GER 194HB – Honors Program (3 units)**

*Course Description:* Writing of Honors Thesis on topic selected by student in consultation with thesis advisor.

*Prerequisite(s):* Open only to majors with a 3.500 minimum GPA in at least 135 graduation units.

*Learning Activities:* Independent Study 2 hour(s), Term Paper.

*Grade Mode:* Pass/No Pass only.

**GER 197T – Tutoring in German (1-4 units)**

*Course Description:* Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with department courses.

*Prerequisite(s):* Consent of German Program Director.

*Learning Activities:* Tutorial 3-12 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

**GER 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**GER 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**GER 202 – Middle High German (4 units)**

*Course Description:* Outline of grammar; selections from Middle High German epic, romance, and lyric poetry.

*Learning Activities:* Discussion 3 hour(s), Lecture 1 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 206 – Cognitive Grammar for Applied Linguists (4 units)**

*Course Description:* Analysis of grammar and application of cognitive grammar to language instruction. Syntactical problems and analyses relevant to the language which the student will teach.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

**GER 210 – Techniques of Literary Scholarship (4 units)**

*Course Description:* Bibliographical, organizational, and methodological tools and resources for advanced, independent research.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 211 – Concepts in Literary Theory (4 units)**

*Course Description:* Advanced course in concepts of literary theory and criticism. Discussion of the emergence of theoretical concepts and their impact on the understanding and appreciation of literary works. Discussion in German and English, readings in German.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 212 – Contemporary Approaches to Literary Theory (4 units)**

*Course Description:* Study of contemporary theoretical approaches such as structuralism, deconstruction, feminism, Marxism/Frankfurt School, and reception theory in conjunction with the works of major authors.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 239 – Narrative & Narrative Theory (4 units)**

*Course Description:* Studies, in a theoretical and literary historical context, major elements of 19th- and 20th-century narrative, such as techniques of framing, refraction, and montage; narrative perspective; mimesis; and self-consciousness. Focuses on paradigmatic prose texts alongside a spectrum of critical approaches.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 240 – Forms of German Verse (4 units)**

*Course Description:* Development of German verse from the Middle Ages to the present, with special emphasis on different techniques of text analysis and interpretation.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**GER 241 – The German Drama (4 units)**

*Course Description:* Major forms of German drama from its origins to the middle of the 20th century.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**GER 242 – The German Novelle (4 units)**

*Course Description:* The major German Novellisten, with particular emphasis on the flowering of this genre in the 19th century.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**GER 243 – Fontane & the Rise of the Modern German Novel (4 units)**

*Course Description:* Fontane, the father of the modern German novel and the chief German representative of the European novel at its greatest, in the context of the 19th-century European political and social scene.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 244 – Gender & Comedy (4 units)**

*Course Description:* Studies of genre and gender in German-language comedy by male and female writers from the 18th century to the present. Authors treated include Lessing, Kleist, Büchner, Ebner-Eschenbach, Hauptmann, Hofmannsthal, Frisch, Langner, and Jelinek.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 252 – The Writing of Lessing (4 units)**

*Course Description:* Study of Lessing's theory of literature with particular emphasis upon his critical attacks on French drama.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 253 – Goethe (4 units)**

*Course Description:* Study of the origins of Goethe's thought in German Pietism, and his principal artistic, autobiographical, scientific, and philosophical works.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 254 – Schiller (4 units)**

*Course Description:* Critical analysis of Schiller's major works and his impact on the intellectual climate in Germany during the late-18th and early-19th centuries.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 255 – Aesthetics in the Age of Goethe (4 units)**

*Course Description:* Emergence of aesthetic autonomy from 18th-century normative poetics during the Age of Goethe. The shift from a model based on the imitation of nature (and the Ancients) to a new concept grounded in the individuality of aesthetic experience.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**GER 257 – Heinrich von Kleist (4 units)**

*Course Description:* Kleist's important dramatic and prose works; special attention will be given to the peculiar hermeneutic problems in modern German, French, and Anglo-American Kleist criticism.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 258 – The Novels of Thomas Mann (4 units)**

*Course Description:* Reading of selected novels with emphasis on aesthetic techniques, originality, ethical and political views, and influence on the contemporary literary scene in Germany.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 259 – Studies in Kafka (4 units)**

*Course Description:* Study of Kafkas narrative techniques with special emphasis in the shorter works on the existential development from its roots in Expressionism.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 260 – The Poetry of Rilke (4 units)**

*Course Description:* Study of the principal motifs, myths, images, and problems in the poetry of Rainer Maria Rilke.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 261 – Brecht & the Epic Theater (4 units)**

*Course Description:* Reading of Brechts works with emphasis on the ideas which impelled the development of new literary forms and concepts.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 262 – Studies in Turn-of-the-Century Culture (4 units)**

*Course Description:* Investigates literary currents in turn-of-the-century Germany and Austria against the background of contemporaneous developments in psychology, the visual arts, philosophy, and music. Authors treated include Hauptmann, Holz and Schlaf, Schnitzler, T. Mann, Wedekind, Musil, Hofmannsthal.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Grade Mode:* Letter.

**GER 285 – Middle High German Literature (4 units)**

*Course Description:* Extensive reading of Middle High German texts in the original language. Examines linguistic and literary problems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**GER 288 – Renaissance & Reformation in German Literature (4 units)**

*Course Description:* Parabolic and didactic style in Germany's literature during the 16th century.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**GER 289 – German Literature of the Baroque (4 units)**

*Course Description:* The "Elegantiaideal" and the varying methods used to portray it in 17th-century German literature.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**GER 290 – The Enlightenment in German Literature (4 units)**

*Course Description:* Revolt against the concept of the Elegantiaideal, and evolution of a new literature based on reason and wit.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **GER 291 – Foreign Language Learning in the Classroom (4 units)**

*Course Description:* Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages.

*Learning Activities:* Seminar 3 hour(s), Project.

*Cross Listing:* FRE 291, SPA 291.

*Grade Mode:* Letter.

## **GER 292 – Sentimentality & Sturm und Drang in German Literature (4 units)**

*Course Description:* Reaction to overemphasis on Reason: theories of Hamann and Herder and works of poets such as Lenz, Leisewitz, the early Goethe and Schiller.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **GER 293 – The Classical Age of German Literature (4 units)**

*Course Description:* Inquiry into the aesthetic and humanistic qualities of Germany's greatest literary epoch.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **GER 294 – The Romantic Period in German Literature (4 units)**

*Course Description:* Survey of the works of early 19th-century authors in reaction against the age of classicism.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **GER 295 – Poetic Realism in German Literature (4 units)**

*Course Description:* Outstanding figures in German literature between 1840 and 1890. Important phases in their developments will be treated.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **GER 296 – 20th-Century German Literature (4 units)**

*Course Description:* Considers the revolt of the Hauptmann generation, Symbolism, Expressionism, and the chief currents of the contemporary scene.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **GER 297 – Special Topics in German Literature (4 units)**

*Course Description:* Various special topics in German literature, which may cut across the more usual period and genre rubrics.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **GER 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **GER 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GER 299D – Special Study for the Doctoral Dissertation (1-12 units)**

*Course Description:* Special study for doctoral dissertation.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GER 390A – The Teaching of German (2 units)**

*Course Description:* Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GER 390B – The Teaching of German (2 units)**

*Course Description:* Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GER 390C – The Teaching of German (2 units)**

*Course Description:* Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of new teaching assistants.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **GER 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **GER 400 – Tutorial & Instructional Internship (1-3 units)**

*Course Description:* Apprentice training in ongoing undergraduate literature courses taught by regular staff, with supplementary weekly critique sessions; intern leadership of discussion sections under staff supervision.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

# Global Disease Biology (GDB)

College of Agricultural & Environmental Sciences

## GDB 090 – Introduction to Global Disease Biology (1 unit)

*Course Description:* Introduction to the Global Disease Biology major, research and internship opportunities, and potential career paths in human, animal, and plant health. Communication, ethics and the nature of science.

*Prerequisite(s):* Open to GDB majors only, or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Open to Global Disease Biology majors only.

*Grade Mode:* Pass/No Pass only.

## GDB 101 – Epidemiology (4 units)

*Course Description:* Principles and practice of epidemiology as applied to human, animal, and plant populations and the environment in which these populations co-exist. Quantitative analysis of both infectious and non-infectious disease. Inter-dependence between epidemiological analysis, decision-making and policy formulation will be highlighted.

*Prerequisite(s):* SAS 013; BIS 002A; BIS 002B; BIS 002C; ((STA 013 or STA 013Y) or (STA 100 or PLS 120)).

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Global Disease Biology majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## GDB 102 – Disease Intervention & Policy (4 units)

*Course Description:* Examination of the prevention and treatment of diseases affecting humans, animals, and plants. Case studies illustrate the merits of a unified approach to promoting health at local, regional, and global scales.

*Prerequisite(s):* GDB 101; SAS 013; BIS 002A; BIS 002B; BIS 002C; PMI 129Y; VME 158.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Project.

*Enrollment Restriction(s):* Pass One restricted to Global Disease Biology majors only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL).

## GDB 103 – Microbiome of People, Animals, & Plants (3 units)

*Course Description:* Examination of the structure and function of microbial communities that live inside and on host organisms. Introduction to general concepts of the microbiome and microbiota, and their relationship to host health and disease.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## GDB 106 – Geographies of Health (4 units)

*Course Description:* Multiple geographies of health, including how both physical environmental systems and human social, economic & political systems impact health and disease. Global, comparative geographical approach emphasizes the benefits of integrated multidisciplinary analyses for planetary health success.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## GDB 187 – Global Disease Biology Seminar (3 units)

*Course Description:* Seminar leading to development of the research proposal and academic plan for the Global Disease Biology major.

*Prerequisite(s):* GDB 090; SAS 013.

*Learning Activities:* Seminar 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to junior standing; Global Disease Biology majors.

*Grade Mode:* Letter.

## GDB 189 – Global Disease Biology Senior Research (3 units)

*Course Description:* Capstone research experience for the Global Disease Biology major. Project may be experimental, library research, or some other creative activity.

*Prerequisite(s):* GDB 090; GDB 189D (can be concurrent); SAS 013; GBD 189D required concurrently the first time GBD 189 is taken.

*Learning Activities:* Independent Study 3 hour(s).

*Enrollment Restriction(s):* Restricted to senior standing; Global Disease Biology majors only.

*Repeat Credit:* May be repeated 1 time(s) for student research conducted over two quarters; second quarter used to finish writing the research paper.

*Grade Mode:* Pass/No Pass only.

## GDB 189D – Global Disease Biology Research Discussion (1 unit)

*Course Description:* Prevent or solve problems during the students' research activity. Independent advising and assistance on research proposal.

*Prerequisite(s):* GDB 090; GDB 187; SAS 013; GDB 189; or consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to junior standing; Global Disease Biology majors only.

*Grade Mode:* Pass/No Pass only.

# Global Studies (GLO)

College of Letters & Science

## GLO 098 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Not Passed only.

**GLO 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special Study for Undergraduates.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Passed/Not Passed only.

**GLO 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Passed/Not Passed only.

**GLO 199 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special Study for Undergraduates.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Passed/Not Passed only.

## Graduate Education (GRD)

### Graduate Studies

**GRD 198 – Directed Group Study (1-5 units)**

*Course Description:* Preparation of undergraduate students in identified graduate school pipeline programs (e.g. McNair scholars) for graduate education. Emphasis on educating and training undergraduates on key skills and competencies needed for the development of a successful graduate school applicant and future graduate scholar. Topics will vary.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1.50-6 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**GRD 298 – Directed Group Study (1-5 units)**

*Course Description:* Training and preparation of graduate students for successful scholarship and future careers. Emphasis on development of written and verbal communication, professional development, leadership, and mentoring. Topics will vary.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1.50-6 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GRD 299 – Research (1-12 units)**

*Course Description:* Special study or research for graduate students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GRD 390 – Teaching in Higher Education (1-2 units)**

*Course Description:* Selected topics related to preparation for teaching in higher education, leadership in academic institutions, job opportunities and career pathways for graduate students pursuing careers in teaching and education.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1.50-3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**GRD 398 – Directed Group Study (1-5 units)**

*Course Description:* Preparation of graduate students for careers as teachers and educators in higher education. Emphasis on the development of clear written and verbal communication skills as well as leadership practices applicable to teaching in academic institutions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1.50-6 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## Greek (GRK)

### College of Letters & Science

**GRK 001 – Elementary Greek (5 units)**

*Course Description:* Introduction to the basic grammar and vocabulary of Classical and New Testament Greek. Development of translation skills with emphasis on Greek-English.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GRK 002 – Elementary Greek (5 units)**

*Course Description:* Continuation of GRK 001.

*Prerequisite(s):* GRK 001; or the equivalent.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GRK 002NT – Elementary New Testament Greek (1 unit)**

*Course Description:* Supplementary study of New Testament Greek.

*Prerequisite(s):* GRK 002 (can be concurrent); concurrent attendance required.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GRK 003 – Intermediate Greek (5 units)**

*Course Description:* Continuation of GRK 002. Selected readings from Greek authors.

*Prerequisite(s):* GRK 002; or the equivalent.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GRK 003NT – Elementary New Testament Greek (1 unit)**

*Course Description:* Supplementary study of New Testament Greek.

*Prerequisite(s):* GRK 003 (can be concurrent); or consent of instructor; concurrent attendance required.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GRK 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**GRK 100 – Readings in Greek Prose (4 units)**

*Course Description:* Review of Greek morphology, syntax, and vocabulary. Readings in Greek prose authors, including Xenophon.  
*Prerequisite(s):* GRK 003; or equivalent.  
*Learning Activities:* Lecture/Discussion 4 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH).

**GRK 101 – Plato (4 units)**

*Course Description:* Study of Plato and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 102 – Euripides (4 units)**

*Course Description:* Study of Euripides and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 103A – Homer: Iliad (4 units)**

*Course Description:* Selected readings from Homer's Iliad.  
*Prerequisite(s):* GRK 003.  
*Learning Activities:* Recitation 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 103B – Homer: Odyssey (4 units)**

*Course Description:* Selected readings from Homer's Odyssey.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Recitation 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 104 – Menander (4 units)**

*Course Description:* Study of Menander and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 105 – Attic Orators (4 units)**

*Course Description:* Selected readings from the orators of 4th- and 5th-century Athens.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.  
*Repeat Credit:* May be repeated 1 time(s) with consent of instructor and when topic differs.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GRK 106 – Greek Hexameter Poetry (4 units)**

*Course Description:* Selected readings from ancient Greek hexameter poetry. Wisdom poetry, hymns, epyllia, idylls, epic, natural history and other texts from the hexameter tradition.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GRK 110 – Readings in the Greek Novel (4 units)**

*Course Description:* Selected readings from Greek prose fiction of the late classical, Hellenistic and imperial periods.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Repeat Credit:* May be repeated 2 time(s) with consent of instructor.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 111 – Sophocles (4 units)**

*Course Description:* Study of Sophocles and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 112 – Aristophanes (4 units)**

*Course Description:* Study of Aristophanes and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 113 – Thucydides (4 units)**

*Course Description:* Study of Thucydides and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 114 – Lyric Poetry (4 units)**

*Course Description:* Study of lyric poetry.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 115 – Aeschylus (4 units)**

*Course Description:* Study of Aeschylus and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 116 – Herodotus (4 units)**

*Course Description:* Study of Herodotus and his works.  
*Prerequisite(s):* GRK 100; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 121 – Greek Prose Composition (4 units)**

*Course Description:* Intensive grammar and vocabulary review through exercises in Greek prose composition.

*Prerequisite(s):* GRK 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**GRK 130 – Readings in Later Greek (4 units)**

*Course Description:* Translation and discussion of selected readings from Hellenistic to Byzantine Greek literature.

*Prerequisite(s):* GRK 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**GRK 131 – Readings in Ancient Greek Philosophy & Science (4 units)**

*Course Description:* Selected readings from ancient Greek philosophical and scientific writers. Texts on logical truth and empirical sense data, material and social contexts of ancient Greek philosophy and science.

*Prerequisite(s):* GRK 100 (can be concurrent); or consent of instructor.

*Learning Activities:* Extensive Writing, Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated when topics differ.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**GRK 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**GRK 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**Health Informatics (MHI)****Graduate Studies****MHI 202 – Computer-Based Patient Records (4 units)**

*Course Description:* Introduction and overview of computer-based clinical record systems. Topics include data modeling, health system standards and terminologies; security, privacy and confidentiality; workflow modeling; data visualization; legal; decision support; public health; and evidence-based practice.

*Prerequisite(s):* Current enrollment within the Health Informatics Graduate Program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MHI 207 – Decision Support Systems (4 units)**

*Course Description:* Explores decision support systems for medical application. Topics include medical decision making, uncertainty, review of existing decision support systems, knowledge engineering, data mining, and knowledge based systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**MHI 208 – Medical Informatics in Web-Based Enterprise Computing (4 units)**

*Course Description:* Introduction to the decision making processes and technologies that are involved in developing web-based distributed enterprise applications in medicine. Focus on the Informatician's role as a team member.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

**MHI 209 – Data Acquisition & Analysis (4 units)**

*Course Description:* Examines the nature, acquisition, and analysis of medical data. Data ranges from signals of electrical potentials, sounds, text, images (still and motion), and data from nucleic acid and protein expression and sequencing instruments.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**MHI 209N – Consumer Digital Health (4 units)**

*Course Description:* Landscape, technologies, and policies involved in data acquisition, storage and analysis in digital and connected health and consumer health informatics. Models of digital health data monitoring, including clinical, mobile health and telehealth, and theories relevant to health and information behavior by consumers and patients. Design, acquisition and analysis of data in the personal and consumer health ecosystem.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MHI 210 – Introduction to Health Informatics (4 units)**

*Course Description:* Overview provides broad exposure to the field of Health Informatics. Topics covered include, but are not limited to, networking, information systems, coding, HL7, Security, and HIPPA.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MHI 212 – Computer Security in Health Informatics (4 units)**

*Course Description:* Critical thinking about basic concepts in computer security and privacy. How the computer security and privacy impact health informatics, ranging from electronic health records to telemedicine to remote, virtual surgery.

*Prerequisite(s):* MHI 210; MHI 202; MHI 209.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

## **MHI 289A – Special Topics in Medical Informatics: Data Acquisition (1-5 units)**

*Course Description:* Special topics in Data Acquisition.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s), Laboratory 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **MHI 289B – Special Topics in Health Informatics: Seminars in Clinical Translational Informatics (1 unit)**

*Course Description:* Seminars in current clinical translational informatics research topics. Guest presenters and faculty led discussions.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Letter.

## **MHI 289E – Clinical Knowledge for the Health Informaticist (3 units)**

*Course Description:* Basic clinical knowledge for health informatics students. Human systems, disease states and conditions, treatments and prognosis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

## **MHI 289F – Database & Knowledge Management (4 units)**

*Course Description:* Objectives include understanding the informatics techniques for data capture, information management, and knowledge generation that a student will use throughout their career.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MHI 289G – Special Topics in Health Informatics: Biostatistics (4 units)**

*Course Description:* Special topics in Biostatistics. Evaluation Methods and Statistics in Biomedical Informatics. Research design and analysis with special emphasis on Biomedical Informatics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **MHI 289H – Modeling Biological Systems (4 units)**

*Course Description:* Create awareness of how modern computer graphics have led to VR-Sim-Rob applications, and how they are modifying the teaching of medicine and in some cases the diagnosis and treatment of patients.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Grade Mode:* Letter.

## **MHI 289I – Programming in Health Informatics (3 units)**

*Course Description:* Basics of computer programming essential to the study of informatics. Impacts on systems within healthcare, public health, nursing, research, and others.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

## **MHI 290 – Seminar in Medical Informatics (1 unit)**

*Course Description:* Discussion of current graduate research and topics in Medical Informatics. Oral presentations of individual study.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to 20 students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MHI 298 – Group Study in Health Informatics (1-5 units)**

*Course Description:* Directed reading and discussion on select topics.

*Prerequisite(s):* Consent of instructor; graduate student in good academic standing.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MHI 299 – Research in Health Informatics (1-12 units)**

*Course Description:* Independent research in Health Informatics.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Hebrew (HEB)**

College of Letters & Science

### **HEB 001 – Elementary Hebrew (5 units)**

*Course Description:* Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

### **HEB 001A – Accelerated Intensive Elementary Hebrew (15 units)**

*Course Description:* Special 12-week accelerated, intensive summer session course that combines the work of HEB 001, HEB 002, and HEB 003. Introduction to Hebrew grammar and development of language skills in a cultural context with emphasis on communication.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open to students who have completed HEB 001, HEB 002, or HEB 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

### **HEB 002 – Elementary Hebrew (5 units)**

*Course Description:* Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew.

*Prerequisite(s):* HEB 001; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HEB 003 – Elementary Hebrew (5 units)**

*Course Description:* Speaking, listening comprehension, reading and writing fundamentals of modern Hebrew.

*Prerequisite(s):* HEB 002; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HEB 010 – Introduction to Biblical Hebrew (3 units)**

*Course Description:* Introduction to the Hebrew Alphabet and basic grammar rules of the biblical language. Students will learn to read most any biblical text and learn how to find the meaning of words by their roots and morphological structure.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**HEB 011 – Introduction to Biblical Hebrew (3 units)**

*Course Description:* Continuation of HEB 010. Biblical text reading, simple/literal translation, verb and noun patterns, compounding of prepositions and nouns.

*Prerequisite(s):* HEB 010.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**HEB 012 – Introduction to Biblical Hebrew (3 units)**

*Course Description:* Continuation of HEB 011. Biblical text reading, simple/literal translation, verb and noun patterns, compounding of prepositions and nouns.

*Prerequisite(s):* HEB 011.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**HEB 021 – Intermediate Modern Hebrew I (4 units)**

*Course Description:* Development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language.

*Prerequisite(s):* HEB 003; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open to students who have taken HEB 100 or HEB 100A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HEB 022 – Intermediate Modern Hebrew II (4 units)**

*Course Description:* Continued development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language.

*Prerequisite(s):* HEB 021; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open to students who have taken HEB 101 or HEB 100B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HEB 023 – Intermediate Modern Hebrew III (4 units)**

*Course Description:* Continued development of grammar, composition, language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Further development of writing and translating skills.

*Prerequisite(s):* HEB 022; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open to students who have taken HEB 100C or HEB 102.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HEB 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HEB 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HEB 100AN – Advanced Modern Hebrew I (4 units)**

*Course Description:* Third year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing.

*Prerequisite(s):* HEB 023; or consent of instructor; students who took HEB 100A as second-year Hebrew may take HEB 100AN.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**HEB 100BN – Advanced Modern Hebrew II (4 units)**

*Course Description:* Third year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing.

*Prerequisite(s):* HEB 100AN; or consent of instructor; students who took HEB 100B as second-year Hebrew may take HEB 100BN.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**HEB 100CN – Advanced Modern Hebrew III (4 units)**

*Course Description:* Third-year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing.

*Prerequisite(s):* HEB 100BN; students who have taken HEB 100C as second-year Hebrew may take HEB 100CN.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**Hematology & Oncology (HON)**

**School of Medicine**

## **HON 199 – Research in Hematology-Oncology (1-5 units)**

*Course Description:* Experience in laboratory research.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Laboratory.

*Grade Mode:* Pass/No Pass only.

## **HON 298 – Topics in Hematology (1-4 units)**

*Course Description:* Basic concepts of the physiology of the hematopoietic organ, the pathophysiology of hematopoietic disease, and concepts of therapeutics will be offered for study. The specific topics to be dictated by the interest and background of the students.

*Prerequisite(s):* One year of graduate work and/or consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **HON 299 – Research (1-12 units)**

*Course Description:* Laboratory investigation contributing to the dissertation for a graduate degree.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **HON 420 – Oncology (4 units)**

*Course Description:* Covers the principles of oncology and the pathophysiology of specific, common cancers correlated with organ systems pathophysiology and systemic pathology courses.

*Prerequisite(s):* Approval by the SOM Committee on Student Promotions.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical student only; students must pass all Year 1 SOM courses.

*Grade Mode:* Pass/Fail only.

## **HON 460 – Hematology-Oncology Consult Clerkship (6-18 units)**

*Course Description:* Acting intern on inpatient hematology/oncology ward service.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **HON 461 – Hematology-Oncology Consult Clerkship (6-12 units)**

*Course Description:* Student is an integral member of the inpatient hematology and oncology consult service, the bone marrow service, and will attend all conferences sponsored by the Division.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **HON 462 – Hematology-Oncology Ambulatory Clerkship (3-18 units)**

*Course Description:* Outpatient rotations in related clinics. Participation with members of the subspecialty service in the initial clinical evaluation, work-up, management and follow-up of the patient with hematologic or oncologic disorders.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity 30 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **HON 493 – Cancer as a Process (1-6 units)**

*Course Description:* Covers cancer as a process, beginning with risks and prevention, preneoplasia, microinvasion, treatment options, metastases and systemic therapy, pain medicine and palliative care, and cancer communication. Format includes traditional lectures, student-led case discussions, and problem-based learning.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 10 hour(s), Clinical Activity 14 hour(s), Auto Tutorial 6 hour(s), Independent Study 10 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **HON 499 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **Hindi/Urdu (HIN)**

College of Letters & Science

### **HIN 001 – Elementary Hindi/Urdu I (5 units)**

*Course Description:* Introduction to Devanagari Script through development of all language skills in a cultural context with emphasis on communicative proficiency.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

### **HIN 001A – Accelerated Intensive Elementary Hindi (15 units)**

*Course Description:* Special 12-week accelerated, intensive summer session course that combines the work of HIN 001, HIN 002, and HIN 003. Introduction to Devnagari Script through development of all language skills in cultural context with emphasis on communicative proficiency.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed HIN 001, HIN 002 or HIN 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**HIN 002 – Elementary Hindi/Urdu II (5 units)**

*Course Description:* Continuation of HIN 001. Devanagari Script through development of all language skills in a cultural context with emphasis on communicative proficiency.

*Prerequisite(s):* HIN 001.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**HIN 003 – Elementary Hindi/Urdu III (5 units)**

*Course Description:* Introduction to listening, speaking, reading, and writing skills in Hindi using the Devanagari script and brief introduction to basic literacy in Urdu using the Nasataliq script.

*Prerequisite(s):* HIN 002.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**HIN 021 – Intermediate Hindi/Urdu I (4 units)**

*Course Description:* Intermediate level course for students who have completed Elementary Hindi/Urdu or the equivalent. Students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu.

*Prerequisite(s):* HIN 003.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HIN 022 – Intermediate Hindi/Urdu II (4 units)**

*Course Description:* Intermediate level course where students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu.

*Prerequisite(s):* HIN 021.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HIN 023 – Intermediate Hindi/Urdu III (4 units)**

*Course Description:* Intermediate level course where students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu.

*Prerequisite(s):* HIN 022.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**HIN 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HIN 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HIN 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching practicum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 18 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**History (HIS)**

College of Letters & Science

**HIS 001 – Introduction to History (2 units)**

*Course Description:* Introduction to history, its key methodologies, writing tasks, and research practices. Examination of the development of history as an academic discipline; ethics in historical research. Topical focus changes regularly.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 002 – Introduction to the History of Science & Technology (4 units)**

*Course Description:* Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a long-term historical perspective.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* STS 002.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Scientific Literacy (SL); World Cultures (WC); Writing Experience (WE).

**HIS 002Y – Introduction to the History of Science & Technology (4 units)**

*Course Description:* Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a long-term historical perspective.

*Learning Activities:* Lecture 2 hour(s); Discussion 1 hour(s); Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken HIS 002 or STS 002.

*Cross Listing:* STS 002Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Scientific Literacy (SL); World Cultures (WC); Writing Experience (WE).

**HIS 003 – Cities: A Survey of World Cultures (4 units)**

*Course Description:* Survey of urban world cultures, focusing on up to ten cities selected by the instructor.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**HIS 004A – History of Western Civilization (4 units)**

*Course Description:* Growth of western civilization from late antiquity to the Renaissance.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 004B – History of Western Civilization (4 units)**

*Course Description:* History of western civilization from the Renaissance to the 18th century.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**HIS 004C – History of Western Civilization (4 units)**

*Course Description:* Development of Western Civilization from the 18th century to the present.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 005 – Modernist Culture (2 units)**

*Course Description:* Modernist culture in global perspective. Introduction to early 20th-century innovations in visual arts, music, literature, film, and architecture in Europe, the Americas, Asia, and Africa.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**HIS 006 – Introduction to the Middle East (4 units)**

*Course Description:* Survey of the major social, economic, political and cultural transformations in the Middle East from the rise of Islam (c.600A.D.) to the present, emphasizing themes in religion and culture, politics and society.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 007A – History of Latin America to 1700 (4 units)**

*Course Description:* Introduction to the history of Spanish and Portuguese America from the late pre-Columbian period through the initial phase and consolidation of a colonial regime (circa 1700). Topics include conquest, colonialism, racial mixture, gender, and labor systems.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 007B – History of Latin America, 1700-1900 (4 units)**

*Course Description:* Latin America from colony to republic. The nature of Iberian colonialism, the causes for independence, the creation of nation states, the difficulties in consolidating these nations, and the rise of Liberalism and export economies in the 19th century.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 007C – History of Latin America 1900-present (4 units)**

*Course Description:* Latin America since the beginning of the 20th century. Themes include export economies, oligarchic rule, crises of depression and war, corporatism, populism, revolution and reform movements, cultural and ethnic issues, U.S.-Latin American relations, neo-liberal restructuring.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 008 – History of Indian Civilization (4 units)**

*Course Description:* Survey of Indian civilization from the rise of cities (ca. 2000 B.C.) to the present, emphasizing themes in religion, social and political organization, and art and literature that reflect cultural interaction and change.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 009A – History of East Asian Civilization (4 units)**

*Course Description:* Surveys traditional Chinese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary China are provided.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 009B – History of East Asian Civilization (4 units)**

*Course Description:* Surveys traditional Japanese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary Japan are provided.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 009C – Korean Culture & Society: From Ancient Three Kingdoms to the Global K-Pop (4 units)**

*Course Description:* Evolution of Korean society from Three Kingdoms period (B.C.E 57 to C.E. 676) to the contemporary era emphasizing the perseverance and transformations of traditional social and cultural patterns.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* EAS 088.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **HIS 010A – World History to 1350 (4 units)**

*Course Description:* Historical examination of the changing relationship of human societies to one another and to their natural settings through the year 1350, with particular attention to long-term trends and to periodic crises that reshaped the links of culture and nature on a global scale.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 010B – World History, c. 1350-1850 (4 units)**

*Course Description:* Major topics in world history from the 14th century to the beginning of the 19th century. Topics will vary but may include: oceans as systems of human communication and conflict; the global consequences of "industrious revolutions" in Europe and Asia, etc.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 010C – World History III (4 units)**

*Course Description:* Major topics from world history of the 19th and 20th centuries, emphasizing the rise and fall of Western colonial empires; Cold War and the superpowers; the spread of the nation-states; and process of globalization.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 011 – History of the Jewish People in the Modern World (4 units)**

*Course Description:* Histories and cultures of the Jews since 1492. Topics include: the making of Jewish diasporas, roots of antisemitism, the Holocaust in images and texts, changing ideas of the self, Jews in America, contemporary visions of the Jewish past.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **HIS 012 – Food & History (4 units)**

*Course Description:* Survey of the ways humans have fed themselves from the dawn of humanity to the present. Transformation of plants and animals into food, cooking into cuisine, and ceremony into etiquette.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **HIS 013 – Global Sexualities (4 units)**

*Course Description:* Global history of sexualities, including comparative study of gender, marriage, and fertility before 1800, followed by the modern history of sexualities worldwide as it intersects with imperialism, race, population control, law, and globalization.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC).

## **HIS 014 – History of Global Capitalism (4 units)**

*Course Description:* History of institutions, workers, commodity chains, and the social and cultural context of capitalism around the world from 1500-present. Emphasis on transnational and comparative histories of political economies and individual human lives.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); World Cultures (WC).

## **HIS 015A – Africa to 1900 (4 units)**

*Course Description:* Introduction to African history to 1900. Origins and impact of early human history, precolonial states and societies, slavery and the slave trade, religious and cultural movements, and the foundations of European colonialism.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## **HIS 015B – Africa Today (4 units)**

*Course Description:* Survey of major themes in colonial and postcolonial sub-Saharan African history, including colonialism, decolonization, nationalism and politics, economic history and labor, urbanization, popular culture, gender, marriage, and family life.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## **HIS 016 – Sex, Science, & Society (4 units)**

*Course Description:* Survey of the relationship between sex, science, and society in the history of the modern world. Emphasis on the development of scientific ideas about the human body against broader social, cultural, and political trends and from a global viewpoint.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* STS 016.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Scientific Literacy (SL); World Cultures (WC); Writing Experience (WE).

## **HIS 017A – History of the United States (4 units)**

*Course Description:* The experience of the American people from the Colonial Era to the Civil War.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 017B – History of the United States (4 units)**

*Course Description:* The experience of the American people from the Civil War to the end of the Cold War.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed HIS 017C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 018A – Race in America to 1865 (4 units)**

*Course Description:* Introduction to history of race and racial formation in the United States to the Civil War through a comparative approach. Examines the experiences of African Americans, Asian Americans, Native American, Mexican Americans and other Latino/a groups.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only one unit of credit to students who have previously completed HIS 178A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**HIS 018B – Race in the United States Since 1865 (4 units)**

*Course Description:* Introduction to the history of race and racial formation in America since 1865 though a comparative approach that examines the experiences of African Americans, Asian Americans, Native American and Mexican Americans and other Latino/a groups.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**HIS 019 – Migration & Borders in Global History (4 units)**

*Course Description:* Introduction to global migration history from 1800 to the present; labor migration systems; border governance; undocumented migrants; partition, displacement, and refugee regimes; race, class, and gender in migration law.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 020 – The Vietnam War (4 units)**

*Course Description:* A history of the Vietnam War, including its origins, fighting, and repercussions.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**HIS 072A – Women & Gender in America, to 1865 (4 units)**

*Course Description:* History of women and gender in America through 1865, emphasizing intersections of gender, race, class, and sexuality. Topics include interracial marriage, slavery, witchcraft, meanings of motherhood, war, domestic labor, moral reform, women's rights, migrations, the effects of commercialization and industrialization.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 072B – Women & Gender in America, 1865-Present (4 units)**

*Course Description:* History of women and gender in America since 1865, emphasizing intersections of gender, race, class, and sexuality. Covers emancipation, migration, immigration, war, media, same-sex and opposite-sex relationships, and the birth control, suffrage, labor, civil rights, feminist, and anti-feminist movements.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 080 – The History of the United States in the Middle East (2 units)**

*Course Description:* History of the United States in the Middle East from 1900 to the present. Examination of U.S. foreign relations toward the Middle East, their regional ramifications and domestic repercussions.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); World Cultures (WC).

**HIS 080W – The History of the United States in the Middle East (2 units)**

*Course Description:* History of the United States in the Middle East from 1900 to the present. Examination of U.S. foreign relations toward the Middle East, their regional ramifications and domestic repercussions with extensive writing.

*Learning Activities:* Lecture/Discussion 1 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Must enroll in HIS 080 concurrently.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**HIS 085 – Nature, Man, & the Machine in America (4 units)**

*Course Description:* History of the attitudes and behavior of Americans toward their natural environment and their technology, from colonial times to the present. No final examination.

*Learning Activities:* Seminar 4 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**HIS 090 – Research in History (4 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Emphasis on primary sources and archival research.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**HIS 092 – Internship in History (1-12 units)**

*Course Description:* Supervised internship and study as a historian, archivist, curator, or an in another history-related capacity, in an approved organization or institution.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 1-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HIS 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**HIS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**HIS 100 – Selected Topics in History (4 units)**

*Course Description:* Selected Topics in History may be organized around a particular geography (e.g., the Balkans), a chronological framework (e.g., the 1960s around the world) or a thematic approach (e.g., the rise of ethnic or racial identities in a particular region).

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**HIS 101 – Introduction to Historical Thought & Writing (5 units)**

*Course Description:* Study of the history of historical thought and writing, analysis of critical and speculative philosophies of history and evaluation of modes of organization, interpretation, and style in historical writing.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HIS 102A – Undergraduate Proseminar in History: Ancient (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Ancient.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HIS 102B – Undergraduate Proseminar in History: Medieval (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Medieval.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HIS 102D – Undergraduate Proseminar in History: Modern Europe to 1815 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Modern Europe to 1815.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HIS 102E – Undergraduate Proseminar in History: Europe Since 1815 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Europe since 1815.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HIS 102F – Undergraduate Proseminar in History: Russia (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Russia.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HIS 102G – Undergraduate Proseminar in History: China to 1800 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. China to 1800.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102H – Undergraduate Proseminar in History: China Since 1800 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. China since 1800.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102I – Undergraduate Proseminar in History: Britain (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Britain.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102J – Undergraduate Proseminar in History: Latin America Since 1810 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Latin America since 1810.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102K – Undergraduate Proseminar in History: American History to 1787 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. American History to 1787.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102L – Undergraduate Proseminar in History: United States, 1787-1896 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. United States, 1787-1896.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102M – Undergraduate Proseminar in History: United States Since 1896 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. United States since 1896.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102N – Undergraduate Proseminar in History: Japan (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Japan.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102O – Undergraduate Proseminar in History: Africa (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Africa.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102P – Undergraduate Proseminar in History: Christianity & Culture in Europe, 50-1850 (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Christianity and Culture in Europe, 50-1850.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102Q – Undergraduate Proseminar in History: India (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. India.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102R – Undergraduate Proseminar in History: Muslim Societies (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Muslim Societies.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 102S – Undergraduate Proseminar in History: Education Abroad Program (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Education Abroad Program; may be taught abroad.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

## **HIS 102X – Undergraduate Proseminar in History: Comparative History (5 units)**

*Course Description:* Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Comparative History, selected topics in cultural, political, economic, and social history that deal comparatively with more than one geographic field.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 103 – Topics in Historical Research (4 units)**

*Course Description:* Individual research resulting in a research paper on a specific topic in one of various fields of history. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 104A – Introduction to Historical Research & Interpretation (4 units)**

*Course Description:* Directed reading and research aimed at preparing students to select appropriate topics and methodologies for a senior honors essay and to situate their topics within a meaningful, broad context of historical interpretations.

*Prerequisite(s):* Acceptance into History Department Honors Program.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 104B – Honors Thesis (4 units)**

*Course Description:* Research in preparation of a senior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* HIS 104A.

*Learning Activities:* Tutorial 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 104C – Honors Thesis (4 units)**

*Course Description:* Completion of a senior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* HIS 104A; HIS 104B.

*Learning Activities:* Tutorial 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HIS 105 – Teaching History (4 units)**

*Course Description:* Teaching of American and world history at the K-12 level. Emphasis on introducing college students to the multiple ways in which history is taught, and on understanding how history education is determined.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 107 – Medicine's Histories: Human & Veterinary Medicine from the Ancient World to One Health (4 units)**

*Course Description:* Global, comparative study of the related histories of human and veterinary medicine from the ancient world to today's interdisciplinary One Health. Emphasis on reintegration of human and veterinary medicine to meet the biggest health challenges today.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## **HIS 108 – Global Environmental History (4 units)**

*Course Description:* Global, comparative study of how environmental change, human perceptions of nature, and manipulations of nature have changed over time. Primary focus post-1500, emphasis on critically analyzing many common ideas of environmental change.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Credit Limitation(s):* Not open for credit to students who have taken HIS 109A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## **HIS 109 – Environmental Change, Disease & Public Health (4 units)**

*Course Description:* Analysis of environmental changes from pre-history to the present and their influence on disease distribution, virulence and public health. Focus on critical study of many human-driven environmental changes and the accelerated transformation/spread of pathogens under globalization.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Credit Limitation(s):* Not open for credit to students who have taken HIS 109B.

*Cross Listing:* SAS 109.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); World Cultures (WC).

## **HIS 110 – Themes in World History (4 units)**

*Course Description:* Topics will emphasize the interaction of diverse regions of the world as well as common patterns of historical change.

*Prerequisite(s):* Upper division standing recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when instructor and/or topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 110A – Colonialism & the Making of the Modern World (4 units)**

*Course Description:* History of the modern world, focusing on struggles between Europeans and colonized peoples; the global formation of capitalism; the creation of nation-states; and the constitution of bourgeois bodies and racial selves in modern societies.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **HIS 111A – Ancient History (4 units)**

*Course Description:* History of ancient empires of the Near East and of their historical legacy to the Western world.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 111B – Ancient History (4 units)**

*Course Description:* Political, cultural and intellectual study of the Greek world from Minoan-Mycenaean period to end of Hellenistic Age.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 111C – Ancient History (4 units)**

*Course Description:* Development of Rome from earliest times. Rise and fall of the Roman Republic; the Empire to 476 A.D.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 112A – Topics in Pre-Modern Jewish History (4 units)**

*Course Description:* Topics in the history of Jews from the Biblical era to the eras of Jewish emancipation. Topics can be framed chronologically (eg., medieval Jewry) or thematically (eg., trade and Jewish communities). May be repeated once for credit.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 112B – Topics in Modern Jewish History (4 units)**

*Course Description:* Topics in the history of Jews from the era of Jewish emancipation to the present. Topics can be framed chronologically or thematically (eg. Zionism, assimilation, the post Holocaust Diaspora). May be repeated once for credit.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 112C – History of Jews in the Muslim World (4 units)**

*Course Description:* History of Jewish communities in the lands of Islam from the time of the Prophet Muhammad to the present day.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 113 – History of Modern Israel (4 units)**

*Course Description:* Topics include the rise and fall of utopian Zionism, the century-long struggle between Jews and Arabs, the development of modern Hebrew culture, the conflict between religious and secular Jews, and the nature of Israel's multicultural society.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 114 – Histories of 20th Century Partition (4 units)**

*Course Description:* Politics of territorial separation in Ireland; Greece/Turkey; India/Pakistan; Palestine/Israel; the U.S./Mexico border, etc. Partition as a focus area in international governance; on refugee migration; race; problems of national citizenship; and the politics of hard borders.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have previously completed an upper division history course in histories of 20th Century Partition.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 115A – History of West Africa (4 units)**

*Course Description:* West and Central Africa from 1500 to the present. Origins and impact of precolonial states and societies, the trans-Atlantic slave trade, colonialism, decolonization, nationalism, and changes in religions, politics, economics, gender, and culture.

*Prerequisite(s):* HIS 015 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HIS 115B – History of East Africa & the Indian Ocean (4 units)**

*Course Description:* Eastern Africa and the Indian Ocean world from 1500 to the present. Origins and impact of precolonial states and societies, slavery, trade, colonialism, decolonization, nationalism, and changes in religions, politics, economics, gender, and culture.

*Prerequisite(s):* HIS 015 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HIS 115C – History of Southern Africa from Exploration to the Rainbow Nation (4 units)**

*Course Description:* Southern Africa from 1500 to the present. Origins and impact of precolonial states and societies, European colonization, industrialization, urbanization, nationalism, apartheid, and changes in religions, politics, economics, gender, and culture.

*Prerequisite(s):* HIS 015 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HIS 115D – Postcolonial Africa (4 units)**

*Course Description:* Survey of social, political, cultural and economic change in African societies since the ending of European colonial rule in the 20th century. Themes include development, health and medicine, war and conflict, urbanization, global and inter-continental migration, and family and gender.

*Prerequisite(s):* HIS 015 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 115E – Slavery, Africa, & the Atlantic World (4 units)**

*Course Description:* History of the African Slave trades, from the early Egyptian and Saharan trades in the pre-modern period to the trans-Atlantic trade (15th-19th century) and the contemporary trafficking of humans.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 115F – History of Modern North Africa, 1800 to the Present (4 units)**

*Course Description:* History of Morocco, Algeria, Tunisia and Libya (the Maghrib), 1800 to the present. Topics include conquest and pacification, reform movements, the rise of nationalism, decolonization, state capitalism, economic liberalization, Islamism, democratization and human rights, the interplay of history and memory.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 116 – African History: Special Themes (4 units)**

*Course Description:* Themes of African history, such as African states and empires, slave trade, relationship of Egypt to rest of Africa, Bantu origins and migrations, and French policy of Assimilation and Association.

*Prerequisite(s):* HIS 015 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 119 – World War I (4 units)**

*Course Description:* The First World War and the settlement that followed from 1914-1919. Causes, conduct, and consequences of the war including military, political, economic, social, and cultural factors, with special emphasis on connections between the home front and the battlefield.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 120 – World War II (4 units)**

*Course Description:* The Second World War from 1931 to 1945 in all of its theaters. Causes, conduct, and consequences of the war including military, political, economic, social, and cultural factors, with special emphasis on battlefield strategy and mobilization of the home front.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 121A – Medieval History (4 units)**

*Course Description:* European history from "the fall of the Roman Empire" to the 8th century.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 121B – Medieval History (4 units)**

*Course Description:* European history from Charlemagne to the 12th century.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 121C – Medieval History (4 units)

*Course Description:* European history from the Crusades to the Renaissance.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 122 – Selected Themes in Medieval History (4 units)

*Course Description:* Each offering will focus on single major theme, such as medieval agrarian history, feudalism, the family, medieval Italy, or the Crusades. Readings include original sources in English translation and modern works. May be repeated for credit.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 125 – Topics in Early Modern European History (4 units)

*Course Description:* Social and cultural history, 1300-1800. Topics such as medieval and Renaissance Italy, early modern Italy, Ancient Regime France, family and sexuality, and material culture and daily life. May be repeated for credit.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 126Y – The History of Human Rights in Europe (4 units)

*Course Description:* History of the origins, development, and state of international humanitarian law (IHL) and international human rights law (IHRL) in Europe. Emphasis on Enlightenment-era and modern theories of the source, utility, and limits of human rights.

*Learning Activities:* Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Cross Listing:* HMR 162Y.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## HIS 127A – Popular Culture in Early Modern Europe (4 units)

*Course Description:* Popular culture in 15th-18th century Europe. Topics may include food and festivals, literacy and religious beliefs, jokes and stereotypes, death and magic, as means of examining social status, gender, race, state power, local and national communities, religious change and conflict.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## HIS 130A – Christianity & Culture in Europe: 50-1450 (4 units)

*Course Description:* History of the ideas and institutions of Christianity and their impact on the late Roman Empire and medieval Europe in terms of outlook on life, art, politics and economics.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 130B – Christianity & Culture in Europe: 1450-1600 (4 units)

*Course Description:* History of the Lutheran, Zwinglian-Calvinist, Radical, Anglican, and Catholic Reformations as foundation stones of a new culture in Europe, with special attention to the interconnections between the revival of antiquity and the different reform movements.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 130C – Christianity & Culture in Europe: 1600-1850 (4 units)

*Course Description:* Survey of the intellectual, cultural and political reorientation of European society in the aftermath of the Wars of Religion. "Secularization" will be discussed in the context of the Enlightenment and Romanticism.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 131A – Early Modern European History (4 units)

*Course Description:* Western European history from about 1350 to about 1500.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 131B – European History During the Renaissance & Reformation (4 units)

*Course Description:* Survey of European society, politics, and culture from the late 15th through the early 17th centuries, with particular focus on the Italian and Northern Renaissance, on the Protestant Reformation, and the Catholic Counter Reformation.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 131C – The Old Regime: Absolution, Enlightenment & Revolution in Europe (4 units)

*Course Description:* Survey of European society, politics, and culture in the 17th and 18th centuries, focusing on religious warfare, absolutism, Scientific Revolution, Enlightenment and the growth of religious tolerance, the French Revolution and the collapse of the old regime.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 132 – Crime & Punishment in Early Modern Europe (4 units)

*Course Description:* Deviance and crime in early modern Europe, contrasting imaginary crimes, e.g. witchcraft, with "real" crimes such as highway robbery and infanticide. Examines impact of gender, sexual orientation, ethnicity, and class in processes of criminalization.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 133 – European Thought & Culture from the Renaissance to the Enlightenment (4 units)

*Course Description:* History of European thought on politics, society, science, and religion from 1400 to 1800. Cultural impact of printing press, Protestant Reformation, wars, exploration, and empire.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## HIS 134A – The Age of Revolution (4 units)

*Course Description:* Ideas and institutions during the French Revolution and the Napoleonic era.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

## HIS 135A – History of Science to the 18th Century (4 units)

*Course Description:* Survey of the historical development of science, technology, and medicine from the ancient world to the 18th century, with special emphasis on Isaac Newton as the culmination of the 17th-century scientific revolution.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 135B – History of Science, 18th to 20th Centuries (4 units)

*Course Description:* Survey of the historical development of scientific thought in geology, biology, chemistry, physics, and cosmology from the 18th to the 20th century, with special emphasis on emergence of broad explanatory principles that serve more than one science.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 136 – Scientific Revolution (4 units)

*Course Description:* Rise of modern science in Europe, 1500–1750.

Transformation of ideas about nature, knowledge, medicine, and technology in the age of Copernicus, Vesalius, Galileo, Descartes, and Newton.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* STS 136.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## HIS 138A – The Rise of the Russian Empire, 1304-1825 (4 units)

*Course Description:* Expansion of the Russian state in Muscovite and imperial era. Emphasis on autocratic rule, the incorporation of non-Russian peoples, and emergence of Russia as a Great Power.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Only 2 units of credit will be allowed to students who have completed former HIS 137B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 138B – Reform & Revolution in Tsarist Russia, 1825-1917 (4 units)

*Course Description:* Processes of state reform and social change in the 19th century; failure of reform and collapse of the Russian Empire; the revolutions of 1917.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 138C – Russian History: The Rise & Fall of the Soviet Union, 1917 to Present (4 units)

*Course Description:* Emergence of the Soviet Union as a socialist system and a Great Power; the decline and collapse of the Soviet Union and the formation of independent nation states in its place.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed former HIS 137C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 139A – Medieval & Renaissance Medicine (4 units)**

*Course Description:* History of medicine, circa 1000-1700. Revival of ancient medicine; role of the universities; development of anatomy, chemistry and natural history; ideas about the body; cultural understanding of disease; hospital and the public health system.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 139B – Medicine, Society, & Culture in Modern Europe (4 units)**

*Course Description:* History of European medicine, 18th to 20th centuries, by examining the development of medical knowledge in epidemiology and anatomy; function of this knowledge, how it changed with technological breakthroughs and professionalization; and role of medicine in attitudes toward poverty, women, race, disease.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 140 – The Rise of Capitalism in Europe (4 units)**

*Course Description:* Comparative analysis of major interpretations of the rise of merchant capitalism during the Middle Ages and Renaissance; European expansion overseas, 1450-1815; the transition to modern capitalism via industrial revolution. Interplay of social, political, cultural, and economic history.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 141 – France Since 1815 (4 units)**

*Course Description:* France since 1815.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 142A – History of the Holocaust (4 units)**

*Course Description:* Topics include comparative genocide, medieval and modern antisemitism, modern German history, the rise of Nazism, Jewish life in Europe before the Nazi period, and the fate of the Jewish communities and other persecuted groups in Europe from 1933-1945.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 142B – The Memory of the Holocaust (4 units)**

*Course Description:* Examination of the literary, philosophical, theological and artistic responses to the Holocaust of the European Jews. Exploration of how memory is constructed, by whom and for what purposes.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 143 – History of Eastern Europe & the Balkans (4 units)**

*Course Description:* History of the Baltic, Danubian, and Balkan lands since the Middle Ages. National cultures and conflicts in the Polish Commonwealth and the Habsburg and Ottoman Empires; nationalist movements, 1789-1914; the 20th century, including an analysis of the contemporary scene.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 144A – History of Germany, 1450 to 1789 (4 units)**

*Course Description:* Survey of early modern Germany, 1450 to 1789, covering the theology and social history of the Reformation, the Peasants War of 1525, religious warfare, state building and absolutism, the rise of Prussia, Austro-Prussian dualism, and the German Enlightenment.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 144B – History of Germany since 1789 (4 units)**

*Course Description:* History of the German lands in the age of the French Revolution; 19th-century liberalism, nationalism, and industrialization; the World Wars, National Socialism, and the Holocaust; east and west Germany in the Cold War; the post-reunification scene.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have completed former HIS 144.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 145 – War & Revolution in Europe: 1789-1918 (4 units)**

*Course Description:* Survey of revolutionary movements, international crises, and wars in Europe from the French Revolution to World War I.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 146A – Europe in the 20th Century (4 units)**

*Course Description:* Survey of the history of Europe from 1919 to 1939.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 146B – Europe in the 20th Century (4 units)**

*Course Description:* Survey of the history of Europe since 1939.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 147A – European Intellectual History: 1800-1870 (4 units)

*Course Description:* European thought in the early industrial era. Shifting cultural frameworks, from romanticism to scientism; liberal and socialist reactions to social change. Focus on the work of Goethe, Hegel, J.S. Mill, Marx, Darwin and Flaubert.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 147B – European Intellectual History: 1870-1920 (4 units)

*Course Description:* Cultural and intellectual watershed of the late-19th and early-20th centuries. Emergence of modern art and literature; psychoanalysis and the new social sciences. Focus on the work of Baudelaire, Wagner, Nietzsche, Freud, Weber and Kafka.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 147C – European Intellectual History: 1920-1970 (4 units)

*Course Description:* European thought and culture since World War I. Coverage includes: literature and politics; Communism and Western Marxism; Fascism; Existentialism; Structuralism; Feminism. Particular attention to Lenin, Brecht, Hitler, Sartre, Camus, Beckett, Marcuse, Foucault, Woolf and de Beauvoir.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 148A – Women & Society in Europe: 1500-1789 (4 units)

*Course Description:* Roles and perceptions of women from the Renaissance to the French Revolution. Emphasis on social and economic factors as well as on discussions of women in the writings of political theorists and social commentators.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 148B – Women & Society in Europe: 1789-1920 (4 units)

*Course Description:* Roles and perceptions of women from the French Revolution to World War I, primarily in France and England. Emphasis on social and economic developments within a loosely chronological and comparative framework.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 148C – Women in Society in Europe: 1914-Present (4 units)

*Course Description:* History of 20th-century Europe from the perspective of women and the family, and of sexual and gender relations. Emphasis on the impact on women of major events and movements, such as World War I, fascism, Soviet communism, World War II, the welfare state, feminism, and mass culture.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 149 – Comparative Cultural History of Modern Britain & France, 1880-1914 (4 units)

*Course Description:* Cultural comparison of the histories of Britain and France during the fin de siecle. Addresses cultural debates of the period (including gender, race, class) and the practices of cultural history.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 151A – England: The Middle Ages (4 units)

*Course Description:* Origins of England to the accession of the Lancastrians. Survey includes: impact of Norman Conquest on Anglo-Saxon institutions; rise of the Church, common law, parliament, and the economy; thought, arts, and literature to the age of Chaucer and Wyclif.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 151B – England: The Early Modern Centuries (4 units)

*Course Description:* From Lancaster and York to the Glorious Revolution. Includes growth of the Church of England; beginnings of modern worldwide economy; rise of the gentry and parliament; thought, arts, and literature in the times of More, Shakespeare, Hobbes, Wren, and Newton.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## HIS 151C – 18th-Century England (4 units)

*Course Description:* English history from the Glorious Revolution to the French Revolution. Examination of the transformation of one of Europe's most politically unstable kingdoms into the firmly established constitutional monarchy which provided an environment fit to engender the industrial revolution.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 151D – Industrial England (4 units)**

*Course Description:* English history from Waterloo to the Battle of Britain; the rise and continuance of the first industrial nation, examining the transformation of landed to class society, oligarchy to democracy and bureaucracy, Bentham to Bloomsbury, empire to commonwealth.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 156 – Latin American Migration History (4 units)**

*Course Description:* Migrations to, from, and within Latin America, with a focus on the period from independence to the present day. The historical development of settler colonialism, inter-regional migrations, rural-to-urban migration, migration promotion, restriction laws, naturalization, and sanctuary across Latin American scenarios. Research paper required.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have previously completed an upper division history course in latin american migration history.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 157 – Business, Biomes & Knowledge: Latin American Environmental History (4 units)**

*Course Description:* Introduction to the geography, political ecology, environmental movements of Latin America and the Caribbean, regional biomes, commodity markets, and the relationships between non-human ecosystems and Latin American societies. Development of extractive processes, land law, agricultural practices, scientific knowledge, and environmental conservation in neotropical forests, Sonoran Desert, the Amazon, Andes and Pampas, among other ecologies.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 158 – Special Topics in Latin American History (4 units)**

*Course Description:* Topics in the history of Latin America. Topics may be framed geographically (e.g., Central America), chronologically (e.g., The Cold War) or thematically (e.g., environmental history).

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HIS 159 – Women & Gender in Latin American History (4 units)**

*Course Description:* Roles of women and men in the history of Latin America, with an emphasis on the intersection of gender with racial and class categories. Introduction to the theoretical premises of women's and gender history.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 160 – Spain & America in the 16th Century (4 units)**

*Course Description:* Atlantic world in the 16th century, particularly the transcultural and reciprocal social and economic relations between Spain and America in the course of colonization.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 161 – Human Rights in Latin America (4 units)**

*Course Description:* History of the origins, denial and protection of Human Rights in Latin America. Emphasis on dictatorships, political violence, social resistance, democracy, justice, accountability, truth commissions, memory.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* HMR 161.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**HIS 162 – History of the Andean Region (4 units)**

*Course Description:* History of the Andean region, the area that now comprises modern Peru, Bolivia, and Chile, from the beginning of human settlement to the present. May be taught abroad.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 163A – History of Brazil (4 units)**

*Course Description:* The history of colonial and imperial Brazil from 1500 to 1889. Written reports.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 163B – History of Brazil (4 units)**

*Course Description:* The history of the Brazilian republic from 1889 to the present.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 164 – History of Chile (4 units)**

*Course Description:* Emphasis on the history of Chilean political economy from 1930 to the present. Various strategies of development (modernization, Marxism, Neo-Liberalism); the rise of mass politics; the course of foreign relations; and the richness of Chilean literature.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 165 – Latin American Social Revolutions (4 units)**

*Course Description:* Major social upheavals since 1900 in selected Latin American nations; similarities and differences in cause, course, and consequence. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 166A – History of Mexico to 1848 (4 units)**

*Course Description:* Political, economic, and social development of pre-Columbian, colonial and national Mexico to 1848.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 166B – History of Mexico since 1848 (4 units)**

*Course Description:* History of Mexico from 1848 to the present.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 167 – Modern Latin American Cultural & Intellectual History (4 units)**

*Course Description:* Introduce to the cultural and intellectual history of modern Latin America including architecture, cinema, painting, music and literature.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 168 – History of Inter-American Relations (4 units)**

*Course Description:* Diplomatic history of Latin America since independence, intra-Latin American relations, relations with the United States, participation in international organizations, and communism in Latin America.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 169A – Mexican-American History (4 units)**

*Course Description:* Economic, social, religious, cultural and political development of the Spanish-speaking population of the Southwestern United States from about 1800 to 1910.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 169B – Mexican-American History (4 units)**

*Course Description:* Role of the Mexican and Mexican-American or Chicano in the economy, politics, religion, culture and society of the Southwestern United States since 1910.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 170A – Colonial America (4 units)**

*Course Description:* Colonial society from 1607 to the American Revolution, with emphasis on European expansion, political, social and economic foundations, colonial thought and culture, and imperial rivalry.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**HIS 170B – The American Revolution (4 units)**

*Course Description:* Analysis of the Revolutionary epoch with emphasis on the structure of British colonial policy, the rise of revolutionary movements, the War for Independence and its consequences, and the Confederation period.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**HIS 170C – The Early National Period, 1789-1815 (4 units)**

*Course Description:* Political and social history of the American republic from the adoption of the Constitution through the War of 1812 and its consequences.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 171A – Slavery, Society & Expansion in the Early U.S. (4 units)**

*Course Description:* Political, social, economic history of early-19th century U.S. emphasizing slavery and expansion. The internal slave trade, the settlement of the Mississippi Valley and Far West, transformed economic and social relations, new reform movements.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 171B – Civil War Era (4 units)**

*Course Description:* Examination of the political and social history of the United States from the Compromise of 1850 to the end of the Civil War in 1865. Causes of the war the war itself and the problems of reconstruction after the war.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 171BF – The Civil War in American Film (1 unit)**

*Course Description:* Viewing and discussion of films with short writing assignments.

*Prerequisite(s):* HIS 171B required concurrently.

*Learning Activities:* Discussion 1 hour(s), Film Viewing.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**HIS 171C – Reconstruction, America's Second Founding (4 units)**

*Course Description:* After the U.S. Civil War, from 1865 to 1876. Emphasis on end of slavery; expansion of civil rights, voting rights, and birthright citizenship; overthrow of biracial Southern governments; segregation and disfranchisement; culture of reconciliation.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH).

**HIS 171D – Selected Themes in 19th-Century American History (4 units)**

*Course Description:* Interpretative overview of a single topic in the history of the United States in the 19th century. Sample topics include social history, the 1850s, and southern history.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**HIS 172 – American Environmental History (4 units)**

*Course Description:* American history through connections between people and nature, pre-Columbus to climate change. Native America; conquest; epidemics; extinctions; industrialization; pollution; environmentalism; climate change and global warming; ideas of nature.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**HIS 173 – Becoming an American: Immigration & American Culture (4 units)**

*Course Description:* Introduction to the wide range of immigrant experiences and cycles of nativism that have shaped American culture in the 20th century. From novels, memoirs and films, students will explore how external and internal immigration has created a multicultural society.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 174A – The Gilded Age & Progressive Era: United States, 1876-1917 (4 units)**

*Course Description:* US history and the construction of modern America from the end of Reconstruction to US entry into World War I. Includes Southern redemption, Western incorporation, electoral corruption, labor movements, Populism, Progressivism, women's suffrage, US imperial expansion, and immigration restriction.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 174AD – Emergence of Modern America: Discussion (1 unit)**

*Course Description:* Intensive discussion of topics and readings for HIS 174A.

*Prerequisite(s):* HIS 174A required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**HIS 174B – War, Prosperity, & Depression: United States, 1917-1945 (4 units)**

*Course Description:* America's emergence as a world power, the business culture of the 1920s, the New Deal and World War II. Emphasis on such issues as government regulation of the economy, welfare capitalism, and class, racial, ethnic, and gender conflicts.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 174BD – America in War, Prosperity & Depression: Discussion (1 unit)**

*Course Description:* Intensive discussion of topics and readings for HIS 174B.

*Prerequisite(s):* HIS 174B required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

## **HIS 174C – The United States Since World War II, 1945 to the Present (4 units)**

*Course Description:* America's struggle to respond to new complexities in foreign relations, social tensions, family changes and media. Emphasis on such topics as: Cold War; anticommunist crusade; civil rights, feminist and environmentalist movement; New Left; counterculture; Vietnam; Watergate; and the moral majority.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **HIS 174CD – The United States Since World War II: Discussion (1 unit)**

*Course Description:* Intensive discussion of topics and readings for HIS 174C.

*Prerequisite(s):* HIS 174C required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

## **HIS 174D – Selected Themes in 20th-Century American History (4 units)**

*Course Description:* Interpretive overview of a single topic in the history of the United States in the 20th century with attention to the phases and processes of historical change.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 174DD – Selected Themes in 20th-Century American History: Discussion (1 unit)**

*Course Description:* Intensive discussion of topics and readings for HIS 174D.

*Prerequisite(s):* HIS 174D required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **HIS 175 – American Intellectual History (4 units)**

*Course Description:* Exploration of the ideas that have shaped politics and society in the United States from colonial times to the present. Topics include American liberalism, republicanism, democracy, constitutionalism, communitarianism, utopianism, pragmatism, feminism, Darwinism, nationalism, conservatism, and economics.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 176A – Cultural & Social History of United States (4 units)**

*Course Description:* Study of social and cultural forces in American society in the 19th century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 176B – Cultural & Social History of United States (4 units)**

*Course Description:* Study of social and cultural forces in American society in the 20th century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **HIS 177A – History of Black People & American Race Relations: 1450-1860 (4 units)**

*Course Description:* History of black people in the United States from the African background to Reconstruction.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **HIS 177B – History of Black People & American Race Relations: 1860-Present (4 units)**

*Course Description:* History of black people and race relations from 1860-present. Emphasis on Civil War, Reconstruction, Segregation, Age of Accommodation, black nationalism, urbanization, civil rights, and changing ideology of race relations.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **HIS 178 – Water in the West: Environment & Politics in America's Arid Lands (4 units)**

*Course Description:* Politics and environmental consequences of water development in the arid western United States since 1848, with emphasis on California and western rivers, including the Colorado, Columbia, Missouri, and Mississippi. Irrigated settlement, the making of state and federal water law and bureaucracy, urban vs. rural competition, Native water rights, growth of irrigation technologies, groundwater overdraft, wildlife impacts. One half-day field trip required.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 179 – Asian American History, 1850-Present (4 units)**

*Course Description:* Historical experience of people of Asian ancestry in the United States from the mid-19th century to the present. Migration, labor, community formation, race relations, women and gender, popular culture.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **HIS 180AN – American Political History, 1789-1896 (4 units)**

*Course Description:* Growth of American politics from the birth of the republic to the end of the 19th century. Development of political parties, the expanding electorate, and how social issues such as slavery shaped the political process.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed HIS 180A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 180BN – American Political History, 1896-present (4 units)**

*Course Description:* Politics in the United States from 1896 to the present. Topics include race and partisan politics; communism and anti-communism; the New Deal and the centralization of government; and the rise of the imperial presidency.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have taken HIS 180A or HIS 180C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 180C – The Fight for the Right to Vote (4 units)**

*Course Description:* History of the struggle for voting rights from the colonial period to the present. Emphasis on the struggle for inclusion by African Americans, women, Latinos, and other groups.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH).

## **HIS 181 – Religion in American History to 1890 (4 units)**

*Course Description:* American religious history from colonization through the Gilded Age. Topics include religious diversity in America; native American religion; Protestant evangelism; gender and religion; religion and bigotry; African American religion; religion in the Civil War; and religion's response to modernization.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 182 – Gender & Justice in American History (4 units)**

*Course Description:* Intersection of gender and law in North America from the colonial period through the 20th century. Topics include witchcraft, suffrage, child custody, protective labor laws, regulation of sexuality. Analysis of legal change, trials, and cultural influences.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **HIS 183A – The Frontier Experience: Trans-Mississippi West (4 units)**

*Course Description:* The fur trade, western exploration and transportation, the Oregon Country, the Greater Southwest and the Mexican War, the Mormons, mining discovery, and the West during the Civil War.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 183B – The Frontier Experience: Trans-Mississippi West (4 units)**

*Course Description:* Spread of the mining kingdom, the range cattle industry, Indian-military affairs, settlement of the Great Plains and Rocky Mountain Regions and political organization of the West.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **HIS 184 – History of Sexuality in America (4 units)**

*Course Description:* History of sexuality in America from pre-European through the late-20th century. Topics include birth control, marriage, sexual violence, prostitution, inter-racial relationships, heterosexuality and homosexuality, the feminist, gay, and lesbian liberation movements, AIDS, commercialization of sexuality.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 185A – History of Science in America (4 units)**

*Course Description:* Survey of the European background. Study of American scientific institutions, ideas, personalities, creative processes in science, and of relationships between society and science from colonial times to present.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**HIS 185B – History of Technology in America (4 units)**

*Course Description:* Study of American technology, emphasizing biographical approach to historical understanding of technological change, creative processes, institutions, ideas, and relationships between technology and society from colonial times to present.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**HIS 186 – History of Alcoholic Beverages in the United States (4 units)**

*Course Description:* History of intoxicating drink in the lands that became the United States from the period before European settlement to the present, including agriculture, manufacture, distribution, and consumption, focusing on culture and politics of alcoholic beverages such as beer, wine, and spirits.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH).

**HIS 187 – History of US Foreign Relations in the 20th Century (4 units)**

*Course Description:* Rise of the U.S. to superpower standing during the 20th century, from colonialism to the war on terror, including political, diplomatic, cultural, and economic activities of both US government and private American agencies beyond U.S. borders.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**HIS 188 – America in the 1960s (4 units)**

*Course Description:* Tumult and upheaval in American politics, culture, and society 1961-1969. Civil rights; Vietnam, the draft and the anti-war movement; rock and roll and the counterculture; modern feminism; modern conservatism; student movements; urban unrest and insurrection.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 189 – California History (4 units)**

*Course Description:* California history from the pre-colonial period to the present including dispossession of California's Indians, political economy of the Spanish and Mexican periods, Gold Rush effects, industrialization, Hollywood, water politics, World War II, Proposition 13, and the emergence of Silicon Valley.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed two of HIS 189A, HIS 189B, HIS 189C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**HIS 190A – Middle Eastern History I: The Rise of Islam, 600-1000 (4 units)**

*Course Description:* Middle Eastern history from the rise of Islam to the disintegration of the Abbasid Caliphate; the formative centuries of a civilization. Politics and religion, conquest and conversion, arts and sciences, Christians, Jews and Muslims, gender and sexuality, orthodoxy and heterodoxy.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 190B – Middle Eastern History II: The Age of the Crusades, 1001-1400 (4 units)**

*Course Description:* Middle Eastern history during the age of the Crusades and Mongol invasions. The idea of holy war, the Crusades, the Mongols as the bearers of Chinese arts, nomads and sedentary life, feudalism, mysticism, slavery, women in the medieval Middle East.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 190C – Middle Eastern History III: The Ottomans, 1401-1730 (4 units)**

*Course Description:* Middle Eastern history from the foundation of the Ottoman Empire on the borderlands of Byzantine Anatolia through its expansion into Europe, Asia, and Africa, creating a new cultural synthesis including the Arab, Greek, Islamic, Mongol, Persian, Slavic, and Turkish traditions.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 190D – Middle Eastern History IV: Safavids Iran, 1300-1720 (4 units)**

*Course Description:* Middle Eastern history focusing on Safavid Empire (present-day Iran, Iraq, Afghanistan, up to Georgia), beginning with the origins of the dynasty as a powerful religious family, to the establishment of the Empire, focusing on Social, Religious, Economic, and Political History.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 191A – Classical China (4 units)**

*Course Description:* History of Chinese civilization from its origins through the establishment of city states and the flowering of classical philosophy, to the rise and fall of the First Empire.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 191B – High Imperial China (4 units)**

*Course Description:* Political disunion and the influx of Buddhism; reunification under the great dynasties of T'ang, Sung, and Ming with analysis of society, culture and thought.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 191C – Late Imperial China (4 units)**

*Course Description:* Patterns and problems of Chinese life traced through the Ming and Ching dynasties (c.1500-1800), prior to the confrontation with the West in the Opium War. Readings include primary sources and novels portraying elite ethos as well as popular culture.

*Prerequisite(s):* HIS 009A or upper division standing recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 191D – 19th-Century China: The Empire Confronts the West (4 units)**

*Course Description:* Decline and fall of the Chinese Empire, with particular attention to the social and political crises of the 19th century, and the response of government officials, intellectuals, and ordinary people to the increasing pressures of Western imperialism.

*Prerequisite(s):* HIS 009A or upper division standing recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 191E – The Chinese Revolution (4 units)**

*Course Description:* Analysis of China's cultural and political transformation from Confucian empire into Communist state. Emphasis on emergence and triumph of peasant revolutionary strategy (to 1949), with some attention to its implications for post-revolutionary culture and politics.

*Prerequisite(s):* Upper division standing recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 191F – History of the People's Republic of China (4 units)**

*Course Description:* Comprehensive analysis of recent Chinese history, including land reform, the Cultural Revolution, the post-Mao era, and the consequences of the new economic policies of the 1980s.

*Prerequisite(s):* Upper division standing recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have completed HIS 190C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 191G – Special Topics in Chinese History to 1800 (4 units)**

*Course Description:* Topics in the history of China from the beginning of the imperial period through the high Qing dynasty. Topics may be framed chronologically (e.g., the Ming Dynasty) or thematically (e.g., Trade in early Chinese history).

*Prerequisite(s):* HIS 009A recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HIS 191H – Special Topics in Chinese History after 1800 (4 units)**

*Course Description:* Topics in the history of China since 1800. Topics may be framed chronologically (e.g., The Republican Period (1911-1948)) or thematically (e.g., The Modern Evolution of Chinese Law).

*Prerequisite(s):* HIS 009A recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topics differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HIS 191J – Sex & Society in Modern Chinese History (4 units)**

*Course Description:* Role of sex, gender, and family relations in the development of Chinese politics, society, and personal life in the modern period, 1900-present.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HIS 192 – Internship in History (1-12 units)**

*Course Description:* Supervised internship and study as historian, archivist, curator, or in another history-related capacity, in an approved organization or institution.

*Prerequisite(s):* Consent of instructor; enrollment dependent on availability of intern positions, with priority to History majors.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HIS 193A – History of the Modern Middle East, 1750-1914 (4 units)**

*Course Description:* State and society within the Middle East from 1750 to 1914 under pressure of the changing world economy and European imperialism. Themes: colonialism, Orientalism, intellectual renaissance, Islamic reform, state-formation, role of subaltern groups.

*Prerequisite(s):* HIS 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **HIS 193B – History of the Modern Middle East, From 1914 (4 units)**

*Course Description:* Middle East from the turn of the 20th century to the present. Themes include the legacy of imperialism, cultural renaissance, the World Wars, nationalism, Palestine/Israel, Islamic revival, gender, revolutionary movements, politics of oil and war, cultural modernism, exile and diaspora.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **HIS 193C – The Middle East Environment: Historical Change & Current Challenges (4 units)**

*Course Description:* Examines Middle East environment and human use of nature over last 10,000 years. Introduction to desert ecology, environmental history and current environmental problems. Case Studies of Egypt, Maghreb countries, Arabian peninsula/Gulf countries, desertification, water, indigenous knowledge, and national parks.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## **HIS 193D – History of Modern Iran, From 1850 to Present (4 units)**

*Course Description:* Modern Iran from the mid 19th century to the present. Themes include the legacy of imperialism, cultural renaissance, the World Wars, nationalism, modernization, Islamic revival, gender, revolutionary movements, politics of oil and war.

*Prerequisite(s):* HIS 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **HIS 194A – Aristocratic & Feudal Japan (4 units)**

*Course Description:* Broad survey of the cultural, social, religious, and political aspects of Japanese history from mythological times through the 16th century emphasizing comparison of the organizations, values, and beliefs associated with the aristocratic and feudal periods.

*Learning Activities:* Lecture 3 hour(s), Term Paper, Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 194B – Early Modern Japan (4 units)**

*Course Description:* Survey of the cultural, social, economic, and political aspects of Japanese history from the 17th through the 19th centuries emphasizing the development of those patterns of thought and political organization with which Japan met the challenge of the nineteenth-century Western expansionism.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 194C – Modern Japan (4 units)**

*Course Description:* Survey of the cultural, social, economic, and political aspects of Japanese history in the 20th century emphasizing labor and social movements, militarism and the Pacific war, and the emergence of Japan as a major economic power.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 194D – Business & Labor in Modern Japan (4 units)**

*Course Description:* Survey of labor and management relations in Japan from the mid-18th century to the present.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 194E – Education & Technology in Modern Japan (4 units)**

*Course Description:* Survey of education and technology in Japan from the mid-18th century to the present.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 195B – History of Modern Korea (4 units)**

*Course Description:* History of Modern Korea, from Yi dynasty period to 1990s. Covers the political and socioeconomic changes in 19th century, modernization under Japanese colonialism, postwar economic growth and effects of the Cold War.

*Prerequisite(s):* Upper division standing recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HIS 195C – A History of Vietnam (4 units)**

*Course Description:* Overview of Vietnamese history: early state formation in Southeast Asia; expansion/contention in the 17th and 18th centuries; colonial period; war with the US; and post-war developments (with an emphasis on relations with China and the US).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 196A – Medieval India (4 units)**

*Course Description:* Survey of history of India in the millennium preceding arrival of British in the 18th century, focusing on interaction of the civilizations of Hinduism and Islam and on the changing nature of the state.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 196B – Modern India (4 units)**

*Course Description:* Survey of cultural, social, economic, and political aspects of South Asian history from arrival of the British in the 18th century to formation of new independent states-India, Bangladesh, and Pakistan in the 20th century.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HIS 197T – Tutoring in History (1-5 units)**

*Course Description:* Tutoring of students in lower division courses.

Weekly meeting with instructors in charge of courses. Written reports on methods and materials required. No final examination.

*Prerequisite(s):* Enrolled as a History major with senior standing and consent of department chairperson.

*Learning Activities:* Discussion 1 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Pass/No Pass only.

**HIS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**HIS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**HIS 201A – Sources & General Literature of History: Ancient (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Ancient.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

**HIS 201B – Sources & General Literature of History: Medieval (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Medieval.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

**HIS 201C – Sources & General Literature of History: Renaissance & Reformation (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Renaissance & Reformation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

**HIS 201D – Sources & General Literature of History: Early Modern Europe (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Early Modern Europe.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

**HIS 201E – Sources & General Literature of History: Europe Since 1815 (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. (E) Europe since 1815.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

**HIS 201F – Sources & General Literature of History: China to 1880 (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. China to 1880.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

**HIS 201G – Sources & General Literature of History: China Since 1880 (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. China since 1880.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

**HIS 201H – Sources & General Literature of History: Britain (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Britain.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201I – Sources & General Literature of History: Latin America Since 1810 (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Latin America since 1810.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201J – Sources & General Literature of History: American History to 1787 (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. American History to 1787.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201K – Sources & General Literature of History: United States, 1787-1896 (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. United States, 1787-1896.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201L – Sources & General Literature of History: United States Since 1896 (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. United States since 1896.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201M – Sources & General Literature of History: Middle East (4 units)**

*Course Description:* Addresses various theoretical and methodological approaches to the study of the Modern Middle East. Survey Modern Middle East historiography in light of theoretical innovations such as post-Orientalism, World Systems theory, and postcolonial theory.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201N – Sources & General Literature of History: Modern Japan (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Modern Japan.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201P – Sources & General Literature of History: African Historiography (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. African Historiography.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201Q – Sources & General Literature of History: Cross-Cultural Women's History (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Cross-Cultural Women's History.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201S – Sources & General Literature of History: History of Science & Medicine (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. History of Science and Medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201T – Sources & General Literature of History: Jewish History (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Jewish History.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201W – Sources & General Literature of History: Advanced Topics in World History (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. Advanced Topics in World History.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 201X – Sources & General Literature of History: World History (4 units)**

*Course Description:* Designed primarily for students preparing for higher degrees in history. (X) World History.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202A – Major Issues in Historical Interpretation: Ancient (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. Ancient. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202B – Major Issues in Historical Interpretation: Medieval Europe (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. Medieval Europe. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202C – Major Issues in Historical Interpretation: Modern Europe (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. Modern Europe. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202D – Major Issues in Historical Interpretation: India (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. India. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202E – Major Issues in Historical Interpretation: India (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. Africa. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202F – Major Issues in Historical Interpretation: China (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. China. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202G – Major Issues in Historical Interpretation: Japan (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. Japan. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202H – Major Issues in Historical Interpretation: United States (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. United States. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 202I – Major Issues in Historical Interpretation: Latin America (4 units)**

*Course Description:* Fundamental issues and debates in the study of history. Latin America. Readings, papers, and class reports.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when subject differs.

*Grade Mode:* Letter.

## **HIS 203A – Research Seminar (4 units)**

*Course Description:* Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year.

*Learning Activities:* Seminar 3 hour(s), Tutorial 1 hour(s).

*Grade Mode:* Letter.

## **HIS 203B – Research Seminar (4 units)**

*Course Description:* Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year.

*Prerequisite(s):* HIS 203A.

*Learning Activities:* Seminar 3 hour(s), Tutorial 1 hour(s).

*Grade Mode:* Letter.

## **HIS 203C – Research Seminar (4 units)**

*Course Description:* Designed for students preparing for higher degrees in History. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year.

*Prerequisite(s):* HIS 203A.

*Learning Activities:* Seminar 3 hour(s), Tutorial 1 hour(s).

*Grade Mode:* Letter.

## **HIS 204 – Historiography (4 units)**

*Course Description:* Major issues in the philosophy and methodology of history.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**HIS 221 – Medieval History (4 units)**

*Course Description:* Topics in the history of medieval and early Renaissance Europe.

*Prerequisite(s):* HIS 121A, HIS 121B, HIS 121C recommended.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**HIS 245 – Modern European History (4 units)**

*Course Description:* Primary sources and research methodologies in the history of modern France and Germany. May be repeated once for credit.

*Prerequisite(s):* HIS 201E.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**HIS 261 – Latin American History (4 units)**

*Course Description:* Latin American history.

*Prerequisite(s):* Two courses in Latin American history; reading knowledge of Spanish or Portuguese.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**HIS 271A – United States History (4 units)**

*Course Description:* Research in literature, methods, and sources on aspects of United States history, culminating in each student completing a research paper in the field by the end of the second quarter.

*Prerequisite(s):* (HIS 201J, HIS 201K, HIS 201L) or HIS 202H.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HIS 271B – United States History (4 units)**

*Course Description:* Research in literature, methods, and sources on aspects of United States history, culminating in each student completing a research paper in the field by the end of the second quarter.

*Prerequisite(s):* (HIS 201J, HIS 201K, HIS 201L) or HIS 202H.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HIS 291A – Chinese History (4 units)**

*Course Description:* Research on topics to be chosen by the students for the purpose of writing article-length papers.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HIS 291B – Chinese History (4 units)**

*Course Description:* Completion of article-length papers on topics chosen by students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HIS 291C – Methods & Issues in Chinese History (4 units)**

*Course Description:* Readings in Chinese historical materials. Training in the use of Chinese reference works (including on-line resources).

*Prerequisite(s):* Consent of instructor. Reading knowledge of Chinese.

*Learning Activities:* Seminar 2 hour(s), Tutorial 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HIS 292 – College Teaching Internship (4 units)**

*Course Description:* Student prepares and teaches one lower division history course in a nearby community college under the supervision of a UC Davis instructor and a community college instructor.

*Prerequisite(s):* HIS 300 (may be taken concurrently).

*Learning Activities:* Internship 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HIS 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter

**HIS 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HIS 299D – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HIS 389 – Introductory Seminar for Teaching Assistants (1 unit)**

*Course Description:* An introduction to the broad comparative and theoretical issues of teaching methods and techniques in history.

*Prerequisite(s):* HIS 390 required concurrently.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HIS 390 – Teaching History in College (2 units)**

*Course Description:* Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Honors Challenge (HNR)**

**College of Letters & Science**

**HNR 090X – Honors Discussion Section (1 unit)**

*Course Description:* Examination of special topics in selected lower division courses through additional readings, discussions, term papers, collaborative work, or special activities, including projects, field and laboratory experiences, computer simulations, creative works.

*Prerequisite(s):* Open only to students in the Davis Honors Challenge.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HNR 092 – Internship (1-12 units)**

*Course Description:* Supervised work experience under the auspices of the Davis Honors Challenge.

*Prerequisite(s):* Consent of instructor; open only to students in the Davis Honors Challenge.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**HNR 094 – Honors Seminar (4 units)**

*Course Description:* Collaborative, multidisciplinary exploration of complex contemporary problem. Focus on critical thinking and analytical interpretation, on oral and written communication, and on the use of electronic media in gathering information.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Open to students in the Davis Honors Challenge.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HNR 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; open to students in the Davis Honors Challenge.

*Learning Activities:* Discussion 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HNR 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor; student in the Davis Honors Challenge.

*Learning Activities:* Independent Study 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**HNR 190X – Honors Contract (1 unit)**

*Course Description:* In-depth examination of material in an upper division course as defined in an Honors Contract Proposal submitted by the student. Contract must be approved by the instructor and the Honors Council of the Academic Senate.

*Prerequisite(s):* Open only to students in the Davis Honors Challenge.

*Learning Activities:* Independent Study, Discussion.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HNR 192 – Internship (1-12 units)**

*Course Description:* Supervised work experience under the auspices of the Davis Honors Challenge.

*Prerequisite(s):* Consent of instructor; open only to students in the Davis Honors Challenge.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**HNR 194 – Honors Seminar (3 units)**

*Course Description:* Team-based work on actual problems drawn from the public or private sector. Focus on critical thinking and analytic interpretation, oral and written communication skills, and development of practical solutions to real-world problems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open only to students in the Davis Honors Challenge.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HNR 195 – Honors Thesis/Honors Project (1-3 units)**

*Course Description:* Guided independent study of a selected topic leading to the presentation of an honors thesis/honors project.

*Prerequisite(s):* Open only to students in the Davis Honors Challenge.

*Learning Activities:* Independent Study 3-9 hour(s).

*Repeat Credit:* May be repeated 9 unit(s).

*Grade Mode:* Letter.

**HNR 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; open only to students in the Davis Honors Challenge.

*Learning Activities:* Discussion 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HNR 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Open only to students in the Davis Honors Challenge.

*Learning Activities:* Independent Study 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Horticulture (HRT)****Graduate Studies****HRT 200A – Horticulture & Agronomy: Principles (4 units)**

*Course Description:* Core course to introduce students to the principles that are of general importance in horticultural and agronomic research, including agroecology, plant developmental physiology, crop improvement, and biotechnology. Generally taken in the first year of the graduate program.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **HRT 200B – Horticulture & Agronomy: Practices (4 units)**

*Course Description:* Introduction to horticultural and agronomic cropping systems. Covers current applied research within agroecology, crop improvement, crop production, postharvest biology.

*Prerequisite(s):* HRT 200A recommended; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 3 hour(s), Seminar 3 hour(s).

*Grade Mode:* Letter.

## **HRT 203 – Research Perspectives in Horticulture (3 units)**

*Course Description:* Following lectures/discussions of scientific methodology, students develop research proposals aided by classroom discussions and individual interactions with instructors. Lectures and critiques of classical papers provide a sense of the evolution of the current concepts in perennial plant biology.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 1 hour(s), Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **HRT 211 – Current Topics in Root Biology (3 units)**

*Course Description:* How roots grow and interact with their environment, from embryonic roots to large tree roots. Analysis of recent literature related to the impact of internal controls on root growth and root system development (e.g., developmental signaling, carbohydrate availability, water status), and the impacts of the external environment on root physiology, root system development, and individual root growth (e.g., soil structure, soil microbial, water, nutrients).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **HRT 290 – Seminar (1 unit)**

*Course Description:* Seminars presented by invited speakers, students, or faculty on selected topics in horticulture.

*Prerequisite(s):* Graduate standing at UC Davis.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **HRT 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **HRT 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Human Development (HDE)**

College of Agricultural & Environmental Sciences

## **HDE 012 – Human Sexuality (3 units)**

*Course Description:* Vocabulary, structure/function of reproductive system; sexual response; pre-natal development; pregnancy and childbirth; development of sexuality; rape and sexual assault; birth control; sexually transmitted diseases; homosexuality; establishing/maintaining intimacy; sexual dysfunctions; communication; enhancing sexual interaction, cultural differences in attitudes towards sexuality. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **HDE 092 – Internship (1-12 units)**

*Course Description:* Supervised internship, off campus and on campus, in community and institutional setting. Involves progressively greater (supervised) participation in program delivery or assessment.

*Prerequisite(s):* Consent of instructor; field work experience or at least one course related to fieldwork assignment (e.g. HDE 100A, HDE 100B, HDE 140 or HDE 140L).

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **HDE 098 – Directed Group Study for Undergraduates (1-5 units)**

*Course Description:* Directed group study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HDE 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HDE 100A – Infancy & Early Childhood (4 units)**

*Course Description:* Biological, social, and cultural influences in the psychological growth and development of children, prenatal through age six. Two observations of preschool children required.

*Prerequisite(s):* (PSC 001 or PSC 001Y); (BIS 002A or BIS 010 or BIS 001A or BIS 010V) or MCB 010 or NPB 010 or NPB 012 or MIC 010.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Grade Mode:* Letter.

## **HDE 100AV – Infancy & Early Childhood (4 units)**

*Course Description:* Biological, social, and cultural influences in the psychological growth and development of children, prenatal through age six. Two observations of preschool children required.

*Prerequisite(s):* (PSC 001 or PSC 001Y); (BIS 002A or BIS 010 or BIS 001A or BIS 010V or MCB 010 or NPB 010 or NPB 012 or MIC 010).

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Grade Mode:* Letter.

**HDE 100B – Middle Childhood & Adolescence (4 units)**

*Course Description:* Interplay of biological and social-cultural factors in the emotional, cognitive and social development from middle childhood through adolescence.

*Prerequisite(s):* (HDE 100A or PSC 140 or PSC 140Y); (PSC 001 or PSC 001Y).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**HDE 100C – Adulthood & Aging (4 units)**

*Course Description:* Development during early, middle, and late adulthood; biological, cognitive, and psycho-social aspects of adult development.

Emphasis on normative patterns of development which characterize "successful aging."

*Prerequisite(s):* PSC 001 or PSC 001Y.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**HDE 101 – Cognitive Development (4 units)**

*Course Description:* Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning, and the role of plasticity. Topics include attention, memory, concepts about the physical and social world, and language.

*Prerequisite(s):* HDE 100A or HDE 100B or PSC 140 or PSC 140Y.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Credit Limitation(s):* Not open for credit to students who have taken PSC 141.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**HDE 102 – Social & Personality Development (4 units)**

*Course Description:* Social and personality development of children, infancy through adolescence. Topics include the development of personality, achievement motivation, self-understanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors.

*Prerequisite(s):* HDE 100A or HDE 100B.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Human Development majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**HDE 104 – Children in Families, Schools, Communities (4 units)**

*Course Description:* Children's social contexts (e.g., family, peers, school, neighborhood, community culture), development, and environmental challenges (e.g., poverty, maltreatment) from birth through adolescence.

*Prerequisite(s):* HDE 100A or HDE 100B or PSC 140 or PSC 140Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Pass One restricted to HDE majors.

*Grade Mode:* Letter.

**HDE 110 – Families in Communities (4 units)**

*Course Description:* Family member's roles, interactions, and development, and how families are impacted by the larger community and society in which they live. Relevant topics/issues include: gender, race/ethnicity, parenting, marriage, grandparents, divorce, acculturation, migration, and policies relevant to family well-being.

*Prerequisite(s):* PSC 001 or PSC 001Y or CRD 001 or CRD 002 or SOC 001 or SOC 002.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to HDE students.

*Credit Limitation(s):* Not open for credit to students who have taken HDE 110V.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

**HDE 110V – Families in Communities (4 units)**

*Course Description:* Family members' roles, interactions, and development, and how families are impacted by the larger community and society in which they live. Relevant topics/issues include: gender, race/ethnicity, parenting, marriage, grandparents, divorce, acculturation, migration, and policies relevant to family well-being.

*Prerequisite(s):* CRD 001 or CRD 002 or PSC 001 or PSC 001Y or SOC 001 or SOC 002.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Credit Limitation(s):* Not open for credit to students who have taken HDE 110.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

**HDE 111 – Family Stress & Resilience (4 units)**

*Course Description:* Theories and research associated with stressors affecting family functioning throughout the lifespan. Normative transitions and non-normative stressors, family services and family based policies and interventions.

*Prerequisite(s):* HDE 110 or HDE 110V.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

**HDE 112 – Social Relationships Across the Lifespan (4 units)**

*Course Description:* Spectrum of relationships across the lifespan; e.g., families, friends, members from the broader social network. Major theories and research among social relationships and development.

*Prerequisite(s):* HDE 100A or HDE 100B or HDE 100C.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **HDE 117 – Longevity (4 units)**

*Course Description:* Nature, origin, determinants, and limits of longevity with particular reference to humans; emphasis on implications of findings from non-human model systems including natural history, ecology and evolution of life span; description of basic demographic techniques including life table methods.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper 1 hour(s).

*Cross Listing:* ENT 117.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **HDE 120 – Research Methods in Human Development (5 units)**

*Course Description:* Scientific process, research designs, and experimental controls; APA manuscript style and scientific writing; statistical analysis and interpretation of results. Laboratory exercises to collect data, analyze and interpret results, and write scientific papers.

*Prerequisite(s):* STA 013 or STA 013Y or STA 013V or STA 100 or EDU 114 or PSC 041 or (SOC 046A, SOC 046B).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **HDE 121 – Psychological Assessment (4 units)**

*Course Description:* Current issues and methodology related to the process of psychological assessment with children.

*Prerequisite(s):* (HDE 100A or HDE 100B); (STA 013 or STA 013Y or PSC 041 or (SOC 046A, SOC 046B)).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **HDE 130 – Developmental Psychopathology (4 units)**

*Course Description:* Foundational principles and current issues in developmental psychopathology, the study of mental health problems and disorders that originate in childhood and adolescence (e.g., disruptive behavior, mood and anxiety disorders).

*Prerequisite(s):* (HDE 100A, HDE 100B) or (PSC 140 or PSC 140Y); consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **HDE 131 – Thriving Across the Lifespan (4 units)**

*Course Description:* Positive developmental trajectories from womb to tomb. Developmental process of thriving (e.g., happiness, life satisfaction, wisdom) and the factors that support thriving.

*Prerequisite(s):* HDE 100A or HDE 100B or HDE 100C.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **HDE 132 – Individual Differences in Cognition (4 units)**

*Course Description:* Individual differences in cognition, including learning disabilities and giftedness. Education implications and neurodevelopmental substrates of individual differences in cognition.

*Prerequisite(s):* (PSC 001 or PSC 001Y); (HDE 100A or HDE 100B).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **HDE 133 – Stress, Adversity & Resilience (4 units)**

*Course Description:* Short and long term biobehavioral responses to stress and adversity. The biological, psychological, social, and cultural factors of resilience. Interventions promoting resilience. Developmental perspective of stress and resilience across the lifespan.

*Prerequisite(s):* HDE 100A or HDE 100B or HDE 100C.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

## **HDE 133V – Stress, Adversity & Resilience (4 units)**

*Course Description:* Short and long term biobehavioral responses to stress and adversity. The biological, psychological, social, and cultural factors of resilience. Interventions promoting resilience. Developmental perspective of stress and resilience across the lifespan.

*Prerequisite(s):* HDE 100A or HDE 100B or HDE 100C.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Pass One restricted to Human Development majors.

*Grade Mode:* Letter.

*General Education:* Diversity Literacy (DL), Social Sciences (SS), Writing Experience (WE).

## **HDE 134 – Disparities & Inequalities in Health & Wellbeing (4 units)**

*Course Description:* Biological, psychosocial, environmental, historical, and political factors on disparities and inequalities. Individual differences in risk exposures. Developmental and intergenerational processes. Policy applications of disparities research.

*Prerequisite(s):* HDE 100A or HDE 100B or HDE 100C.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to HDE majors only.

*Credit Limitation(s):* Only two units of credit for student who have previously taken SPH 113; only two units of credit for student who have previously taken SOC 163.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **HDE 135 – Health Behaviors Across the Lifespan (4 units)**

*Course Description:* Development of health-related behaviors and physical and mental health outcomes across the lifespan. Coping strategies and behaviors such as nutrition, physical activity, technology, substance use/abuse, and social and cognitive engagement, as related to developmental stage.

*Prerequisite(s):* NPB 011 or NUT 010 or NUT 010V or NUT 010Y or SAS 013 or HDE 100A or HDE 100B or HDE 100C.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**HDE 137 – Contextual Determinants of Health (4 units)**

*Course Description:* Community, cultural, political, and physical environment influences on health and well-being. Developmental approach. Unique contextual determinants of health from womb to tomb.

*Prerequisite(s):* HDE 100A or HDE 100B or HDE 100C.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted with Human Development majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

**HDE 140L – Laboratory in Early Childhood (4 units)**

*Course Description:* Application of theories of learning and development to interaction with infants, toddlers, and preschoolers at Early Childhood Laboratory. Applied skills in communication, guidance and curriculum.

*Prerequisite(s):* HDE 100A; consent of instructor; to enroll, students must contact the Internship Coordinator in 1303 Hart Hall.

*Learning Activities:* Laboratory 7 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

**HDE 141 – Field Study With Children & Adolescents (4-6 units)**

*Course Description:* Study of children's affective, cognitive and social development within the context of family/school environments, hospitals and foster group homes.

*Prerequisite(s):* HDE 100A or HDE 100B; and consent of instructor.

*Learning Activities:* Discussion 2 hour(s), Fieldwork 6-12 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Letter.

**HDE 142 – Field Study with Emotionally Distressed Children & Adolescents (4-6 units)**

*Course Description:* Field study with children who are identified as emotionally distressed, including those with internalizing and externalizing behavioral problems.

*Prerequisite(s):* HDE 130 (can be concurrent); and consent of instructor.

*Learning Activities:* Discussion 1.50 hour(s), Fieldwork 6-12 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Letter.

**HDE 143 – Field Studies of the Elderly (4-6 units)**

*Course Description:* Apply theory and research on adult development and aging, work with older adults in a variety of settings, and develop skills relevant to that application. Develop a small research project.

*Prerequisite(s):* HDE 100C or HDE 160 (can be concurrent); and consent of instructor.

*Learning Activities:* Discussion 2 hour(s), Fieldwork 6 hour(s), Variable 4-6 hour(s).

*Grade Mode:* Letter.

**HDE 160 – Social Aspects of Aging (4 units)**

*Course Description:* How the social context affects adult development and aging. Emphasis on demography, social policy, culture, and adaptation.

Oral histories as class projects.

*Prerequisite(s):* HDE 100C.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**HDE 161 – Technology Use, Health, & Aging (4 units)**

*Course Description:* Principles from gerontology applied to older adults' use of technology to support health and well-being across a variety of domains (e.g., cognitive and physical fitness, social engagement) and contexts (assisted living, aging in place). Cognitive, sensory, and physical changes in later life that impact technology use.

*Prerequisite(s):* (PSC 001 or PSC 001Y); HDE 100C; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**HDE 163 – Cognitive Neuropsychology in Adulthood & Aging (4 units)**

*Course Description:* Theories, methods, and findings concerning the relationship between cognitive processes and brain functioning.

Readings, lectures, and in-class discussions cover research on normal younger and older adults, neuropsychological case studies, and selected patient groups (e.g., amnesia, schizophrenia, Alzheimer's disease).

*Prerequisite(s):* (PSC 001 or PSC 001Y); HDE 100C recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**HDE 180 – Special Topics in Human Development (4 units)**

*Course Description:* In-depth examination into selected topics in the field of human development (e.g., brain development, parenting, nutrition).

Content varies from quarter to quarter.

*Prerequisite(s):* Four upper division courses in Human Development (HDE).

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to HDE students with junior or senior class standing; priority given to students who have not received HDE 180 units previously.

*Repeat Credit:* May be repeated 1 time(s) when the topic differs.

*Grade Mode:* Letter.

**HDE 190C – Introductory Research Conference (1 unit)**

*Course Description:* Instructors lead discussions with undergraduate students who involve themselves in a research project. Research papers are reviewed and aspects of project proposals developed out of class are presented and evaluated.

*Prerequisite(s):* Involvement in ongoing research; consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HDE 192 – Internship (1-12 units)**

*Course Description:* Supervised internship off and on campus, in community, and institutional settings.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **HDE 197T – Peer Tutoring in Human Development (1-5 units)**

*Course Description:* Assist the instructor of a Human Development course by tutoring individual students or small groups of students, leading voluntary discussion groups, or organizing other voluntary activities.  
*Prerequisite(s):* Consent of instructor; upper division standing completion of course to be tutored.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated 10 unit(s) with consent of instructor.

*Grade Mode:* Pass/No Pass only.

## **HDE 198 – Directed Group Study (1-5 units)**

*Course Description:* May be taught abroad.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HDE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HDE 200A – Early Development (4 units)**

*Course Description:* Theory and research on the biological, social, cognitive, and cultural aspects of development from conception to the age of five years.

*Prerequisite(s):* Graduate standing; basic biology or physiology; one upper division course in psychology or a related field; one upper division or graduate course in developmental psychology (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **HDE 200B – Middle Childhood & Adolescence (4 units)**

*Course Description:* Theory and research on biological, cognitive, social, and cultural influences on behavioral development from age five years until late adolescence.

*Prerequisite(s):* Graduate standing; basic biology or physiology, and at least two upper division or graduate level courses in psychology or related fields.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **HDE 200C – Development in Adulthood (4 units)**

*Course Description:* Theory and research focusing on social, personality, cognitive, and biological development from early to late adulthood.

Emphasis is on theory development and continuity and change.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **HDE 203 – Adolescent Behavioral & Emotional Development (4 units)**

*Course Description:* Analysis of recent theories, research methods, and major findings on adolescent behavioral and emotional development, including contextual and genetic influences on adolescence, pubertal transitions, and social/family contexts and processes. Emphasis on multi-level mechanisms underlying adolescent behavioral and emotional development.

*Prerequisite(s):* HDE 200B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **HDE 204 – Developmental Neuroscience & Adolescent Psychopathology (4 units)**

*Course Description:* Introduction to human developmental neuroscience. Understanding of adolescence and its characterization as a time of risky and unhealthy behavior and vulnerability to onset of mental disorder as well as issues around plasticity of the adolescent brain and prevention/intervention.

*Prerequisite(s):* Graduate standing in Human Development, Psychology, Education, Neuroscience or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **HDE 205 – Longitudinal Data Analysis (4 units)**

*Course Description:* Introduction to longitudinal data manipulation, organization, description, and modeling in the multilevel modeling and structural equation modeling frameworks.

*Prerequisite(s):* PSC 204B; or equivalent graduate courses in statistics or consent of instructor; familiarity with multiple regression and the basics of matrix algebra.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **HDE 207 – Topics in Technology Use, Health & Aging (4 units)**

*Course Description:* Principles from gerontology applied to older adults' use of technology to support health and well-being across a variety of domains (e.g., cognitive and physical fitness, social engagement) and contexts (assisted living, aging in place). Cognitive, sensory, and physical changes in later life that impact technology use.

*Prerequisite(s):* Graduate standing in one of the following Graduate Groups: Human Development, Psychology, Communication, Education, and Nursing Science and Healthcare Leadership, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **HDE 210 – Theories of Behavioral Development (3 units)**

*Course Description:* Consideration of enduring issues in theories of behavioral development; analysis of adequacy of major theoretical schools (e.g., social learning, Piagetian) as scientific theories.

*Prerequisite(s):* Graduate standing in behavioral sciences.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **HDE 211 – Physiological Correlates of Behavioral Development (4 units)**

*Course Description:* An overview of mechanisms of organismic development and the implications of developmental biology for the analysis of behavioral ontogeny; consideration of parallels between processes of organismic development and behavioral development in children and infra-human mammals.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **HDE 220 – Research Methods in Human Growth & Development (4 units)**

*Course Description:* Overview of qualitative and quantitative approaches to empirical inquiry in the social sciences, with a focus on theory and research methods in biological growth and cognitive and social/emotional development from prenatal period to death.

*Prerequisite(s):* STA 013 or STA 013Y; or the equivalent and at least two upper division courses in Human Biology or Developmental Psychology.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **HDE 232 – Cognition & Aging (3 units)**

*Course Description:* Manner in which cognitive processes are affected by aging as well as an understanding of the changes in the central nervous system occurring with aging.

*Prerequisite(s):* HDE 200C.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **HDE 234 – Children's Learning & Thinking (3 units)**

*Course Description:* Analysis of theories, research methods, and major findings of children's higher-order cognition, including origins of knowledge, development of problem-solving skills, reasoning strategies, and scientific concepts, with an emphasis on the underlying mechanism involved in children's thinking and learning processes.

*Prerequisite(s):* HDE 200A or PSC 212 recommended.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **HDE 238 – The Context of Individual Development (3 units)**

*Course Description:* Analysis of human development within the context of daily life. Contextualizing theories and methods of developmental psychology will be distinguished from contextual theories and methods. Developmental psychology models will be distinguished from child psychology models.

*Prerequisite(s):* Graduate standing in Human Development, Child Development, Education, Psychology, Anthropology, Sociology, or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **HDE 239 – Developmental Psychopathology (4 units)**

*Course Description:* Theories, current issues, and empirical studies of atypical development from infancy to adulthood that integrate multiple system levels from genes, neurobiology, cognition, emotion, family and peer dynamics to community and cultural contexts.

*Prerequisite(s):* Graduate standing in Human Development, Psychology, Sociology, a related social science, or consent of instructor.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **HDE 240 – Peer Relationships during Adolescence (4 units)**

*Course Description:* Examines the role of peer relationships in adolescent development including forms and functions at the individual, dyadic and group levels. Ethnicity and cross cultural research will be discussed. Emphasis on methodology, including surveys, peer nominations/sociometrics, experimental, and observational designs.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Graduate standing in Human Development, Psychology, Education, or consent of instructor.

*Grade Mode:* Letter.

## **HDE 250 – Current Research on Family Relationships (4 units)**

*Course Description:* Discussion of theories, methods, and current research on the nature and development of sibling, romantic, and parent-child relationships across the lifespan. Emphasis on interpersonal and family processes examined in ethnic/cultural contexts. Implications for individual development will be addressed.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing in Human Development Graduate Group, Psychology, Sociology, a related social science, or consent of instructor.

*Grade Mode:* Letter.

## **HDE 252 – Family Research, Programs & Policy (4 units)**

*Course Description:* Examines the competing interests of research, policy, and service on current issues of family functioning and individual well being. Considers communication barriers between researchers, practitioners, and policy makers.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Graduate standing in Human Development, Psychology, Sociology, related social sciences, or consent of instructor.

*Grade Mode:* Letter.

## **HDE 290 – Seminar (3 units)**

*Course Description:* Discussion and evaluation of theories, research, and issues in human development. Different topics each quarter.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **HDE 290C – Research Conference (1 unit)**

*Course Description:* Supervising instructors lead research discussions with their graduate students. Research papers are reviewed and project proposals are presented and evaluated.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **HDE 291 – Research Issues in Human Development (4 units)**

*Course Description:* In-depth presentations of research issues in particular areas of behavioral development.

*Prerequisite(s):* Graduate Standing in the behavioral sciences.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**HDE 292 – Graduate Internship (1-12 units)**

*Course Description:* Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor.

*Prerequisite(s):* Consent of faculty (internship sponsor) and satisfactory completion of placement relevant course work, for example: EDU 213, EDU 216; HDE 222, HDE 242; LAW 272, LAW 273.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s) with justified skill acquisition and promise of informing evaluation research.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HDE 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**HDE 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HDE 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# Human Physiology (HPH)

**School of Medicine****HPH 098F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**HPH 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**HPH 115 – Cannabis & Cannabinoids in Physiology & Medicine (3 units)**

*Course Description:* In-depth scientific analysis of cannabis and cannabinoids, topics include biochemical, physiological, behavioral, pharmacological, social and therapeutic aspects of cannabinoids, with emphasis on the physiological impacts on major organ systems in humans and animals, and the potential medicinal uses.

*Prerequisite(s):* NPB 100 or NPB 101 or NPB 110B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**HPH 157 – Advanced Physiology of Animal/Human Disease (3 units)**

*Course Description:* Centers on fundamental mechanisms and pathophysiological basis for animal and human diseases. Case-based and uses animal and human diseases to help exemplify the physiological consequences of organ dysfunction.

*Prerequisite(s):* NPB 101 B+ or better or NPB 110C B+ or better; consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited to 35 students initially.

*Cross Listing:* NPB 157.

*Grade Mode:* Letter.

**HPH 192 – Internship in Human Physiology (1-12 units)**

*Course Description:* Supervised work experience in physiology and related fields.

*Prerequisite(s):* Upper division standing; approval of project prior to period of internship by preceptor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**HPH 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed reading, discussion and/or laboratory experience on selected topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**HPH 198F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for upper division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**HPH 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor. Senior standing in biology, chemistry, physics, psychology, or engineering.

*Learning Activities:* Laboratory 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**HPH 199FA – Student Facilitated Course Development (1-4 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will teach under 098F/198F.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

**HPH 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**HPH 210A – Advanced Physiology (5 units)**

*Course Description:* Advanced course on fundamental principles of cell physiology, transport physiology, signal transduction, physiology of excitable cells, and muscle physiology.

*Prerequisite(s):* Physiology Ph.D. program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* HPH 210A (or MCP 210A) is a required core course for the MCIP graduate group; course contains thermodynamics discussions and requires substantial math and physics background in order to succeed; approval for registering from Co-IRs is required to get CRN.

*Cross Listing:* MCP 210A.

*Grade Mode:* Letter.

**HPH 234 – Advances in Computational Physiology & Pharmacology (2 units)**

*Course Description:* Multi-scale biomedical modeling methodologies and applications, with emphasis on ion channel structure-function, computer-aided drug design, and membrane excitability. State-of-the-art techniques used for multi-scale modeling of biomedical systems and their applications.

*Prerequisite(s):* No formal requirements; basic knowledge of mathematics, physics, chemistry, and biology helpful.

*Learning Activities:* Lecture 2 hour(s).

*Cross Listing:* PHA 234.

*Grade Mode:* Letter.

**HPH 298 – Group Study (1-5 units)**

*Course Description:* For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**HPH 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HPH 400 – Human Physiology (6 units)**

*Course Description:* General and cellular physiology of neurons, muscle, and epithelial cells and systemic physiology of cardiovascular, respiratory, gastrointestinal, and renal systems.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Medical student only.

*Grade Mode:* Pass/Fail only.

**HPH 403 – Medical Neuroanatomy (5 units)**

*Course Description:* Anatomy of the normal human nervous system, to include gross external and internal morphology of brain and spinal cord, and function neuroanatomy of motor, sensory and cognitive systems. Incorporates application of neuroanatomy to clinical problem solving.

*Prerequisite(s):* HPH 400; Block 1.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to medical students only.

*Cross Listing:* CHA 403.

*Grade Mode:* Pass/Fail only.

**HPH 440 – Cannabis & Cannabinoids in Physiology & Medicine (3 units)**

*Course Description:* Provides an in-depth scientific analysis of current knowledge on cannabis and cannabinoids pertaining to human physiology and potential medicinal uses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**HPH 493 – Physiological Principles in SICU SSM (6 units)**

*Course Description:* Special Study Module, a four-week course on the topic: Care of the Critically Ill Surgical Patient: Use of Physiological Principles to Guide Treatment of Patients with Common Surgical Problems.

*Prerequisite(s):* Consent of instructor; restricted to UC Davis School of Medicine students only.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Cross Listing:* SUR 493C.

*Grade Mode:* Honors/Pass/Fail.

**HPH 497T – Tutoring in Human Physiology (1-5 units)**

*Course Description:* Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine.

*Prerequisite(s):* Advanced standing or consent of instructor.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HPH 498 – Directed Reading & Group Study (1-4 units)**

*Course Description:* Directed reading and discussion on selected topics in human physiology.

*Prerequisite(s):* Consent of instructor; medical students.

*Learning Activities:* Discussion 2-8 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HPH 499 – Research (1-6 units)**

*Course Description:* Laboratory investigation on selected topics.

*Prerequisite(s):* Consent of instructor; medical students.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Human Rights (HMR)**

College of Letters & Science

**HMR 001 – Human Wrongs/Human Rights (4 units)**

*Course Description:* Introduction to Human Rights and the problems they seek to address. Using key episodes of inhumanity like slavery, genocide, and racism. Examines how international movements for social justice led to the emergence of the international Human Rights system.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HMR 120A – Art, Architecture, & Human Rights (4 units)**

*Course Description:* Study of human rights as they relate to art, architecture, and cultural heritage. Examines museums, art collections, and cultural-heritage management, their relation to the cultural prerogatives of communities and indigenous groups, and protection of cultural heritage during war and conflict.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* AHI 120A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**HMR 130 – Special Topics in Human Rights (4 units)**

*Course Description:* Thematic study of human rights. Topics may include contemporary or historical issues in the promotion, protection, and violation of human rights; human rights and the arts, religion, literature are possible topical areas.

*Prerequisite(s):* HMR 134 or RST 134 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HMR 131 – Genocide (4 units)**

*Course Description:* Comparative and critical study of the modern phenomenon of genocide from religious, ethical and historical perspectives.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**HMR 132 – Human Rights & the Refugee (4 units)**

*Course Description:* Comparative, historical, global and theoretical study of the human rights of refugees and the concept of the refugee; analysis of refugee protection, resettlement and integration; study of United Nations, intergovernmental and non-governmental organizations and refugees.

*Prerequisite(s):* Junior standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**HMR 134 – Human Rights (4 units)**

*Course Description:* Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion 1 hour(s).

*Credit Limitation(s):* No credit for students who have completed RST 090.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HMR 135 – Human Rights Tools For Advocacy & Practice (4 units)**

*Course Description:* Practices in the field of human rights leading to improvements in people's lives; recent political developments in the global application of human rights and strategic tools used to promote the realization of human rights standards. Key international and local NGOs and their work promoting the capacities of rights holder to claim and enjoy their rights and in persuading duty bearers to fulfill their human rights obligations.

*Prerequisite(s):* HMR 134 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**HMR 136 – Human Rights in the Middle East (4 units)**

*Course Description:* Study of the experience of Human Rights in the modern Middle East, with special attention to the Human Rights issues raised by events of Arab Spring; Palestine-Israel conflict; history of genocide, mass killing and totalitarianism in the region.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**HMR 138 – Human Rights, Gender, & Sexuality (4 units)**

*Course Description:* Gender and sexuality in the context of human rights. Topics include women's participation in the public sphere, the right to change gender, the right for family privacy, and the right to marriage.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HMR 140A – Human Rights & the Popular Imagination (4 units)**

*Course Description:* Arts, music, literature, film and television in the rise of human rights movements and the protection, promotion and violation of human rights. Topics may include: human rights & science fiction; human rights & the graphic novel; human rights & contemporary cinema; human rights & rock and roll.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HMR 140B – Art & Politics of Memory: Truth, Justice, Reconciliation & Human Rights (4 units)**

*Course Description:* Critical exploration of the role of art and memory in the dictatorships, authoritarian societies, civil conflicts, and genocides of the late 20th and early 21st centuries. Case studies focus on the violation of massive human rights and political and cultural conflict for truth, justice, and reconciliation in the aftermath of those violations. Emphasis on how memory is constructed and contested by states, artists, writers, historians and different ethnic and political communities.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when subject matter differs; e.g., when taught by a different instructor or focusing on a different region or era.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **HMR 161 – Human Rights in Latin America (4 units)**

*Course Description:* History of the origins, denial and protection of Human Rights in Latin America. Emphasis on dictatorships, political violence, social resistance, democracy, justice, accountability, truth commissions, memory.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* HIS 161.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **HMR 162 – Human Rights & Indigenous Peoples (4 units)**

*Course Description:* Interdisciplinary, global, and comparative study of human rights and the history, struggles, revitalization, and current status of indigenous peoples. Topics include the UN Declaration on the Rights of Indigenous People, settler colonialism, genocide, indigenous rights movements, and efforts towards justice, recognition, and restitution.

*Prerequisite(s):* HMR 001 or HMR 134 or HMR 161 or NAS 001 recommended; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s); Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

## **HMR 162Y – The History of Human Rights in Europe (4 units)**

*Course Description:* History of the origins, development, and state of international humanitarian law (IHL) and international human rights law (IHRL) in Europe. Emphasis on Enlightenment-era and modern theories of the source, utility, and limits of human rights.

*Learning Activities:* Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Cross Listing:* HIS 126Y.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **HMR 190 – Seminar (4 units)**

*Course Description:* Emphasis on current scholarly debate about the methods for analyzing and comparing diverse human rights issues with the intention of integrating disciplined study of the field.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **HMR 192 – Human Rights Internship (1-12 units)**

*Course Description:* Participation in community service, Human Rights Studies outreach, collaboration with community groups locally, nationally or internationally culminating in an analytical term paper on a topic approved by the sponsoring instructor. Students will work with faculty to develop, plan and implement an internship with a local non-profit organization, government organization, or similar institution with the purpose of exploring the practical implementation of human rights.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* P/NP only.

## **HMR 198 – Directed Group Study (1-4 units)**

*Course Description:* Group study on focused topics in human rights. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **HMR 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Opportunity for advanced undergraduate students to work with a faculty member in a focused manner on a topic or topics of human rights.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **HMR 200A – History, Theory & Criticism of Human Rights (4 units)**

*Course Description:* Introduces the advanced study of Human Rights and the theoretical and practical elaboration of the international Human Rights system. Seminar engages with criticism of Human Rights and develops research and teaching within disciplinary and interdisciplinary frameworks.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Cross Listing:* REL 231E.

*Grade Mode:* Letter.

## **HMR 200B – Memory, Culture, & Human Rights (4 units)**

*Course Description:* Explores the multiple convergences among memory, culture, and human rights. Discusses diverse approaches to how societal actors in different historical, cultural, and national settings, construct meanings of past political violence, inter-group conflicts, and human rights struggles.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Cross Listing:* CST 210.

*Grade Mode:* Letter.

**HMR 298 – Group Study (1-4 units)**

*Course Description:* Group study on focused topics in human rights. Four-unit courses may serve as electives for the Designated Emphasis in Human Rights.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 16 unit(s) when topic differs.

*Grade Mode:* Letter.

**HMR 299 – Individual Study (1-12 units)**

*Course Description:* Individual study for the designated emphasis in human rights.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-12 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HMR 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching Assistant Training Practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 1-4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Humanities (HUM)

College of Letters & Science

**HUM 001 – Humanities Forum (2 units)**

*Course Description:* Reading and discussion of a single work representative of a particular culture, historical period, or genre and significant for its ongoing cultural impact in the humanities, sciences, social sciences, technology, and popular arenas. Attention to provocative implications for contemporary society.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in HUM 001D for an additional 2 units.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**HUM 001D – Issues & Concepts in the Humanities (2 units)**

*Course Description:* Small group discussions and preparation of short papers for HUM 001.

*Prerequisite(s):* HUM 001 (can be concurrent); HUM 001 required concurrently.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in HUM 001 required.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**HUM 002A – Global Humanities Forum (4 units)**

*Course Description:* Introduction to humanities topics and methodologies; analysis of major figures, works, and genres in world arts and literatures, with emphasis on relationships between history, society, and culture.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**HUM 002B – American Humanities Forum (4 units)**

*Course Description:* Introduction to humanities topics and methodologies; analysis of major figures, works, and genres in American arts and literatures, with emphasis on relationships between history, society, and culture.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**HUM 003 – Medicine & Humanities (4 units)**

*Course Description:* Evolution of the "medical arts" into the "science of medicine." Culture of medicine in the context of society, medical ethics.

*Prerequisite(s):* Satisfaction of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**HUM 004 – Animals & Human Culture (2 units)**

*Course Description:* Meaning of human relations with animals studied across a variety of historical periods and cultures and from a variety of humanistic perspectives.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**HUM 004D – Animals & Human Culture: Discussion (2 units)**

*Course Description:* Small group discussions and preparation of short papers for HUM 004.

*Prerequisite(s):* HUM 004 (can be concurrent); HUM 004 required concurrently.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**HUM 007 – Travel & Travel Literature (4 units)**

*Course Description:* History of travel from the age of exploration to the modern era. Contemporary trends in travel, including mas tourism, adventure travel, and ecotavel. Social, economic, and cultural issues related to modern trends in travel. Analysis of literary representations of travel.

*Prerequisite(s):* Satisfaction of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **HUM 008 – Introduction to Perspectives on Narrative (4 units)**

*Course Description:* Interdisciplinary approach to the use of story across time, culture, and discipline. How the telling and retelling of particular stories reflect the values, concerns, and assumptions of their original audiences and genres.

*Prerequisite(s):* Satisfaction of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **HUM 009 – Don Quixote & the Modern World (2 units)**

*Course Description:* Reading Don Quixote as emblem of modernity in the West. Issues of reality versus illusion, heroism, freedom and self-fulfillment, racial tolerance and love. Don Quixote in other cultural and popular media: film, dance, art, musical drama, and television. GE credit with concurrent enrollment in HUM 009D: ArtHum, Wrt.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **HUM 009D – Don Quixote & the Modern World Discussion (2 units)**

*Course Description:* Small group discussions and preparation of short papers for HUM 009.

*Prerequisite(s):* HUM 009 required concurrently.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **HUM 010 – How to be a Critic: Understanding Cultural Products & Practices (2 units)**

*Course Description:* Introduction to key topics and methodologies of interest to humanists. Series uses a variety of critical approaches to examine the cultural significance of subjects such as: fashion, film, architecture, music, food, dance.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **HUM 010D – How to be a Critic: Discussion (2 units)**

*Course Description:* Optional discussion section can be taken concurrently with HUM 10. Small group discussions and preparation of short papers.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in HUM 010 required.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **HUM 013 – Witches: Myth & Historical Reality (4 units)**

*Course Description:* Examines the historical construction of the witch.

Four areas covered are: European pagan religions and the spread of Christianity; the "Burning' Times" in early modern Europe; 17th-century New England and the Salem witch trials; and fairy tales.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **HUM 015 – Language & Identity (4 units)**

*Course Description:* Introduction to topics related to the construction of identity through language use, including geographical and social factors affecting language groups. Language ideology affecting linguistic groups, including bilinguals and non-native speakers of English.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

## **HUM 060 – Narrative & Argumentative Approaches to Major Current Issues in the Media, Culture, & Society (4 units)**

*Course Description:* Interdisciplinary approach to contemporary issues (abortion, AIDS, civil rights, war and peace, welfare state) around which individuals, communities and institutions define themselves in American society, by applying principles of narrative theory to the narratives where those issues are embedded.

*Prerequisite(s):* English A or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **HUM 092 – Internship (1-12 units)**

*Course Description:* Internships in fields where students can practice their skills.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **HUM 144 – Marx, Nietzsche, Freud (4 units)**

*Course Description:* Study of major texts of Marx, Nietzsche, and Freud, selected with an eye to their impact on 20th-century economics, ethics, and attitudes toward eros. Particular focus on conceptions of the self and the individual's relation to society.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* GER 144.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **HUM 180 – Topics in the Humanities (4 units)**

*Course Description:* Analysis of interdisciplinary issues in the Humanities. Topics vary. May be taught abroad.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **HUM 192 – Internship (1-12 units)**

*Course Description:* Internships in fields where students can practice their skills.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **HUM 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HUM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HUM 250 – Topics in the Humanities (4 units)**

*Course Description:* Topics in the humanities, selected by the instructor.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

## **HUM 292 – Graduate Internship (1-15 units)**

*Course Description:* Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 15 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **HUM 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **HUM 299 – Individual Research (1-4 units)**

*Course Description:* Individual research in the humanities resulting in a formal written research report.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **HUM 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Hydrologic Science (HYD)**

College of Agricultural & Environmental Sciences

### **HYD 010 – Water, Power, Society (3 units)**

*Course Description:* Water resources issues. How water has been used to gain and wield socio-political power. Water resources development in California as related to current and future sustainability of water quantity and quality. Roles of science and policy in solving water problems.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Cross Listing:* SAS 010.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

## **HYD 092 – Hydrologic Science Internship (1-12 units)**

*Course Description:* Work experience off and on campus in Hydrologic Science. Internship supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division student.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **HYD 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HYD 103N – Fluid Mechanics Fundamentals (4 units)**

*Course Description:* Fluid mechanics axioms, fluid statics, kinematics, velocity fields for one-dimensional incompressible flow and boundary layers, turbulent flow time averaging, potential flow, dimensional analysis, and macroscopic balances to solve a range of practical problems.

*Prerequisite(s):* PHY 009B.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* EBS 103.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **HYD 110 – Irrigation Systems & Water Management (4 units)**

*Course Description:* Soil and plant aspects of irrigation and drainage. Soil-water principles including water storage and movement, plant response to irrigation, water use by crops, irrigation systems (i.e., micro-irrigation, sprinkler irrigation and surface irrigation), and related salinity and water quality impacts.

*Prerequisite(s):* PHY 007A; SSC 100 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ABT 110, ESM 110.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **HYD 118 – Evapotranspiration Principles, Measurement & Modeling (4 units)**

*Course Description:* Estimation of evapotranspiration (ET) for irrigation management and water resources planning; including the basic principles and key factors controlling evaporation and ET rates, methods of measuring these factors in the field and remotely, and determination of likely water requirements for crops and various landscape conditions as needed for water resources planning.

*Prerequisite(s):* HYD 124 C or better; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ESM 118; EBS 148.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**HYD 124 – Plant-Water-Soil Relationships (4 units)**

*Course Description:* Principles of plant interactions with soil and atmospheric water environments and practical applications to crop management (e.g., irrigation) and plant eco-physiology (e.g., drought). *Prerequisite(s):* (SSC 100 (can be concurrent) or SSC 107 (can be concurrent)); (PLS 100A (can be concurrent) or PLB 111 (can be concurrent)); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed WSC 104.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**HYD 134 – Aqueous Geochemistry (6 units)**

*Course Description:* Chemistry of natural waters; dielectric properties of water; thermodynamic and mass-action relations; metal hydrolysis; acid-base equilibria; metal-coordination chemistry; solubility calculations; electron-exchange reactions; sorptive partitioning; ion exchange; and dissolved organic matter.

*Prerequisite(s):* CHE 002B.

*Learning Activities:* Lecture 4 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**HYD 141 – Physical Hydrology (4 units)**

*Course Description:* Introduction to the processes that constitute the hydrologic cycle. Special emphasis on a quantitative description of the following processes: precipitation, infiltration, evaporation, transpiration, surface runoff, and groundwater runoff.

*Prerequisite(s):* PHY 009B; MAT 021B; HYD 100 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**HYD 142 – Systems Hydrology (4 units)**

*Course Description:* General course considering hydrologic processes from a systems or statistical model perspective. General probability concepts are applied to frequency, time series and spatial data analysis. Linear systems are also considered in conjunction with Kalman filter techniques.

*Prerequisite(s):* HYD 141 or ECI 142.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL).

**HYD 143 – Ecohydrology (4 units)**

*Course Description:* Movement and storage of water in individual ecosystems and the integrated functioning of water and biota at the watershed scale.

*Prerequisite(s):* HYD 010 or HYD 141 or ESP 001 or ESM 100 or ESM 108 or ESM 120 or GEL 001 or GEL 050 or SSC 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL).

**HYD 144 – Groundwater Hydrology (4 units)**

*Course Description:* Global role of groundwater resources in society; groundwater in the hydrologic cycle; geology of groundwater; global, US, and California geography of groundwater; physical measures of groundwater occurrence and flow; water balance; modeling groundwater flow; principles of well construction; aquifer tests; groundwater quality; contaminant transport and monitoring; groundwater law, water quality regulations, and sustainable management.

*Prerequisite(s):* MAT 012 (can be concurrent) or MAT 016B (can be concurrent) or MAT 021A (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* EBS 144.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

**HYD 145 – Water Science & Design (4 units)**

*Course Description:* Introduction to watershed engineering, storm water management, design of hydraulic systems. Topics include hydrological risk analysis, flood routing, design storms, open channel flow, pipes, culverts, spillways, and detention basins. Class project and field trips will apply theory to real-life problems.

*Prerequisite(s):* (HYD 141 or ESM 100); (MAT 016B or MAT 021B); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Writing Experience (WE).

**HYD 146 – Hydrogeology & Contaminant Transport (5 units)**

*Course Description:* Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic systems. Groundwater geology and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping test and work with physical and computer models.

*Prerequisite(s):* HYD 144 or ECI 144; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s), Term Paper 1 hour(s).

*Cross Listing:* GEL 156.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**HYD 147 – Runoff, Erosion & Water Quality Management (3 units)**

*Course Description:* Practical hydrology and runoff water quality management from disturbed watersheds. Development of hillslope and soils restoration concepts and practice, modeling and application.

*Prerequisite(s):* (PHY 007B or PHY 009B); (MAT 016C or MAT 017C or MAT 021C); (ECI 142 or HYD 141 or ESM 100); or equivalent.

*Learning Activities:* Lecture/Lab 3 hour(s), Fieldwork.

*Cross Listing:* EBS 147.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **HYD 150 – Water Law (3 units)**

*Course Description:* Principles and issues of California Water Law. Types of water rights, groundwater rights and management, and protection of instream uses. Water projects, role of federal government and federal/state relations. Basic water quality acts, endangered species act, water transfers and current water issues.

*Prerequisite(s):* Consent of instructor or upper division standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH).

## **HYD 151 – Field Methods in Hydrology (4 units)**

*Course Description:* Measurement methods and data analysis for evaluation of water storage, movement and contamination in the field. Equipment such as data loggers, water and sediment samplers, pressure transducers, weather stations, surveying equipment, and flow meters will be used.

*Prerequisite(s):* ERS 100 or HYD 141.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **HYD 182 – Environmental Analysis using GIS (4 units)**

*Course Description:* Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS.

*Prerequisite(s):* ABT 150 or LDA 150; or equivalent GIS experience and skills; general biology and/or ecology courses are recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Cross Listing:* ABT 182.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **HYD 192 – Hydrologic Science Internship (1-12 units)**

*Course Description:* Work experience off and on campus in water science. Internship supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-40 hour(s).

*Grade Mode:* Pass/No Pass only.

## **HYD 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HYD 199 – Special Study for Advanced Undergraduate (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Senior standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **HYD 201A – Hydrologic Sciences Core Survey (3 units)**

*Course Description:* Considers the primary sub-disciplines while reviewing the fundamental scientific concepts/processes of the hydrologic sciences research community, and includes a basic writing component.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project.

*Grade Mode:* Letter.

## **HYD 201B – Hydrologic Sciences Core Seminar (1 unit)**

*Course Description:* Exposes students to the research underway in the Hydrologic Sciences Graduate Group as well as provide them the opportunity to present and refine their research through interaction with other students in the Graduate Group.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/No Pass only.

## **HYD 210 – Vadose Modeling & Characterization (3 units)**

*Course Description:* Principles and modeling of water flow and chemical transport in the vadose zone, with specific applications to soils. Topics include hydraulic properties, finite difference application to unsaturated water flow, parameter optimization, diffusive and convective transport in gaseous and liquid phases.

*Prerequisite(s):* SSC 107; or consent of instructor.

*Learning Activities:* Lecture 1.50 hour(s), Laboratory 3 hour(s), Discussion 0.50 hour(s).

*Grade Mode:* Letter.

## **HYD 241 – Precision Irrigation Systems & Management (3 units)**

*Course Description:* Advanced irrigation science and engineering for agricultural, horticultural, engineering, and hydrology graduate students. Precision irrigation techniques for application of water to meet specific requirements of individual plants or management units and maximum economic benefits of crop production.

*Prerequisite(s):* ABT 110; SSC 100; HYD 110; EBS 145.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EBS 241.

*Grade Mode:* Letter.

## **HYD 242 – Hydrology & Sustainability of Irrigated Lands (3 units)**

*Course Description:* Impact of irrigated agricultural on groundwater depletion, surface water and groundwater quality, soil salinization, downstream ecosystems, and seawater intrusion. Exploration of efficient resource use, and policies adopted in California to enhance sustainability of irrigated crop production.

*Prerequisite(s):* ABT 110 or ESM 110 or HYD 110 or EBS 145.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EBS 242.

*Grade Mode:* Letter.

## **HYD 243 – Water Resource Planning & Management (3 units)**

*Course Description:* Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design and management. Water allocation, capacity expansion, and reservoir operation. Conjunctive use of surface water and groundwater. Water quality management. Irrigation planning and operation models.

*Prerequisite(s):* HYD 141 or ECI 142.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EBS 243.

*Grade Mode:* Letter.

## **HYD 245 – Climate Change, Water & Society (4 units)**

*Course Description:* Integration of climate science and hydrology with policy to understand hydroclimatology and its impact upon natural and human systems. Assignments: readings, take-home examination on climate and hydrologic science, paper that integrates course concepts into a research prospectus or review article.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Cross Listing:* ATM 245, ECL 245.

*Grade Mode:* Letter.

## **HYD 252 – Hillslope Geomorphology & Sediment Budgets (4 units)**

*Course Description:* Exploration of theoretical and empirical foundations of sediment production on hillslopes using computer models and field experiments to promote an understanding of how watersheds evolve naturally and with human impacts.

*Prerequisite(s):* HYD 141 or GEL 035 or ECI 142; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

## **HYD 254Y – Ecohydraulics (3 units)**

*Course Description:* Use of 2D hydrodynamic modeling to perform instream flow assessment by exploring flow-dependent hydraulic patterns at multiple spatial scales and extrapolating results with empirical and analytical functions to evaluate geomorphic resilience and ecological functions.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Discussion 1 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

## **HYD 256 – Geomorphology of Estuaries & Deltas (4 units)**

*Course Description:* Survey of the processes and landforms associated with sediment deposition in the coastal zone. Application of geomorphic principles to coastal management issues.

*Prerequisite(s):* HYD 141 or GEL 035; or ECI 042 or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

## **HYD 264 – Modeling of Hydrologic Processes (3 units)**

*Course Description:* Techniques used to model the spatio-temporal structure of rainfall and runoff are introduced. Procedures studied include those based on stochastic point processes, chaos theory, fractal geometry, and fractional noises.

*Prerequisite(s):* HYD 141; STA 102; or the equivalents.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **HYD 269 – Numerical Modeling of Groundwater Systems (3 units)**

*Course Description:* Finite difference and finite element techniques in modeling groundwater flow and transport. Fundamentals of constructing and calibrating models with hands-on applications. Methods and limitations of numerical solution of transport equations. Model interpretation and ethics.

*Prerequisite(s):* MAT 022B; (ECI 144; or HYD 145A); HYD 145B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **HYD 273 – Introduction to Geostatistics (4 units)**

*Course Description:* Statistical treatment of spatial data with hydrologic emphasis. Topics: theory of random functions, variogram analysis, Kriging/co-Kriging, indicator geostatistics, and stochastic simulation of spatial variability. Geostatistical software use.

*Prerequisite(s):* STA 130A; STA 130B; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **HYD 274 – Practice of Groundwater Flow & Transport Modeling (3 units)**

*Course Description:* Selecting and building groundwater flow and transport models. Planning, preparation, execution, presentation, and review of modeling projects. Review of methods, assumptions, and limitations of groundwater models; practicing with MODFLOW, MT3D, associated GUI, and with other groundwater modeling software of choice.

*Learning Activities:* Lecture 2 hour(s), Lecture/Lab 0.50 hour(s), Lecture/Discussion 0.50 hour(s).

*Grade Mode:* Letter.

## **HYD 275 – Analysis of Spatial Processes (3 units)**

*Course Description:* Characterization of homogeneous random fields; extremes and spectral parameters; geometry of excursions, local averaging; scale of fluctuation; non-Gaussian and irregular random fields; geostatistical applications.

*Prerequisite(s):* STA 102; or the equivalent; HYD 273 or STA 273A recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **HYD 286 – Selected Topics in Environmental Remote Sensing (3 units)**

*Course Description:* In depth investigation of advanced topics in remote sensing applications, measurements, and theory.

*Prerequisite(s):* ERS 186; consent of instructor, or equivalent; ERS 186L recommended.

*Learning Activities:* Discussion 2 hour(s), Lecture 1 hour(s), Project.

*Repeat Credit:* May be repeated.

*Cross Listing:* GEO 286.

*Grade Mode:* Letter.

## **HYD 290 – Seminar in Hydrologic Science (1 unit)**

*Course Description:* Seminars and critical review of problems, issues, and research in hydrologic sciences. Oral presentations of research. Topics vary.

*Prerequisite(s):* Consent of instructor. Graduate standing and background in Hydrologic Science.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HYD 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HYD 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**HYD 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**HYD 440 – Hazardous Waste Operations Training (3 units)**

*Course Description:* Forty-hour course designed to meet the requirements of Federal OSHA regulation CFR 1910.120. Covers the health, regulatory, processing and safe handling issues/problems associated with working with hazardous materials.

*Prerequisite(s):* Upper division standing in College of Agricultural and Environmental Sciences.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**Immunology (IMM)****Graduate Studies****IMM 201 – Introductory Immunology (4 units)**

*Course Description:* Comprehensive introduction to the principles of immunology.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Enrollment limited to 30 students.

*Grade Mode:* Letter.

**IMM 201L – Advanced Immunology Laboratory Rotations (4 units)**

*Course Description:* Laboratory assignment in two research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental design. Student writes a project outline and gives oral presentation.

*Learning Activities:* Discussion/Laboratory 12 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**IMM 202L – Advanced Immunology Laboratory Rotations (5 units)**

*Course Description:* One four-week and one six week assignment in immunology research laboratories. Individual research problems with an emphasis on methodological/procedural experience and experimental design.

*Learning Activities:* Discussion/Laboratory 15 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**IMM 203 – Cancer Immunology (2 units)**

*Course Description:* Covers concepts in cancer biology, progression and immune evasion. It will also cover topics such as: immune surveillance, immune effector mechanisms and current concepts in immune therapy.

*Learning Activities:* Lecture 1 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

**IMM 204 – Topics in Innate Immunity (2 units)**

*Course Description:* Covers current topics in the field of innate immunity through student seminar presentations and critical evaluation of the literature. Concepts include: pathogen recognition, intercellular communication, specialized cellular function and effector/signaling molecules.

*Prerequisite(s):* IMM 201; or equivalent; IMM 293 preferred.

*Learning Activities:* Extensive Writing/Discussion 1 hour(s), Performance Instruction 1 hour(s).

*Enrollment Restriction(s):* Restricted to first- or second-year GGI and MGG students; others with permission of instructor; enrollment limited to 18 students.

*Grade Mode:* Letter.

**IMM 210 – Topics on Neuroimmunology & Neuroinflammation (1 unit)**

*Course Description:* Topics will include a broad range of frontiers in neuroimmunology and neuroinflammation. Research articles in current literature will serve to guide in-depth discussions of experimental approaches, technical aspects of experimental techniques, data interpretation, and other relevant aspects of each topic.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IMM 291 – Introduction to Critical Analysis of Immunology Research Literature (2 units)**

*Course Description:* Introduction to critical reading of primary research papers in Immunology. Guided discussions on recent primary research papers provided to students before each class.

*Prerequisite(s):* IMM 201 (can be concurrent); or consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IMM 292 – Immunotoxicology Seminar (2 units)**

*Course Description:* Seminar presentations dealing with principles of xenobiotic effects on immune system functions and specific examples of drugs and environmental chemicals exerting toxic effects on the immune system.

*Prerequisite(s):* Graduate standing in Pharmacology/Toxicology, Immunology, Physiology, or Biochemistry.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IMM 293 – Current Concepts in Immunology (4 units)**

*Course Description:* Innate and acquired immunity as defense mechanisms against disease. Mechanisms regulating the distinct cell types driving these responses and current concepts in the literature.

*Prerequisite(s):* PMI 126; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**IMM 294 – Comparative Clinical Immunology (4 units)**

*Course Description:* Clinical immunology in animals and man. Pathogenesis of representative infectious diseases, hypersensitive reactions, and autoimmunity. Emphasis on specific and nonspecific immune effector mechanisms to combat infections or mediate pathology.

*Prerequisite(s):* PMI 126; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed IMM 294A.

*Grade Mode:* Letter.

**IMM 295 – Cytokines (3 units)**

*Course Description:* Cytokines and their involvement in human and animal physiology/disease, molecular mechanisms and receptor signaling. Immune and non-immune actions. Overlapping/redundant functions (referred to as the "cytokine network").

*Prerequisite(s):* IMM 293; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**IMM 296 – Advanced Topics in Immunology (1 unit)**

*Course Description:* Presentation and discussion of faculty research topics in Immunology

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IMM 297 – Mucosal Immunology (2 units)**

*Course Description:* Basic concepts and current research topics in the field of mucosal immunology, with an emphasis on human immunology. Major emphases include innate and adaptive mucosal immunity, the gastrointestinal tract, the lung, lymphocyte trafficking, and mucosal vaccination.

*Prerequisite(s):* IMM 201; or equivalent.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

**Infectious Diseases (IDI)**

School of Medicine

**IDI 141 – Infectious Diseases of Humans (1 unit)**

*Course Description:* Integrates information on biological and molecular nature of the causative organism, modern diagnostics, treatment and prevention strategies, and the role of infectious diseases in contemporary society and throughout human history.

*Prerequisite(s):* Introductory knowledge in biology and chemistry recommended.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**IDI 192 – Research Internship in Internal Medicine (1-12 units)**

*Course Description:* Supervised work experience in the division of Infectious Diseases. Undergraduates will have an opportunity to acquire research experience in clinical settings.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**IDI 199 – Infectious Diseases Research (1-5 units)**

*Course Description:* Discrete problem requiring reading and actual manual effort in solution will be assigned to each student. Progress and results will be reviewed at intervals with instructor and via seminar presentation.

*Prerequisite(s):* Consent of instructor; chemistry through organic chemistry (in addition, physical and biochemistry preferred), biology through basic bacteriology (in addition, microbiology and immunology preferred).

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**IDI 211 – Epidemiology & Prevention of Infectious Diseases (3 units)**

*Course Description:* Infectious disease epidemiology and prevention, with equal emphasis on human and veterinary diseases. Major categories of infectious diseases by mode of transmission.

*Prerequisite(s):* EPI 205B; (EPI 207; or IMD 421).

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**IDI 299 – Research in Infectious Diseases (1-12 units)**

*Course Description:* Laboratory investigation contributing to the dissertation for a graduate degree.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IDI 440 – Introduction to AIDS & Related Disorders (1.5-6 units)**

*Course Description:* Familiarizes students with the diagnosis and treatment of individuals infected with the human immunodeficiency virus. Interview patients, observe patient care and participate in ongoing clinic research as well as examine alternative lifestyles.

*Prerequisite(s):* First- and second-year medical students in good academic standing; consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Discussion 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**IDI 450 – Clinical & Social Care of the Injection Drug User (1-6 units)**

*Course Description:* Lecture and guided clinical practice in a supervised clinical setting, focusing on the social and medical aspects of health care for injection drug users.

*Prerequisite(s):* Consent of instructor; first- and second-year medical students in good academic standing.

*Learning Activities:* Lecture 1 hour(s), Clinical Activity 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IDI 460 – Infectious Diseases Clinical Clerkship (3-6 units)**

*Course Description:* Patients ill with infectious diseases, including AIDS, will be evaluated and presented at rounds and case conferences. Patients are also seen in the Infectious Diseases Clinic. Instruction in clinical microbiology and the proper use of the laboratory will be provided.

*Prerequisite(s):* Successful completion of two years of study in an accredited medical school.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment with priority to fourth-year medical students.

*Grade Mode:* Honors/Pass/Fail.

## **IDI 470 – Outbreak Investigation & Infection Prevention (3-9 units)**

*Course Description:* Outbreak investigation is a central aspect of infectious disease epidemiology. Gathering of clinical data and its analysis for surveillance underpins outbreak identification, response and control. Focuses on understanding routine and unusual outbreak and the application of methods for detection, investigation and control in both inpatient and outpatient settings as well as local and global environments.

*Learning Activities:* Lecture.

*Grade Mode:* Pass/Fail only.

## **IDI 493 – Correctional Medicine SSM; Evaluation of HIV & Hepatitis C Patients (6 units)**

*Course Description:* Primary agenda focuses on the evaluation of treatment of HIV and Hepatitis C patients in the correctional environment.

*Learning Activities:* Clinical Activity 30 hour(s), Discussion 5 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **IDI 499 – Research Topics in Infectious Disease (2-12 units)**

*Course Description:* Discrete problem requiring reading and actual manual effort in solution will be assigned to each student. Progress and results to be reviewed at intervals with instructor and via seminar presentation.

*Prerequisite(s):* Successful completion of the first-year of study in School of Medicine; graduate students (approved for graduate credit); and/or consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

# **Integrated Studies (IST)**

College of Letters & Science

## **IST 008 – Colloquium (1 unit)**

*Course Description:* Lectures, films, and readings on the interrelation between the arts and sciences.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **IST 008A – Special Topics in Natural Science & Mathematics (4 units)**

*Course Description:* Group study of a special topic in natural sciences and mathematics. Varies with topic offered.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **IST 008B – Special Topics in Humanities (4 units)**

*Course Description:* Group study of a special topic in humanities. Varies with topic offered.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **IST 008C – Special Topics in the Social Sciences (4 units)**

*Course Description:* Group study of a special topic in the Social Sciences. Varies with topic offered.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **IST 009 – Seminar (1 unit)**

*Course Description:* Preparation of a research report. Normally taken with IST 008.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **IST 090 – Seminar (1 unit)**

*Course Description:* Interrelation between the arts and sciences, focusing on a special topic.

*Prerequisite(s):* IST 009; consent of instructor; completion of 45 units with a minimum GPA of 3.250.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Enrollment limited to sophomores who participated in the Integrated Studies Honors Program during their freshman year and transfer students by consent of instructor.

*Grade Mode:* Pass/No Pass only.

## **IST 094 – Introduction to Undergraduate Research (1 unit)**

*Course Description:* The nature of research at the undergraduate level.

*Prerequisite(s):* IST 009; consent of instructor; completion of 45 units with a minimum GPA of 3.500.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to sophomores who participated in the Integrated Studies Honors Program during their freshman year and other students by consent of instructor.

*Grade Mode:* Pass/No Pass only.

**IST 190 – Topics in Integrated Studies (1 unit)**

*Course Description:* Discussion of the integration of the arts and sciences, focusing on a special topic.

*Prerequisite(s):* IST 009; consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

**IST 194HA – Special Study for Honors Students (4 units)**

*Course Description:* A program of research culminating in the writing of a junior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* IST 009; consent of instructor; completion of 90 units with a minimum GPA of 3.500.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**IST 194HB – Special Study for Honors Students (4 units)**

*Course Description:* A program of research culminating in the writing of a junior honors thesis under the direction of a faculty advisor.

*Prerequisite(s):* IST 009; consent of instructor; completion of 90 units with a minimum GPA of 3.500.

*Learning Activities:* Independent Study 3 hour(s), Seminar 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**IST 197T – Tutoring in Integrated Studies (1-4 units)**

*Course Description:* Tutoring in Integrated Studies courses, usually in small discussion groups. Weekly discussions with the instructor on the subject matter of the course being tutored and on the art and craft of teaching.

*Prerequisite(s):* Consent of Director of Integrated Studies.

*Learning Activities:* Tutorial 1 hour(s).

*Enrollment Restriction(s):* Open to students in the Integrated Studies Program only.

*Repeat Credit:* May be repeated 8 time(s).

*Grade Mode:* Pass/No Pass only.

# Internal Medicine (IMD)

**School of Medicine****IMD 090 – Seminar in Medical Ethics (1 unit)**

*Course Description:* Seminar Series covering the current topics in Medical Ethics.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**IMD 092 – Internship (1-4 units)**

*Course Description:* Supervised internship in internal medicine and related fields.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-12 hour(s).

*Grade Mode:* Pass/No Pass only.

**IMD 098 – Directed Group Study (1-2 units)**

*Course Description:* Directed group study in medicine and related fields.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Seminar 1-2 hour(s).

*Grade Mode:* Pass/Fail only.

**IMD 099 – Undergraduate Research in Medicine: Molecular & Cell Biology (1-3 units)**

*Course Description:* Undergraduate research in medicine, focusing on molecular & cellular biology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/Fail only.

**IMD 164 – Practicum in Community Health Clinic: Bayanihan Clinic (1 unit)**

*Course Description:* Through active participation in the medical aspects of community health clinics, the undergraduate student gains knowledge of the organization, administration, and problem-solving capabilities.

*Learning Activities:* Clinical Activity 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**IMD 192 – Internship in Internal Medicine (1-12 units)**

*Course Description:* Supervised work experience in internal medicine and related fields.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/Fail only.

**IMD 194 – Practicum in Community Health Clinics (1-3 units)**

*Course Description:* The undergraduate student, through active participation in the medical aspects of community health clinics, gains knowledge of the organization, administration, and problem-solving capabilities of these primary care facilities.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 5-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**IMD 198 – Directed Group Study (1-3 units)**

*Course Description:* Directed group study in medicine and related fields.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-2 hour(s), Extensive Problem Solving 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**IMD 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/Fail only.

**IMD 214 – Topics in Medical Ethics (1 unit)**

*Course Description:* The complex moral, legal and ethical dilemmas that patients, families, and health care providers face in today's clinics.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IMD 220D – Cardiovascular System (2.5 units)**

*Course Description:* Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders.

*Prerequisite(s):* HPH 200; consent of instructor; graduate student status.

*Learning Activities:* Lecture/Discussion 5.50 hour(s).

*Grade Mode:* Letter.

**IMD 250 – Medicine & the Law (3 units)**

*Course Description:* Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IMD 414 – One Health: A Course on Global Health (1 unit)**

*Course Description:* Global health problems are complex and require culturally-sensitive, socially-acceptable, and action-oriented approaches to create practical and cost-effective solutions. Will examine major health problems created by the convergence of human, animal, and environmental influences.

*Learning Activities:* Conference 8 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**IMD 416 – Summer Institute on Race & Health (6 units)**

*Course Description:* Using field trips, media, readings, and clinical experiences, eight-ten first-year medical students explore issues of race, health disparities and related issues in a four-week institute during the summer break.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 30 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/Fail only.

**IMD 420A – Hematology (2 units)**

*Course Description:* Malignant disorders of blood cells and transfusion therapy. Covers acute leukemia, myelodysplasia, myeloproliferative disorders, lymphoma, and myeloma.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

**IMD 420B – Gastrointestinal System (2.5 units)**

*Course Description:* Basic pathophysiologic principles of digestive diseases on which clinical concepts and judgments can be developed. Emphasis on pathophysiologic basis of gastroenterological and hepatic disorders with discussion of major disorders and their diagnosis and management.

*Prerequisite(s):* Approval of Committee on Student Progress.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

**IMD 420C – Pulmonary & Critical Care Medicine (2.5 units)**

*Course Description:* Clinical aspects of respiratory anatomy, physiology, and pathology. Diagnostic procedures and a description of the major pulmonary diseases & disorders, and critical care medicine.

*Prerequisite(s):* Approval of SOM's Committee on Student Promotions.

*Learning Activities:* Lecture/Discussion 5.50 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only; student must pass all SOM Year 1 courses.

*Grade Mode:* Pass/Fail only.

**IMD 420D – Cardiovascular System (2.5 units)**

*Course Description:* Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders.

*Prerequisite(s):* Approval of the School of Medicine Committee on Student Promotions.

*Learning Activities:* Lecture/Discussion 5.50 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only; student must pass all SOM Year 1 courses.

*Grade Mode:* Pass/Fail only.

**IMD 420E – Nephrology (2 units)**

*Course Description:* Fundamental aspects of disorders of body water, electrolytes and acid/base balance; major categories and mechanisms of parenchymal renal diseases; urinary tract infections.

*Prerequisite(s):* Approval of Student Progress Committee.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Pass/Fail only.

**IMD 430 – Medicine Clerkship (3-12 units)**

*Course Description:* Clerkship is divided into two, four-week blocks, one each at UCDMC and at Kaiser Hospitals. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**IMD 430FA – SJVP Longitudinal Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430FB – SJVP Longitudinal Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430FC – SJVP Longitudinal Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430FD – SJVP Longitudinal Medicine Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430R – Rural PRIME Internal Medicine Longitudinal Clerkship (2 units)**

*Course Description:* Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430RA – Rural PRIME Internal Medicine Longitudinal Clerkship (3 units)**

*Course Description:* Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430RB – Rural PRIME Internal Medicine Longitudinal Clerkship (3 units)**

*Course Description:* Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430RC – Rural PRIME Internal Medicine Longitudinal Clerkship (3 units)**

*Course Description:* Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430RD – Rural PRIME Internal Medicine Longitudinal Clerkship (1 unit)**

*Course Description:* Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430TA – TeachMS Longitudinal Medicine Clerkship (A) (4 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430TB – TeachMS Longitudinal Medicine Clerkship (B) (6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 430TC – TeachMS Longitudinal Medicine Clerkship (C) (2 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 439D – Directed Clinical Studies in Internal Medicine (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **IMD 439R – Directed Studies in Internal Medicine (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Independent Study 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **IMD 440 – TEACH-MS Outpatient Internal Medicine (3 units)**

*Course Description:* Two-week rotation. Participate in the clinical care of patients from underserved communities, working with outpatient Internal Medicine preceptors who are primarily based at the Sacramento County Health Center. Rotate through a variety of different outpatient clinics including: Primary Care, Same Day Access Clinic, Homeless Outreach Clinic, and Chronic Disease Management.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Pass/Fail only.

## **IMD 450A – Medicine & the Law (1.5 units)**

*Course Description:* Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 450B – Medicine & the Law (1.5 units)**

*Course Description:* Legal and bioethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 458Y – Climate Change: Implications for Clinical Practice & Population Health (3-9 units)**

*Course Description:* Climate change and its associated environmental and social disruptions are and will increasingly lead to clinical and population health consequences for which clinicians, and health systems, will need to be prepared to best care for their patients and the populations they serve. Draws from the Global Consortium on Climate and Health Education's set of Core Climate and Health Competencies for Health Professionals and places an emphasis on climate change and clinical practice.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 459 – Oncology: Research & Treatment of Cancer (2 units)**

*Course Description:* Comprehensive review of current treatment practices of cancer and state-of-the-art research impacting treatment and prevention of cancer. Emphasis on epidemiology, molecular biology, and pharmacology.

*Prerequisite(s):* Second-, third-, or fourth-year medical student and/or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **IMD 460 – Correctional Health Care Clerkship (1-12 units)**

*Course Description:* Covers Correctional Health delivery and the effects of detention and incarceration on health status. Special emphasis on problems unique to health care delivery in a prison setting. Student will spend time in clinical settings at three prison facilities.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 461 – Mather VA Internal Medicine AI (3-6 units)**

*Course Description:* Acting Internship in Internal Medicine for qualified 4th year Medical Students from the UC Davis School of Medicine at the Sacramento VA Hospital. Experiences will somewhat mirror those of AIs at UCDMC.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 462 – Medicine Wards AI (6 units)**

*Course Description:* Assume role of acting intern and be primary physician on medical ward under direction of medical resident and staff. Teams I-V take call every fifth night. Emphasis on evidence-based inpatient care.

*Prerequisite(s):* MDS 431; consent of instructor; demonstrated ability to accept responsibility.

*Learning Activities:* Clinical Activity 40 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 463 – Acting Internship in Medicine Intensive Care Unit (MICU) (3-6 units)**

*Course Description:* At UCDMC, student functions as acting intern on MICU service under direction of medical resident and staff. Responsibility for patients admitted to MICU. On call in hospital every fourth night.

*Prerequisite(s):* Completion of third-year in medical school; consent of Director of MICU.

*Learning Activities:* Clinical Activity 40 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 464 – Bayanihan Primary Care Clinic (1-12 units)**

*Course Description:* Under the guidance and supervision of a physician, learn patient history taking, medical documentation, counseling, diagnosis and treatment of patients with chronic and acute disease. Provides exposure to the special needs of various ethnic and socioeconomic groups.

*Learning Activities:* Clinical Activity 0.60 hour(s).

*Enrollment Restriction(s):* Restricted to medical students in all four years of medical school.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **IMD 465 – Medicos-Global Health Sciences (9 units)**

*Course Description:* Travel to foreign country for four weeks to collaborate with faculty from local universities and work in urban and rural environments, including hands-on experience with clinic patients. Cultural exchange and awareness of global health care.

*Prerequisite(s):* Consent of instructor; medical students only.

*Learning Activities:* Lecture 5 hour(s), Clinical Activity 25 hour(s), Fieldwork 5 hour(s), Project (Term Project) 5 hour(s).

*Grade Mode:* Pass/Fail only.

## **IMD 466 – Medical Spanish for Providers (3 units)**

*Course Description:* Provides ample experience in Spanish patient interviews, supervision of interview styles and Spanish-language skills, discussion of common diagnoses, procedural consent, management/treatment plans, and patient education in Spanish to empower medical students to practice medicine with the nationally growing monolingual Spanish-speaking patient population. Curriculum adapted with permission from the Medical Spanish Taskforce.

*Learning Activities:* Lecture 40 hour(s).

*Grade Mode:* Pass/Fail only.

## **IMD 467 – TEACH-MS Outpatient Internal Medicine Advanced Clinical Clerkship (3 units)**

*Course Description:* Two-week rotation with participation in the clinical care of patients from underserved communities, working with outpatient Internal Medicine preceptors who are primarily based at the Sacramento County Health Center.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Pass/Fail only.

## **IMD 468 – Ambulatory Internal Medicine Externship (3-18 units)**

*Course Description:* Hands-on primary care clinical experience in the ambulatory setting supervised by a general internist. Emphasis on evidence-based outpatient care.

*Prerequisite(s):* IMD 430; consent of instructor; demonstrated ability to accept responsibility.

*Learning Activities:* Clinical Activity 40 hour(s), Variable 12-40 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 469 – Acting Internship in Medicine Intensive Care Unit (MICU) (4-8 units)**

*Course Description:* At UCDMC, student functions as acting intern on MICU service under direction of medical resident and staff. Responsibility for patients admitted to MICU.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail Only.

## **IMD 470 – Critical Evaluation of Landmark Studies in Evidence-Based Medicine (3 units)**

*Course Description:* Primary objective is to prepare future physicians to effectively integrate evidence-based medicine into their clinical practice. While this course has an Internal Medicine emphasis, the skills the course aims to impart—formulating focused clinical questions, searching the medical literature, evaluating the quality of research, and integrating evidence into clinical practice, giving effective article presentations)—apply to all future clinicians, regardless of their specialty.

*Prerequisite(s):* Fourth-year medical student.

*Learning Activities:* Seminar.

*Grade Mode:* Pass/Fail only.

## **IMD 480 – Person Centered Assessment (1 unit)**

*Course Description:* Person-centered assessment modalities and diagnostic approaches with regards to Internal Medicine and its different subspecialties.

*Prerequisite(s):* Open to all medical students.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Pass/Fail only.

## **IMD 490 – Medical Care for Underserved & Marginalized Communities (3 units)**

*Course Description:* Review the evidence about health outcomes for marginalized communities, to use the frameworks of 'structural competency' and 'implicit bias' to understand phenomena that drive disparities, to study the cases of several underserved communities in the Sacramento area, experience first-hand community organizations that are providing care to marginalized communities and practice how to identify in the clinical setting unmet social needs and their impact on health.

*Learning Activities:* Lecture/Discussion 24 hour(s).

*Grade Mode:* Pass/Fail only.

## **IMD 493 – Palliative Care: Essentials in Communication, Pain & Symptom Management (6 units)**

*Course Description:* Spend one week with the inpatient palliative care service, one week with the inpatient pain pharmacy service, and two weeks with Snowline Hospice.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 24 hour(s), Discussion 4 hour(s), Independent Study 2 hour(s).

*Grade Mode:* Pass/Fail only.

## **IMD 494 – Practicum in Community Health Clinics (1-12 units)**

*Course Description:* Assigned to clinical settings that demonstrate ethnic, urban/rural, or other related aspects of clinical community health. Through active participation in health care delivery, learn to relate conceptual with practical aspects of primary health care.

*Prerequisite(s):* Medical student with consent of instructor.

*Learning Activities:* Clinical Activity 15-40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 495 – Palliative Care: Essentials in Communication, Pain & Symptom Management (3-6 units)**

*Course Description:* Mix of didactic sessions and clinical time. Exposure to management of nociceptive pain, neuropathic pain and mixed pain syndromes. Introduction to the pathophysiology of pain, pharmacology of opioids and non-opioids medications, and management of pain, titration and equianalgesic conversion of pain medications.

*Learning Activities:* Variable.

*Grade Mode:* Pass/Fail only.

## **IMD 497 – Medicine, Bioethics & the Holocaust (3 units)**

*Course Description:* Concept of "evil" and the role of collaborators, bystanders and participants exemplified by the holocaust and compared to problems physicians face in practice today. Demonstration that evil emerges incrementally until taken for granted.

*Prerequisite(s):* Consent of instructor; medical students only.

*Learning Activities:* Lecture/Discussion 10 hour(s).

*Grade Mode:* Pass/Fail only.

## **IMD 498 – Group Study in Internal Medicine (1-18 units)**

*Course Description:* Special study for medical students which may involve laboratory or library research, ambulatory or inpatient care responsibility on campus, at UCDMC or off campus by specific arrangement.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **IMD 499 – General Medicine Research (1-18 units)**

*Course Description:* General medicine research.

*Learning Activities:* Independent Study 20 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **International Agricultural Development (IAD)**

College of Agricultural & Environmental Sciences

## **IAD 010 – Introduction to International Agricultural Development (4 units)**

*Course Description:* Theories, practices and institutions relating to agricultural development; the interaction of changing social, cultural and economic organization through successive stages of economic development; impact of new agricultural technology on underdeveloped regions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **IAD 092 – Internship (1-12 units)**

*Course Description:* Supervised internship, off and on campus, in community and institutional settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **IAD 103 – Social Change & Agricultural Development (4 units)**

*Course Description:* How social and cultural factors influence technological change in agriculture; theories of diffusion of innovations; social impact analysis and technology assessment.

*Prerequisite(s):* Introductory social science course (Anthropology (ANT), Sociology (SOC), Economics (ECN), International Agricultural Development (IAD)).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **IAD 142 – Equipment & Technology for Small Farms (2 units)**

*Course Description:* Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ABT 142.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## **IAD 160 – Agroforestry: Global & Local Perspectives (3 units)**

*Course Description:* Traditional and evolving use of trees in agricultural ecosystems; their multiple roles in environmental stabilization and production of food, fuel, and fiber; and socioeconomic barriers to the adoption and implementation of agroforestry practices.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C; (PLS 142 or PLS 150 or BIS 002B); or general ecology course in lieu of PLS 142 or PLS 150 or BIS 002B.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken previously taken AMR 160. (Former AMR 160.)

*Cross Listing:* PLS 160.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **IAD 170 – Program Development for International Agriculture (4 units)**

*Course Description:* Principles of leadership and management for international agricultural development. Organizations and organizational behavior, and the implications for planning and administering organizations involved in the global development effort.

*Prerequisite(s):* IAD 010.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **IAD 190 – Proseminar in International Agricultural Development (1 unit)**

*Course Description:* Presentation and discussion of current topics in international agricultural development by visiting lecturers, staff and students.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **IAD 192 – Internship (1-12 units)**

*Course Description:* Supervised internship, off and on campus, in community and institutional settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **IAD 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **IAD 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **IAD 200N – Philosophy & Practice of Agricultural Development (5 units)**

*Course Description:* Introduces key elements of philosophy and practice of agricultural development in less developed countries; major paradigms of development; historical context within which these paradigms operate; various development techniques and initiatives emerging from agricultural production to institutional capacity building and management.

*Learning Activities:* Lecture/Discussion 5 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed former IAD 202.

*Grade Mode:* Letter.

## **IAD 201 – Economics of Small Farms & Farming Systems (4 units)**

*Course Description:* Economic perspective on small farm development. Establishes a basis for predicting farmers' responses to changes in the economic environment, and for proposing government policies to increase small farm production and improve farmer and national welfare.

*Prerequisite(s):* ARE 100A or ECN 100; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **IAD 202N – Analysis & Determinants of Farming Systems (4 units)**

*Course Description:* Unifying concepts of cropping systems in temperate and tropical climatic zones; agroecosystems stability, diversity and sustainability; management strategies, resource use efficiency and their interactions; role of animals, their impact on energy use efficiency, nutrient cycling, and providing food and power.

*Prerequisite(s):* PLS 110C or PLS 111; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed former IAD 200.

*Grade Mode:* Letter.

## **IAD 203N – Project Planning & Evaluation (4 units)**

*Course Description:* Interdisciplinary setting for application of student skills and specialization to a "real world" development project. Focus on team-building and effective interdisciplinary problem-solving methods, with the objective of producing a project document and presentation within a specified deadline.

*Prerequisite(s):* IAD 200N; or consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Workshop 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed former IAD 203.

*Grade Mode:* Letter.

## **IAD 290 – Seminar in International Agricultural Development (1-2 units)**

*Course Description:* Discussion and critical evaluation of advanced topics and issues in international agricultural development.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **IAD 291 – Topics in International Agricultural Development (1-3 units)**

*Course Description:* Selected topics dealing with current issues in agricultural development in lesser developed nations. Variable content.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**IAD 292 – Graduate Internship (1-12 units)**

*Course Description:* Individually designed supervised internship, off or on campus, in community, business or institutional setting. Developed with advice of faculty mentor and Humphrey Coordinator.

*Prerequisite(s):* Participation in H. Humphrey Fellow Program or consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IAD 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IAD 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**IAD 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**International Commercial Law (ICL)****School of Law****ICL 201 – Orientation in United States Law (7 units)**

*Course Description:* Investigation of the Common Law System of the United States. Includes structure of the U.S. government, Constitutional law, contracts, torts, real property, consumer law, securities law, intellectual property, antitrust, taxation, labor law, environmental law, ethics, remedies, legal research and trial practice.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 201A – Fundamentals in United States Law (4 units)**

*Course Description:* Investigation of the Common Law System of the U.S. Includes the American constitutional system, the American judiciary, the American civil trial, and foundational substantive and procedural law such as real property, torts, criminal law and procedure, civil procedure, and contracts.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 201B – Advanced Topics in United States Law (3 units)**

*Course Description:* Orientation to advanced topics in U.S. law: Intellectual Property (including copyright and trademarks), Commercial and Consumer Law, Advanced Contracts, Antitrust, Taxation, Remedies, Labor Law, Environmental Law, Dispute Resolution, Remedies and introduction to trial techniques and legal research/writing.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 202 – Introduction to Contracts (4 units)**

*Course Description:* Examines sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 202A – Introduction to Contracts Formation (2 units)**

*Course Description:* Examines formation of the sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 202AS – Introduction to Contracts Formation (2 units)**

*Course Description:* Examines formation of the sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 202B – Contracts Performance (2 units)**

*Course Description:* Examines issues of performing promises that are enforceable and possible breach of promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 202BS – Contract Performance (2 units)**

*Course Description:* Examines issues of performing promises that are enforceable and possible breach of promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts to changing social demands.

*Prerequisite(s):* ICL 202A; or equivalent; Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 203 – Civil Procedure (2 units)**

*Course Description:* Study of the fundamental and recurrent problems in civil actions including the methods used by federal and state courts to resolve civil disputes.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 204 – International Joint Ventures (3 units)**

*Course Description:* International and U.S. business and legal transactions. Legal planning, problem solving, decision making and negotiations related to the break-up and dissolution of a major international joint venture. U.S. laws including finance, tax, bankruptcy, labor, antitrust, environmental, corporate structures and intellectual property. Offered every three years.

*Prerequisite(s):* ICL 201; Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 205 – Introduction to Constitutional Law (4 units)**

*Course Description:* Principles, doctrines and controversies regarding the structure and division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among branches of the federal government.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 205A – Overview of US Constitutional Law (2 units)**

*Course Description:* Principles, doctrines and controversies regarding the structure and division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among branches of the federal government.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 205AS – Overview of US Constitutional Law (2 units)**

*Course Description:* Principles, doctrines and controversies regarding the structure and division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among branches of the federal government.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 205B – Constitutional Law–Protection of Individual Rights (2 units)**

*Course Description:* Principles, doctrines and controversies regarding the U.S. Constitution Bill of Rights, including due process of law, equal protection, freedom of expression, freedom of religion, state action, and congressional legislation in aid of civil rights and liberties.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 211 – Negotiations & Alternative Dispute Resolution (1 unit)**

*Course Description:* Mechanisms for resolving disputes including the alternatives to litigation such as negotiation, mediation, and arbitration. Advantages and disadvantages of each approach. Offered every three years.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 10 hour(s).

*Grade Mode:* Letter.

**ICL 212 – Introduction to Negotiation (2 units)**

*Course Description:* Introduction to theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 212S – Introduction to Negotiation (2 units)**

*Course Description:* Introduction to theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 214 – Advanced Negotiation (2 units)**

*Course Description:* Principles and empirical approaches to advanced negotiations including negotiation framework, models, styles, multiple party/issue negotiations and settlements.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 214S – Advanced Negotiation (2 units)**

*Course Description:* Principles and empirical approaches to advanced negotiations including negotiation framework, models, styles, multiple party/issue negotiations and settlements.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 215 – Business Associations (4 units)**

*Course Description:* Legal rules and concepts applicable to business associations including general partnerships, joint ventures, limited partnerships, limited liability entities, and sole proprietorships.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 215S – Business Associations (4 units)**

*Course Description:* Legal rules and concepts applicable to business associations including general partnerships, joint ventures, limited partnerships, limited liability entities, and sole proprietorships.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 216 – International Business Transactions (2 units)**

*Course Description:* Legal problems arising from international business transactions. Focus on international sales contracts, choice of law, forum selection clauses, letters of credit, transfers of technology, regulation of bribery, development of joint ventures, repatriation of profits, foreign exchange problems, and national efforts to control imports.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 217 – Alternative Dispute Resolution (2 units)**

*Course Description:* Introduces students to a wide variety of alternative dispute resolution procedures, with an in-depth emphasis on negotiation, mediation and arbitration.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 219 – Advanced Writing Project (4 units)**

*Course Description:* The completion of a written research project under the active supervision of a faculty member in satisfaction of the research-writing requirement.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Project.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ICL 220 – United States Taxation of Multinational Investments (2 units)**

*Course Description:* An analysis of the United States taxation of multinational investments including jurisdiction of tax, the U.S. tax system, foreign tax credits, treaties, and transfer pricing.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 227 – Criminal Procedure (2 units)**

*Course Description:* Federal constitutional limits on government authority to gather evidence and investigate crime. Includes Fourth Amendment limits on search, seizure, and arrest; Fifth Amendment privilege against self-incrimination; Sixth Amendment right to counsel.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 228A – Mergers & Acquisitions Law (2 units)**

*Course Description:* Practical approach to mergers and acquisitions with an in-depth look at the planning, negotiation and completion of mergers and acquisitions.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 228AS – Mergers & Acquisitions Law (2 units)**

*Course Description:* Practical approach to mergers and acquisitions with an in-depth look at the planning, negotiation and completion of mergers and acquisitions.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 236 – United States Securities Law & Regulation (2 units)**

*Course Description:* Structural and jurisdictional issues associated with securities practice. Topics include the regulation of public offerings, transactions by corporate insiders, regulation of corporate disclosure and conduct, and the liabilities of corporations and individuals under anti-fraud provisions.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 239 – Mediation (2 units)**

*Course Description:* Introduction to the mediation process. Development of communication skills, the ability to analyze disputes, to understand why mediations succeed or fail, and understand the advantages and limitations of mediation as a method of resolving disputes.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 242 – Private International Law (2 units)**

*Course Description:* Operating law across national borders; emphasis on methods of resolving international disputes. International aspects of jurisdiction, choice of law, judgment enforcement, forum choice, process service, taking of evidence, foreign sovereign immunity, extraterritorial regulation of antitrust, securities; other national laws.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 242S – Private International Law (2 units)**

*Course Description:* Operating law across national borders; emphasis on methods of resolving international disputes. International aspects of jurisdiction, choice of law, judgment enforcement, forum choice, process service, taking of evidence, foreign sovereign immunity, extraterritorial regulation of antitrust, securities; other national laws.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

**ICL 247 – Banking Law (1 unit)**

*Course Description:* Institutional features of international banking transactions, the structure of a large financial deal, and the mechanics of overseeing large loans. Emphasis on negotiable instruments such as bills of lading, letters of credit, standby letters of credit, and interbank transactions. Offered every three years.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 10 hour(s).

*Grade Mode:* Letter.

**ICL 249 – Comparative Law (1 unit)**

*Course Description:* A comparative study of the development of schools of legal thought, chiefly Common law systems and Civil law traditions. Attention to the historical reasons for their divergence, contemporary approaches to universal problems such as succession, torts, and contracts, the cross-fertilization of laws and difficulties commonly associated with importing foreign law into new territory.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 10 hour(s).

*Grade Mode:* Letter.

### **ICL 250 – International Trade Law (3 units)**

*Course Description:* An investigation of global trading systems including international trade in goods and services, e-commerce, international intellectual property, international tax planning and investment. Includes substantive and procedural provisions of the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA). Offered every three years.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

### **ICL 251 – United States Litigation Issues (1 unit)**

*Course Description:* Prevention and resolution of disputes in international commerce. Emphasis on preparing for a trial in the United States. Includes the study of pre-trial motions, jury selection, opening statements, rules of evidence, closing arguments, and the selection of appropriate strategies. Offered every three years.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 10 hour(s).

*Grade Mode:* Letter.

### **ICL 262 – Antitrust (1 unit)**

*Course Description:* Historical and institutional background of Antitrust law in the United States. The statutory framework including price fixing, limits on distribution, monopolization and mergers, and reporting requirements.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 10 hour(s).

*Grade Mode:* Letter.

### **ICL 270 – Financing International Transactions (3 units)**

*Course Description:* How capital is raised in international markets. Investment strategies for U.S. markets. Taxation of financial investments, international currency regulation, and assessing rates of return on international investments. Offered every three years.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

### **ICL 274 – Intellectual Property (2 units)**

*Course Description:* Intensive study of intellectual property law. Including copyright, trademark and patent law and unfair competition.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

### **ICL 274S – Intellectual Property (2 units)**

*Course Description:* Intensive study of intellectual property law. Including copyright, trademark and patent law and unfair competition.

*Prerequisite(s):* ICL 201; Law school education or the equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

### **ICL 283 – Contract Remedies (2 units)**

*Course Description:* Covers a range of remedies for contract breach: remedies under common law and equity, liquidated damages clauses, remedies for mistake and unconscionability as well as breach of contract for the Sale of Goods under UCC Article II.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

### **ICL 283S – Contract Remedies (2 units)**

*Course Description:* Covers a range of remedies for contract breach: remedies under common law and equity, liquidated damages clauses, remedies for mistake and unconscionability as well as breach of contract for the Sale of Goods under UCC Article II.

*Prerequisite(s):* ICL 202A; ICL 202B; or equivalent; Law School education or equivalent.

*Learning Activities:* Discussion/Laboratory 20 hour(s).

*Grade Mode:* Letter.

### **ICL 285 – Environmental Law (2 units)**

*Course Description:* Introduction to federal and state environmental law. Historical development of environmental law; the role of courts, the legislature and the executive branch in the development and implementation of environmental policy. Review of major statutes.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

### **ICL 289 – Licensing Academy in Intellectual Property & Technology Commercialization (4 units)**

*Course Description:* Intellectual property as it relates to current forms of legal protection and how new innovations fit into these models, including public-private technology transfer, patents, institutional objectives, technology transfer offices, startups, and licenses.

*Prerequisite(s):* ICL 201; Law School education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Letter.

### **ICL 290 – American Legal System Research Seminar (1 unit)**

*Course Description:* American legal system and its structure. Legal research methodologies and presentation with attention to analysis, synthesis, organization, and editing techniques common to legal writing.

*Prerequisite(s):* ICL 201; Law School education or equivalent.

*Learning Activities:* Seminar 5 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **ICL 291C – International Commercial Law Seminar (4 units)**

*Course Description:* Advanced seminar on a current topic in International Commercial Law. Offered at the University of Cologne in Cologne, Germany for two weeks each summer.

*Prerequisite(s):* ICL 201; Law School education or equivalent.

*Learning Activities:* Seminar 20 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

### **ICL 292 – International Commercial Law Seminar (1-4 units)**

*Course Description:* Advanced seminar in a current topic in International Commercial Law. Topic changes each year course is offered.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

## **ICL 292S – International Commercial Law Seminar (1-4 units)**

*Course Description:* Advanced seminar in a current topic in International Commercial Law. Topic changes each year course is offered.

*Prerequisite(s):* Law school education or equivalent.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

## **ICL 299 – Advanced Research in Legal Problems (1-4 units)**

*Course Description:* Student individualized research projects under faculty supervision.

*Prerequisite(s):* ICL 201; Law School education or equivalent.

*Learning Activities:* Variable 3-40 hour(s).

*Enrollment Restriction(s):* Permission of supervising instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **International Relations (IRE)**

College of Letters & Science

## **IRE 001 – Global Interdependence (4 units)**

*Course Description:* Development of the concept of global interdependence along its political, economic, demographic, cultural, technological, and environmental dimensions. Focus on the ways societies and states interact. Provides the foundation for upper division multidisciplinary work in international relations.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **IRE 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **IRE 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **IRE 104 – The Political Economy of International Migration (4 units)**

*Course Description:* Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation.

*Prerequisite(s):* SOC 001, SOC 002, SOC 003, or SOC 004 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* SOC 104.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **IRE 190 – Topics in International Relations (4 units)**

*Course Description:* Selected topics in international relations. Variable content.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **IRE 192 – International Relations Internship (1-12 units)**

*Course Description:* Work experience in international relations, with term paper summarizing the practical experience of the student.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **IRE 194HA – Special Study for Honors Students (4 units)**

*Course Description:* Directed reading, research, and writing on topics selected by students and instructor culminating in preparation of a senior honors thesis under direction of a faculty advisor.

*Prerequisite(s):* Open only to majors of senior standing who qualify for Honors Program.

*Learning Activities:* Seminar 2 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

## **IRE 194HB – Special Study for Honors Students (4 units)**

*Course Description:* Directed reading, research, and writing on topics selected by students and instructor culminating in preparation of a senior honors thesis under direction of a faculty advisor.

*Prerequisite(s):* Open only to majors of senior standing who qualify for Honors Program.

*Learning Activities:* Seminar 2 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

## **IRE 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **IRE 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

# **Italian (ITA)**

College of Letters & Science

**ITA 001 – Elementary Italian (5 units)**

*Course Description:* Introduction to Italian grammar and development of all language skills in a cultural context with special emphasis on communication.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Students who have successfully completed ITA 002 or ITA 003 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only; although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed; not open for credit to students who have taken ITA 001A or ITA 001S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 001A – Accelerated Intensive Elementary Italian (15 units)**

*Course Description:* Special 12-week accelerated, intensive summer session course that combines the work of ITA 001, ITA 002, and ITA 003. Introduction to Italian grammar and development of all language skills in a cultural context with emphasis on communicative ability.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ITA 001, ITA 002, or ITA 003.

*Grade Mode:* Letter.

**ITA 001S – Elementary Italian (5 units)**

*Course Description:* Introduction to Italian grammar and development of all language skills in a cultural context with special emphasis on communication. May be taught abroad.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Students who have successfully completed ITA 002 or ITA 003 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only; although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed; not open for credit to students who have taken ITA 001 or ITA 001A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 002 – Elementary Italian (5 units)**

*Course Description:* Continuation of ITA 001 or ITA 001S. Review of grammar and vocabulary, and practice of all language skills through cultural texts.

*Prerequisite(s):* ITA 001 or ITA 001S.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ITA 001A or ITA 002S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 002S – Elementary Italian (5 units)**

*Course Description:* Continuation of ITA 001 or ITA 001S. Review of grammar and vocabulary, and practice of all language skills through cultural texts. May be taught abroad.

*Prerequisite(s):* ITA 001 or ITA 001S.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ITA 001A or ITA 002.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 003 – Elementary Italian (5 units)**

*Course Description:* Continuation of ITA 002 or ITA 002S. Review of grammar and vocabulary, and practice of all language skills through cultural texts.

*Prerequisite(s):* ITA 002 or ITA 002S.

*Learning Activities:* Lecture/Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ITA 001A or ITA 003S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 003S – Elementary Italian (5 units)**

*Course Description:* Continuation of ITA 002 or ITA 002S. Review of grammar and vocabulary, and practice of all language skills through cultural texts. May be taught abroad.

*Prerequisite(s):* ITA 002 or ITA 002S.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ITA 001A or ITA 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 005S – Intermediate Italian (4 units)**

Starting Winter Quarter 2024, this course is no longer offered.

*Course Description:* Review and study of grammar and syntax, readings of short prose works, and written exercises. Intended to prepare students to read, understand, and discuss modern Italian. May be taught abroad.

*Prerequisite(s):* ITA 004 or ITA 004S.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ITA 005.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC).

**ITA 008A – Italian Conversation (3 units)**

*Course Description:* Italian conversation with peers in classroom setting.

*Prerequisite(s):* ITA 003; or the equivalent.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); World Cultures (WC).

**ITA 008AS – Italian Conversation (3 units)**

*Course Description:* Italian conversation in local context outside United States. May be taught abroad.

*Prerequisite(s):* ITA 003; or the equivalent.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); World Cultures (WC).

**ITA 008B – Italian Conversation (3 units)**

*Course Description:* Italian conversation with peers in a classroom setting.

*Prerequisite(s):* ITA 008A.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* World Cultures (WC).

**ITA 008BS – Italian Conversation (3 units)**

*Course Description:* Italian conversation in local context outside United States. May be taught abroad.

*Prerequisite(s):* ITA 008A.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL); World Cultures (WC).

**ITA 021 – Intermediate Italian (5 units)**

*Course Description:* Continued development of grammatical structures and vocabulary. Emphasis on reading and writing in Italian.

*Prerequisite(s):* ITA 003 or ITA 003S or ITA 032 or ITA 032Y.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ITA 021S – Intermediate Italian (5 units)**

*Course Description:* Continued development of grammatical structures and vocabulary. Emphasis on reading and writing in Italian.

*Prerequisite(s):* ITA 003 or ITA 003S or ITA 032 or ITA 032Y.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory.

*Enrollment Restriction(s):* Not open to students who have taken ITA 004, ITA 004S, ITA 021.

*Credit Limitation(s):* Not open to students who have taken ITA 004, ITA 004S, ITA 021.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ITA 022 – Intermediate Italian (5 units)**

This version has ended; see updated course, below.

*Course Description:* Continued development of grammatical structures and vocabulary. Emphasis on reading and writing in Italian.

*Prerequisite(s):* ITA 021.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ITA 022 – Intermediate Italian (5 units)**

*Course Description:* Continued development of grammatical structures and vocabulary. Emphasis on reading and writing in Italian.

*Prerequisite(s):* ITA 021 or ITA 021S.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Winter Quarter 2024.

**ITA 022S – Intermediate Italian (5 units)**

*Course Description:* Continued development of grammatical structures and vocabulary. Emphasis on reading and writing in Italian.

*Prerequisite(s):* ITA 021 or ITA 021S.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory.

*Credit Limitation(s):* Not open for credit to students who have taken ITA 005 or ITA 005S or ITA 022.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ITA 023 – Intermediate Italian (5 units)**

*Course Description:* Continued development of grammatical structures and vocabulary. Emphasis on reading and writing in Italian.

*Prerequisite(s):* ITA 022 or ITA 022S.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ITA 023S – Intermediate Italian (5 units)**

*Course Description:* Continued development of grammatical structures and vocabulary. Emphasis on reading and writing in Italian.

*Prerequisite(s):* ITA 022 or ITA 022S.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory.

*Enrollment Restriction(s):* Not open to students who have taken ITA 009 or ITA 009S or ITA 023.

*Credit Limitation(s):* No credit if taken ITA 009 or ITA 009S or ITA 023.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ITA 031 – Beginning Italian for Spanish Speakers (5 units)**

*Course Description:* Intensive introductory course on Italian language with emphasis on structural similarities between Italian and Spanish.

*Prerequisite(s):* SPA 003 or SPA 003V or SPA 003Y; or two years of high school Spanish or native or heritage speaker of Spanish.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ITA 001, ITA 001A, ITA 001S, ITA 002, ITA 002S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**ITA 031Y – Beginning Italian for Spanish Speakers (5 units)**

*Course Description:* Intensive Introductory course on Italian language with emphasis on structural similarities between Italian and Spanish.

*Prerequisite(s):* SPA 003 or SPA 003V or SPA 003Y; consent of instructor. SPA 003 or two years of high school Spanish or native or heritage speaker of Spanish.

*Learning Activities:* Lecture/Discussion 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ITA 001, ITA 001A, ITA 001S, ITA 002, ITA 002S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ITA 032 – Beginning Italian for Spanish Speakers (5 units)**

*Course Description:* Continuation of ITA 031. Intensive introductory course to Italian language and grammar with emphasis on oral and written communication. Highlights the structural similarities between Italian and Spanish.

*Prerequisite(s):* ITA 031 or ITA 031Y; or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ITA 001A, ITA 001S, ITA 002, ITA 002S, ITA 003, ITA 003S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ITA 032Y – Beginning Italian for Spanish Speakers (5 units)**

*Course Description:* Continuation of ITA 031. Intensive introductory course to Italian language and grammar with emphasis on oral and written communication. Highlights the structural similarities between Italian and Spanish.

*Prerequisite(s):* ITA 031 or ITA 031Y; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ITA 001A, ITA 003, ITA 003S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## **ITA 050 – Studies in Italian Cinema (4 units)**

*Course Description:* Introduction to Italian cinema through its genres.

Focus is on cinema as a reflection of and a comment on modern Italian history. Film will be studied as an artistic medium and as a form of mass communication.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Lower division standing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **ITA 090X – Lower Division Seminar (1-2 units)**

*Course Description:* Examination of a special topic in Italian language or culture (such as Italian culture seen through film, Italian feminism, literature, or politics) through shared readings, discussions, written assignments, or special activities such as film screening or laboratory work.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Seminar 1-2 hour(s).

*Grade Mode:* Letter.

## **ITA 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily intended for lower division students.

*Prerequisite(s):* Consent of instructor. Lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **ITA 101 – Advanced Conversation, Composition & Grammar (4 units)**

*Course Description:* Instruction and practice in expository writing in Italian, with emphasis on advanced grammar, organization, and vocabulary building.

*Prerequisite(s):* ITA 023 or ITA 023S; or consent of instructor, or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **ITA 101S – Advanced Conversation, Composition & Grammar (4 units)**

*Course Description:* Instruction and practice in expository writing in Italian, with emphasis on advanced grammar, organization, and vocabulary building. May be taught abroad.

*Prerequisite(s):* ITA 023 or ITA 023S; or consent of instructor; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have completed ITA 101.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **ITA 104 – Italian Translation & Style (4 units)**

*Course Description:* Practice in translation from Italian to English and English to Italian, using literary and nonliterary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material.

*Prerequisite(s):* ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed ITA 104S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **ITA 104S – Italian Translation & Style (4 units)**

*Course Description:* Practice in translation from Italian to English and English to Italian, using literary and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material. May be taught abroad.

*Prerequisite(s):* ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* No credit allowed to those who have completed ITA 104.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 105 – Introduction to Italian Literature (4 units)**

This version has ended; see updated course, below.

*Course Description:* Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance, and Early Modern periods in Italy.

*Prerequisite(s):* ITA 009 or ITA 009S; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**ITA 105 – Introduction to Italian Literature (4 units)**

*Course Description:* Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance, and Early Modern periods in Italy.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

This course version is effective from, and including: Fall Quarter 2023.

**ITA 107 – Survey of Italian Culture & Institutions (4 units)**

*Course Description:* Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature, the arts, philosophy, and socio-political institutions. Taught in English.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ITA 107S – Survey of Italian Culture & Institutions (4 units)**

*Course Description:* Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature, the arts, philosophy, and socio-political institutions. May be taught abroad.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed ITA 107.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ITA 108 – Contemporary Issues in Italian Culture & Society (4 units)**

*Course Description:* Analysis of cultural issues in contemporary Italy: Myth and reality of imagined Italies, Italian identities; immigration and race relations; the media and popular culture. Taught in English.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ITA 108S – Contemporary Issues in Italian Culture & Society (4 units)**

*Course Description:* Analysis of cultural issues in contemporary Italy; myth and reality of imagined Italies; Italian identities; immigration and race relations; the media and popular culture. May be taught abroad & in English.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed ITA 108.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**ITA 112 – Medieval & Renaissance Poetry: St. Francis to Petrarch (4 units)**

This version has ended; see updated course, below.

*Course Description:* Study of the origins of Italian religious and secular poetry of the 13th and 14th centuries. Diversified poetry is illustrated in works of St. Francis, Dante, Cavalcanti, Petrarch, the Sicilian School, the Sweet New Style Poets, and other authors.

*Prerequisite(s):* ITA 009 or ITA 009S; consent of instructor, or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**ITA 112 – Medieval & Renaissance Poetry: St. Francis to Petrarch (4 units)**

*Course Description:* Study of the origins of Italian religious and secular poetry of the 13th and 14th centuries. Diversified poetry is illustrated in works of St. Francis, Dante, Cavalcanti, Petrarch, the Sicilian School, the Sweet New Style Poets, and other authors.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; consent of instructor, or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 113 – Dante Alighieri, Divina Commedia (Inferno, Purgatorio, Paradiso) (4 units)**

This version has ended; see updated course, below.

*Course Description:* Study of Dante Alighieri's *Divina Commedia*, and its role in the development of Italian language and literature. Emphasis will be placed on reading the whole poem within the historical context of the Middle Ages.

*Prerequisite(s):* ITA 009 or ITA 009S; consent of instructor, or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

### **ITA 113 – Dante Alighieri, Divina Commedia (Inferno, Purgatorio, Paradiso) (4 units)**

*Course Description:* Study of Dante Alighieri's *Divina Commedia*, and its role in the development of Italian language and literature. Emphasis will be placed on reading the whole poem within the historical context of the Middle Ages.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; consent of instructor, or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 114 – Boccaccio, Decameron, & the Renaissance Novella (4 units)**

This version has ended; see updated course, below.

*Course Description:* Study of the development of the short story in Italy, as exemplified in Giovanni Boccaccio's *Decameron*, in his predecessors and Renaissance followers.

*Prerequisite(s):* ITA 009 or ITA 009S; consent of instructor, or the equivalent course.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

### **ITA 114 – Boccaccio, Decameron, & the Renaissance Novella (4 units)**

*Course Description:* Study of the development of the short story in Italy, as exemplified in Giovanni Boccaccio's *Decameron*, in his predecessors and Renaissance followers.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; consent of instructor, or the equivalent course.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 115A – Studies in the Cinquecento (4 units)**

This version has ended; see updated course, below.

*Course Description:* Analysis of key texts from the high moment of the Italian Renaissance. The political and aesthetic legacy of humanism will be foregrounded in relation to authors such as Ficino, Ariosto, Machiavelli, Aretino, Castiglione, and Tasso.

*Prerequisite(s):* ITA 009 or ITA 009S; or consent of instructor, or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

### **ITA 115A – Studies in the Cinquecento (4 units)**

*Course Description:* Analysis of key texts from the high moment of the Italian Renaissance. The political and aesthetic legacy of humanism will be foregrounded in relation to authors such as Ficino, Ariosto, Machiavelli, Aretino, Castiglione, and Tasso.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor, or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 115B – Italian Literature of the Renaissance & the Baroque: From Cellini to Marino (4 units)**

*Course Description:* Continued examination into the loss of an ideal.

Emphasis on the conflicts in Michelangelo and Tasso leading to Marino, with an excursus on Galileos role in the formation of a modern literary standard.

*Prerequisite(s):* ITA 115A.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL).

## **ITA 115C – Italian Drama from Machiavelli to the Enlightenment (4 units)**

This version has ended; see updated course, below.

*Course Description:* Development of comic and tragic forms as critical representations of their societal and historical contexts, i.e. Machiavelli and the logic of power, Baroque dramatists in the service of counter-reformation Italy, Goldoni's comedies and bourgeois social consciousness.

*Prerequisite(s):* ITA 009; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

### **ITA 115C – Italian Drama from Machiavelli to the Enlightenment (4 units)**

*Course Description:* Development of comic and tragic forms as critical representations of their societal and historical contexts, i.e. Machiavelli and the logic of power, Baroque dramatists in the service of counter-reformation Italy, Goldoni's comedies and bourgeois social consciousness.

*Prerequisite(s):* ITA 009 or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 115D – Early Modern Italian Lyric (4 units)**

This version has ended; see updated course, below.

*Course Description:* Examination of the poetic tradition influenced by Petrarch. Consideration of the relation between gender and genre in such poets as Petrarch, Bembo, della Casa, Tasso, Marino, Gaspara Stampa, Veronica Franco, Isabella di Morra.

*Prerequisite(s):* ITA 009 or ITA 009S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

### **ITA 115D – Early Modern Italian Lyric (4 units)**

*Course Description:* Examination of the poetic tradition influenced by Petrarch. Consideration of the relation between gender and genre in such poets as Petrarch, Bembo, della Casa, Tasso, Marino, Gaspara Stampa, Veronica Franco, Isabella di Morra.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 118 – Italian Literature of the 18th Century (4 units)**

This version has ended; see updated course, below.

*Course Description:* Development of modern Italian literature. Emphasis on the work of Goldoni, Bettinelli, Baretti, Parini, Alfieri, and Vico.

*Prerequisite(s):* ITA 009 or ITA 009S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL).

### **ITA 118 – Italian Literature of the 18th Century (4 units)**

*Course Description:* Development of modern Italian literature. Emphasis on the work of Goldoni, Bettinelli, Baretti, Parini, Alfieri, and Vico.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 119 – Italian Literature of the 19th Century (4 units)**

This version has ended; see updated course, below.

*Course Description:* Romanticism in Italy, including Manzoni, Verga, and Verismo.

*Prerequisite(s):* ITA 009 or ITA 009S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

### **ITA 119 – Italian Literature of the 19th Century (4 units)**

*Course Description:* Romanticism in Italy, including Manzoni, Verga, and Verismo.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 120A – Italian Literature of the 20th Century: The Novel (4 units)**

This version has ended; see updated course, below.

*Course Description:* Development of the novel from Svevo to the present. Emphasis on the work of Svevo, Levi, Moravia, Pavese, and Vittorini.

*Prerequisite(s):* ITA 009; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

### **ITA 120A – Italian Literature of the 20th Century: The Novel (4 units)**

*Course Description:* Development of the novel from Svevo to the present. Emphasis on the work of Svevo, Levi, Moravia, Pavese, and Vittorini.

*Prerequisite(s):* ITA 009 or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 120B – Italian Literature of the 20th Century: Poetry & Drama (4 units)**

This version has ended; see updated course, below.

*Course Description:* Italian poetry with emphasis on Hermeticism; the theater of Luigi Pirandello and its role in the development of contemporary Italian drama.

*Prerequisite(s):* ITA 009; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

### **ITA 120B – Italian Literature of the 20th Century: Poetry & Drama (4 units)**

*Course Description:* Italian poetry with emphasis on Hermeticism; the theater of Luigi Pirandello and its role in the development of contemporary Italian drama.

*Prerequisite(s):* ITA 009 or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 121 – New Italian Cinema (4 units)**

*Course Description:* Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II.

Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required.

*Prerequisite(s):* FMS 001; or consent of instructor; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* FMS 121.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **ITA 121S – New Italian Cinema (4 units)**

*Course Description:* Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II.

Productions by representative directors such as Amelio, Giordana, Moretti, Muccino are included. Knowledge of Italian not required. May be taught abroad.

*Prerequisite(s):* FMS 001; and consent of instructor and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* FMS 121S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **ITA 128 – Topics in Italian Culture (4 units)**

This version has ended; see updated course, below.

*Course Description:* In-depth study of a particular topic in Italian Culture. Topics include: Italian Cities; Church and State; the "Southern Question"; Fascism and Resistance; 1968: Counter Culture, Feminism and Terrorism; Multicultural Italy.

*Prerequisite(s):* ITA 009 or ITA 009S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **ITA 128 – Topics in Italian Culture (4 units)**

*Course Description:* In-depth study of a particular topic in Italian Culture. Topics include: Italian Cities; Church and State; the "Southern Question"; Fascism and Resistance; 1968: Counter Culture, Feminism and Terrorism; Multicultural Italy.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 131 – Autobiography in Italy (4 units)**

This version has ended; see updated course, below.

*Course Description:* Development of representations of selfhood with particular attention to generic conditions, the confessional tradition and the problem of women's self-representation. Authors studied may included Petrarch, Tasso, Casanova, Alfieri, Zvezok, Sibilla Aleramo and Primo Levi.

*Prerequisite(s):* ITA 009 or ITA 009S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **ITA 131 – Autobiography in Italy (4 units)**

*Course Description:* Development of representations of selfhood with particular attention to generic conditions, the confessional tradition and the problem of women's self-representation. Authors studied may included Petrarch, Tasso, Casanova, Alfieri, Zvezok, Sibilla Aleramo and Primo Levi.

*Prerequisite(s):* ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 139B – Italian Literature in English: Boccaccio, Petrarch & the Renaissance (4 units)**

*Course Description:* Petrarch and Boccaccio and their relations to the Middle Ages and the Renaissance; the Renaissance, with particular attention to the works of Lorenzo de' Medici, Leonardo da Vinci, Machiavelli, Ariosto, Michelangelo, and Tasso.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **ITA 140 – Italian Literature in English Translation: Dante, Divine Comedy (4 units)**

*Course Description:* Reading of Dante Alighieri's Divine Comedy, through the otherworld realms of Inferno, Purgatory, and Paradise.

*Prerequisite(s):* Any course from the GE Literature Preparation List.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **ITA 141 – Gender & Interpretation in the Renaissance (4 units)**

*Course Description:* Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; "high" and "low" culture and its relation to literary practices.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* COM 138.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **ITA 142 – Masterpieces of Modern Italian Narrative (4 units)**

*Course Description:* Analysis of major works of Italian narrative fiction from unification of Italy to present. Students will learn to use representative methods and concepts which guide literary scholarship. Consideration of works within European social and cultural context.

*Prerequisite(s):* ENG 003 or COM 002 or HIS 004C.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **ITA 145 – Special Topics in Italian Literature (4 units)**

This version has ended; see updated course, below.

*Course Description:* Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-20th-century theater, fascism, futurism, women and literature, and the image of America, etc.

*Prerequisite(s):* ITA 009 or ITA 009S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **ITA 145 – Special Topics in Italian Literature (4 units)**

*Course Description:* Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-20th-century theater, fascism, futurism, women and literature, and the image of America, etc.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## **ITA 145S – Special Topics in Italian Literature (4 units)**

*Course Description:* Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-20th-century theater, fascism, futurism, women and literature, the image of America, etc. May be taught abroad.

*Prerequisite(s):* ITA 009 or ITA 009S or ITA 023 or ITA 023S; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ITA 145.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **ITA 150 – Studies in Italian Cinema (4 units)**

*Course Description:* Introduction to Italian cinema through its genres.

Focus on cinema as a reflection or a comment on modern Italian history. Film as an artistic medium and as a form of mass communication.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **ITA 190X – Upper Division Seminar (1-2 units)**

*Course Description:* Examination of a special topic in Italian language or culture through shared readings, discussions, written assignments or special activities such as film screening or laboratory work.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Seminar 1-2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ITA 192 – Italian Internship (1-12 units)**

*Course Description:* Participation in government and business activities to gain work experience and to develop a better knowledge of Italian language and culture.

*Prerequisite(s):* Upper division standing; consent of chairperson of Italian Department.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**ITA 192S – Italian Internship (1-12 units)**

*Course Description:* Participation in community service, teaching, government, and business activities to gain work experience and to develop a better knowledge of Italian language and culture. May be taught abroad in Italy.

*Prerequisite(s):* Upper division standing; consent of instructor and UC Davis program director or chairperson of Italian Department.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**ITA 194H – Special Study for Honors Students (3 units)**

*Course Description:* Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Italian literature, civilization, or language studies.

*Prerequisite(s):* Open only to majors of senior standing who qualify for Honors Program.

*Learning Activities:* Independent Study 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**ITA 195H – Honors Thesis (3 units)**

*Course Description:* Writing of an honors thesis on a topic in Italian literature, civilization, or language studies under the direction of a faculty member.

*Prerequisite(s):* ITA 194H.

*Learning Activities:* Independent Study 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**ITA 197T – Tutoring in Italian (1-4 units)**

*Course Description:* Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Seminar 1-2 hour(s), Laboratory 1-2 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

**ITA 197TC – Community Tutoring in Italian (1-5 units)**

*Course Description:* Field experience as Italian tutors or teacher's aides.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1-2 hour(s), Laboratory 2-4 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

**ITA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ITA 198S – Directed Group Study (1-4 units)**

*Course Description:* Group study on focused topics in Italian literature and culture. Varies according to instructor. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**ITA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**ITA 199S – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Opportunity for a faculty member to work with an advanced undergraduate student in a focused manner on a topic or topics of mutual research/creative interest. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**ITA 297 – Individual Study (1-5 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ITA 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**ITA 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ITA 299D – Dissertation Research (1-12 units)**

*Course Description:* Dissertation research.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ITA 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Japanese (JPN)

College of Letters & Science

## JPN 001 – Elementary Japanese (5 units)

*Course Description:* Introduction to spoken and written Japanese in cultural contexts, with emphasis on communication.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 001A – Accelerated Intensive Elementary Japanese (15 units)

*Course Description:* Special 12-week accelerated, intensive summer session course that combines the work of JPN 001, JPN 002 and JPN 003. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* not open for credit to students who have completed JPN 001, JPN 002, or JPN 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 001AS – Intensive Elementary Japanese (15 units)

*Course Description:* Intensive course taught combining the work of JPN 001, JPN 002 and JPN 003. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Taught abroad in Japan.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken JPN 001, JPN 002, or JPN 003.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 002 – Elementary Japanese (5 units)

*Course Description:* Continuation of training in basic Japanese spoken and written skills.

*Prerequisite(s):* JPN 001 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 003 – Elementary Japanese (5 units)

*Course Description:* Continuation of training in basic spoken and written skills in Japanese language. May be taught abroad.

*Prerequisite(s):* JPN 002 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 004 – Intermediate Japanese (5 units)

*Course Description:* Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in JPN 003.

*Prerequisite(s):* JPN 003 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 005 – Intermediate Japanese (5 units)

*Course Description:* Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in JPN 004.

*Prerequisite(s):* JPN 004 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 006 – Intermediate Japanese (5 units)

*Course Description:* Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in JPN 005. May be taught abroad.

*Prerequisite(s):* JPN 005 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 007S – Intensive Intermediate Japanese (20 units)

*Course Description:* Special intensive course that combines the work of JPN 003, JPN 004, JPN 005, and JPN 006. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Taught abroad in Japan.

*Prerequisite(s):* JPN 002 C- or better; or the equivalent language proficiency. consent of instructor.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Credit Limitation(s):* Credit limit may apply to students who have taken JPN 003, 004, 005, or 006.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 010 – Masterworks of Japanese Literature (in English) (4 units)

*Course Description:* Introduction to Japanese literature: readings and discussion in English of important works from earliest times to the present.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 015S – Introduction to Japanese Culture (2 units)**

*Course Description:* Aspects of Japanese culture: literature, history, religion, art, language, and society. Taught abroad in Japan; in English.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork.

*Enrollment Restriction(s):* Restricted to students enrolled in units for the Kyoto Quarter Abroad program.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 025 – Japanese Language & Culture (in English) (4 units)**

*Course Description:* Classification and communication of experience in Japanese culture; principles of language use in Japanese society. Speech levels and honorific language, language and gender, minority languages, literacy. Role of Japanese in artificial intelligence and computer science.

*Prerequisite(s):* JPN 001 or LIN 001 or ANT 004 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 031 – Basic Kanji (4 units)**

*Course Description:* Introduction and mastery of 300 basic Kanji or Chinese characters to establish a solid foundation in the novel and complex Kanji encountered while learning Japanese.

*Prerequisite(s):* JPN 001 C- or better; or consent of instructor, or equivalent proficiency of basic writing system (Hiragana and Katakana).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to students who have never been exposed to any form of Kanji or Chinese characters before; students who have completed schooling up to the 6th grade in the Japanese education system or equivalent or whose native languages have Chinese character orthography are not allowed to register.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 050 – Introduction to the Literature of China & Japan (4 units)**

*Course Description:* Methods of literary analysis and their application to major works from the various genres of Chinese and Japanese literature (in translation), including film. East Asian cultural traditions will also be introduced.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* CHN 050.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**JPN 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**JPN 101 – Japanese Literature in Translation: The Early Period (4 units)**

*Course Description:* Study of early Japanese literature from the Nara to the end of the Heian period through a broad survey of the major literary genres such as lyric poetry, court diaries, prose narratives, poem-tales, and classical Chinese writings.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 102 – Japanese Literature in Translation: The Middle Period (4 units)**

*Course Description:* Study of the major literary genres from the 12th century to the second half of the 19th century including poetry, linked-verse, military chronicles, no drama, Buddhist literature, haiku, haibun, kabuki, bunraku, plays and Edo prose narratives.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 103 – Japanese Literature in Translation: The Modern Period (4 units)**

*Course Description:* Modern Japanese literature from the late 19th century to the present with focus on the concept of modernity; in addition to the study of authors and genres, examines historical and cultural contexts. Lectures, readings and discussions in English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 104 – Modern Japanese Literature: War & Revolution (3 units)**

*Course Description:* Perspectives and sensibilities with which major modern Japanese writers have interpreted the traumatic and often poignant experiences of war and socio-political upheavals from the late 19th century to the 1970s. Lectures, discussions, and readings in English.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 105 – Modern Japanese Literature: Hero & Anti-Hero (4 units)**

*Course Description:* Ways in which representative hero and anti-hero protagonists in modern Japanese literature perceive, confront, challenge, and resolve a wide array of social, political, and moral problems of their times. Taught in English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## JPN 106 – Japanese Culture Through Film (4 units)

*Course Description:* Aspects of Japanese culture such as love, sexuality, war, the military, the family, the position of women, growing up and death as portrayed in Japanese cinema. Lectures, discussion, and readings in English. Films with English subtitles.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

## JPN 107 – Modern Japanese Autobiographies (in English) (4 units)

*Course Description:* Exploring the modern and contemporary Japanese social and cultural landscape through critical analysis of modern Japanese autobiographies by prominent and other authors in the 19th and 20th centuries.

*Learning Activities:* Lecture 3 hour(s), Term Paper, Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## JPN 108 – Poetry of China & Japan (in English) (4 units)

*Course Description:* A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* CHN 108.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## JPN 109 – Japanese Popular Culture (4 units)

*Course Description:* Japanese popular culture, from its development during the early modern period to contemporary incarnations. Emphasis on major forms of popular culture that emerged in the 20th century, including manga, anime, and genre film.

*Learning Activities:* Film Viewing 3 hour(s), Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## JPN 111 – Modern Japanese: Reading & Discussion (4 units)

*Course Description:* Readings in modern Japanese short stories, newspaper articles, and essays; conversation practice based on these readings.

*Prerequisite(s):* JPN 006 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 112 – Modern Japanese: Reading & Discussion (4 units)

*Course Description:* Continuation of JPN 111.

*Prerequisite(s):* JPN 111 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 113 – Modern Japanese: Reading & Discussion (4 units)

*Course Description:* Continuation of JPN 112. May be taught abroad.

*Prerequisite(s):* JPN 112 C- or better; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## JPN 114A – Spoken Japanese (2 units)

*Course Description:* Training in spoken Japanese for students with a basic working knowledge of the language. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Oral Skills (OL).

## JPN 114B – Spoken Japanese (2 units)

*Course Description:* Continuation of JPN 114A. Training in spoken Japanese for students with a basic working knowledge of the language. May be taught abroad.

*Prerequisite(s):* JPN 114A C- or better; or consent of instructor, or equivalent language proficiency.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Oral Skills (OL).

## JPN 114C – Spoken Japanese (2 units)

*Course Description:* Continuation of JPN 114B. Training in spoken Japanese for students with a basic working knowledge of the language. May be taught abroad.

*Prerequisite(s):* JPN 114B C- or better; or consent of instructor, or equivalent language proficiency.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Oral Skills (OL).

## JPN 115 – Japanese Composition (2 units)

*Course Description:* Development of skills in the techniques of writing Japanese. Practice in short essay writing with an aim toward mastery of the vocabulary and syntax of written style Japanese.

*Prerequisite(s):* JPN 006 C- or better; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**JPN 116 – Culture & History in Kyoto (8 units)**

*Course Description:* Intensive course exploring the historical and cultural riches in Kyoto and its environs. May be taught abroad on-site in and around Kyoto, Japan.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork.

*Enrollment Restriction(s):* Limited to students enrolled in the corresponding Quarter Abroad program.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 117S – Intensive Modern Japanese: Reading & Discussion (17 units)**

*Course Description:* Introduction to basic Japanese grammar and development of more advanced reading, writing, and conversation skills in a cultural context. Combination of JPN 006, JPN 111, JPN 112, JPN 113; intensively taught abroad in Japan.

*Prerequisite(s):* JPN 005 C- or better; or consent of instructor, or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 17 hour(s).

*Credit Limitation(s):* Not open to students who have taken JPN 006, JPN 111, JPN 112, or JPN 113; an exception can be made for students who have taken JPN 006 or its equivalent, provided that those 5 units are deducted from the 19 total unit load.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**JPN 121 – Advanced Japanese I (4 units)**

*Course Description:* First of three courses in a series of fourth-year Advanced Japanese which focuses on the levels of formality or politeness in conversation as well as socio-cultural aspects and topics in Japanese society.

*Prerequisite(s):* JPN 113 C- or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**JPN 122 – Advanced Japanese II (4 units)**

*Course Description:* Second of three courses in a series of fourth-year Advanced Japanese which focuses on the levels of formality or politeness in conversation as well as socio-cultural aspects and topics in Japanese society.

*Prerequisite(s):* JPN 121 C- or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**JPN 123 – Advanced Japanese III (4 units)**

*Course Description:* Third of three courses in a series of fourth-year Advanced Japanese which focuses on the levels of formality or politeness in conversation as well as socio-cultural aspects and topics in Japanese society.

*Prerequisite(s):* JPN 122 C- or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**JPN 130 – Readings in Modern Japanese Literature to 1926 (4 units)**

*Course Description:* Short stories and essays by Japanese writers of the Meiji and Taishô eras, from 1868 to 1926. Authors include Natsume Sôseki, Izumi Kyôka, Tanizaki Jun'ichirô and Akutagawa Ryûnosuke. Readings and discussion in Japanese with some emphasis on translation into English.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to completion of JPN 113 or equivalent as determined by taking a placement exam or consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 131 – Readings in Modern Japanese Literature: 1920-1945 (4 units)**

*Course Description:* Fourth-year level reading of representative works of modern Japanese literature including short stories, novellas, diaries, memoirs, poetry and excerpts from novels and plays from 1920 through the militaristic era, to the end of the war years in 1945.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**JPN 132 – Readings in Modern Japanese Literature: 1945-1970 (4 units)**

*Course Description:* Continuation of JPN 131, but may be taken independently. Covers selected texts from the immediate post-war years beginning in 1945 down to 1970 and the post-war recovery.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**JPN 133 – Readings in Modern Japanese Literature: 1970-Present (4 units)**

*Course Description:* Fourth-year level reading in Japanese of fiction, essays and works drawn from other literary genres published since 1970.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 134 – Readings in the Humanities: Traditional Culture (4 units)**

*Course Description:* Fourth-year level reading of modern works by major specialists on traditional Japanese culture: history, religion, thought, art, international relations, and literary history and criticism. Focus is equally on developing reading skills and learning about Japanese culture.

*Prerequisite(s):* JPN 113 C- or better; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **JPN 135 – Readings in the Humanities: The Modern Period (4 units)**

*Course Description:* Fourth-year level reading of authentic modern writings on Japanese culture, history, philosophy, society, religion, law, politics, international relations, aesthetics, and comparative culture by prominent critics, commentators, and scholars.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **JPN 136 – Readings in Japanese Newspapers (4 units)**

*Course Description:* Fourth-year level reading of newspaper articles and other journalism in Japanese on a wide variety of subjects.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **JPN 137 – Readings in Contemporary Japanese Literature (4 units)**

*Course Description:* Readings of short stories and essays by contemporary writers. Representative writers include Yoshimoto Banana, Otsuichi, Suzuki Koji, Kyogoku Natsumi, Ogawa Yoko, and Murakami Haruki.

Readings and discussion in Japanese with some emphasis on translation into English.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **JPN 138 – Readings in the Humanities: Japan Today (4 units)**

*Course Description:* Topical essays focused on contemporary Japan.

Themes center on defining Japan today in terms of its future and past such as through its urban society, trends in architecture, "soft power" industries, and "traditional" elements as mainstays of Japan's cultural currency.

*Prerequisite(s):* JPN 113; or equivalent language proficiency, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to completion of JPN 113 or equivalent as determined by taking a placement exam or consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **JPN 141 – Introduction to Classical Japanese (4 units)**

*Course Description:* Basic features of classical Japanese grammar through careful reading of selected literary texts such as Hojoki or Tsurezuregusa.

*Prerequisite(s):* JPN 113; or the equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **JPN 151 – Japanese Linguistics (4 units)**

*Course Description:* Introduction to Japanese linguistics, featuring key aspects of the Japanese language. Analysis of Japanese from the perspectives of phonology, syntax, discourse analysis, sociolinguistics and psycholinguistics.

*Prerequisite(s):* JPN 003; or equivalent language proficiency.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **JPN 152 – Traditional Japanese Drama (4 units)**

*Course Description:* Survey in English of Japanese drama, focusing on traditional forms: noh, kyōgen, bunraku puppet theater, and kabuki, with some attention to modern theater. Texts of plays and secondary works on performance techniques and the composition of plays.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **JPN 153 – Love, Sexuality & the Family in Modern Japanese Literature (4 units)**

*Course Description:* Modern Japanese literature from the late-19th century to the present with a focus on love and sexuality in various forms, particularly as understood through the evolving institution of the Japanese family. Lectures, readings and discussions in English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **JPN 154 – Tourism & Heritage in Japan (4 units)**

*Course Description:* Focus on related concepts of tourism and cultural heritage within Japan, with attention to questions of tradition, authenticity and nostalgia. Examination of cultural heritage sites on various scales, including built environment, national cultural forms, and local performances such as festivals.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **JPN 155 – Introduction to Japanese Folklore (4 units)**

*Course Description:* Focus on narrative genres of myth, legend, and folktale, with additional attention paid to festivals, folk art, belief systems, and the development of folklore studies (minzokugaku) as an academic discipline. Examination of the relationship of folklore to ethnic and national identity.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**JPN 156 – Japanese Literature on Film (4 units)**

*Course Description:* Survey of films based on works of Japanese literature, emphasis on pre-modern and early modern texts. Introduction to major directors of Japan, with a focus on cinematic adaptation. Lectures and readings in English. Films in Japanese with English subtitles.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* CTS 148B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**JPN 157 – Japanese Women Writers (4 units)**

*Course Description:* Survey of women writers from earliest times to the present. Genres include poetry, narrative fiction, diaries, short stories, novels, and film. Representative authors include Murasaki Shikibu, Sei Shônagon, Higuchi Ichiyo, Enchi Fumiko and Ogawa Yôko. Readings and discussion in English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 158 – The Supernatural in Japan (4 units)**

*Course Description:* Depictions of the supernatural in Japanese history through the contemporary era. Overview of Japanese literary and visual arts and the socio-historical contexts of the supernatural. Lectures and readings in English. Films in Japanese with English subtitles.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**JPN 159 – The “Other” in Modern Japanese Literature & Culture (4 units)**

*Course Description:* Modern Japanese literature and culture from the late 19th century to the present with focus on the concept of the “Other;” those seen as minorities (race, ethnicity, sexuality) or somehow different from mainstream society. Lectures, readings and discussions in English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 160 – The Culture of Japanese Food (4 units)**

*Course Description:* Study of Japanese food and the culture of eating and drinking in Japan. Attention to symbolism, historical development, aesthetics, identity and global contexts. Materials examined include critical sources as well as literary texts, art, and films.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**JPN 162 – Japan Travelogue: Ethnographic Writing on Japanese Culture & People (4 units)**

*Course Description:* Focuses on ethnographic writing about Japan. Includes modern scholarly ethnographies, travel writing, blog posts, etc. Critical analysis of how the Japanese “other” is represented across time.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 165 – Sexuality & Love in Premodern Japanese Literature (4 units)**

*Course Description:* Love and eros in opposite-sex, same-sex, marital, premarital, extramarital, commercial and “amateur” modes and in aristocratic, samurai and commoner milieus as reflected in works of literature produced in Japan between the 700s and 1867. Readings, lectures and discussions in English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 192 – Japanese Internship (1-12 units)**

*Course Description:* Work experience in Japanese language, with analytical term paper on a topic approved by instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**JPN 194H – Special Thesis Honors Project (1-5 units)**

*Course Description:* Guided research, under the direction of a senate faculty member, leading to a senior thesis project on a topic in Japanese literature, culture, linguistics, or language studies.

*Prerequisite(s):* Consent of instructor; senior standing and qualification for the Japanese Senior Thesis Project.

*Learning Activities:* Independent Study 3-15 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**JPN 197T – Tutoring in Japanese (1-5 units)**

*Course Description:* Leading of small voluntary discussion groups affiliated with one of the Program's regular courses.

*Prerequisite(s):* Consent of Department Chairperson.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**JPN 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **JPN 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **JPN 291 – Seminar in Modern Japanese Literature: Major Writers (4 units)**

*Course Description:* In-depth reading and critical analyses of major works by and critical literature on one or two prominent modern or contemporary writers such as Natsume Soseki, Mori Ogai, Shimazaki Toson, Akutagawa Ryunosuke, Tanizaki Junichiro, Abe Kobo and Oe Kenzaburo.

*Prerequisite(s):* JPN 130 or JPN 131 or JPN 132 or JPN 133 or JPN 134 or JPN 135 or JPN 136 or JPN 137 or JPN 138; or the equivalent language proficiency.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **JPN 297 – Directed Independent Study (4 units)**

*Course Description:* Directed independent study on a topic culminating in a term paper. Independent Studies may only be arranged with consent of the instructor and when graduate seminars are unavailable.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Conference 1 hour(s), Term Paper, Independent Study.

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 5 time(s) when no seminars are available and topic differs.

*Grade Mode:* Letter.

## **JPN 299 – Research (1-12 units)**

*Course Description:* Description:

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Jewish Studies (JST)**

College of Letters & Science

## **JST 010 – Introduction to Jewish Cultures (4 units)**

*Course Description:* Diverse Jewish cultures created over the past 2,000 years using examples from less-familiar communities such as India, China, and Ethiopia. Topics include the tensions between homeland/diaspora and questions of identity (race, nationality, culture, or religion).

*Learning Activities:* Lecture 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **JST 101 – Topics in Jewish Thought (4 units)**

*Course Description:* Selected themes in Jewish thought in historical and social perspective. Traces the historical development of topics in Jewish thought such as Messianism, or focuses on one specific historical period, such as modern Jewish thought.

*Prerequisite(s):* JST 010 or RST 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **JST 110 – Selected Topics in Jewish Literature (4 units)**

*Course Description:* Literature written about the Jewish experience, treated in its historical and social context. Examines literature written in one language, such as English, Hebrew, or Yiddish, or a theme, such as gender or modern identities, as expressed in different literary traditions.

*Prerequisite(s):* One lower division literature or Jewish Studies (JST) course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **JST 111 – Israeli Writing Since 1960 (4 units)**

*Course Description:* Contemporary Hebrew literature, in translation, in relation to post-independence debates about religious, social, and political identity of the Jewish state; literary reflections of Israeli ethnic diversity and changing gender relations; modern Hebrew poetry and postmodern experiments in fiction.

*Prerequisite(s):* One course in American or European literature.

*Learning Activities:* Lecture/Lab 3 hour(s), Extensive Writing 1 hour(s).

*Credit Limitation(s):* No credit will be given to students who have completed HUM 119.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **JST 112 – Readings in Jewish Writing & Thought in German Culture (4 units)**

*Course Description:* Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German speaking world; what it means to be "other" in the mainstream culture.

*Prerequisite(s):* RST 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper 1 hour(s).

*Credit Limitation(s):* No credit will be given to students who have completed HUM 121.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **JST 116 – Readings in Jewish Writing & Thought in German Culture (4 units)**

*Course Description:* Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German speaking world; what it means to be "other" in the mainstream culture.

*Prerequisite(s):* RST 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* No credit will be given to students who have completed HUM 121.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Cross Listing:* GER 116.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **JST 120 – Cinema & the American Jewish Experience (4 units)**

*Course Description:* Examination of American cinema to reveal how Jewish identity is expressed and submerged, tracing the relations between religion, identity, race, politics, and art.

*Prerequisite(s):* JST 010 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed HUM 122.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **JST 121 – Oral History & Jewish Life (4 units)**

*Course Description:* Oral history methodologies and application to an in-depth oral history interview about Jewish life. Topics include oral history practices and ethics, immigration, migration, religious practice, ethnic relations, and community organization structures.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper 1 hour(s).

*Credit Limitation(s):* No credit given to students who have completed HUM 123.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

# **Landscape Architecture (LDA)**

College of Agricultural & Environmental Sciences

## **LDA 001 – Introduction to Environmental Design (4 units)**

*Course Description:* Introduction to the role of design professionals in contributing to the built environment at a range of scales. Introduction to basic methods used by design professionals to evaluate, design, plan, and manage landscapes and the built environment.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL).

## **LDA 002 – Place, Culture & Community (4 units)**

*Course Description:* Social dimensions of landscapes and everyday environments, including concepts of place, culture and community. Urban and rural environments including wilderness, parks, sacred space, agricultural sites, workplaces, transportation networks, housing, recreation, and military sites. Application of course concepts and methods for interpreting cultural landscapes through archival and field research.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

## **LDA 003 – Sustainable Development: Theory & Practice (4 units)**

*Course Description:* Origins, theoretical perspectives, and practical applications of the concept of sustainable development across scales (site, building, neighborhood, city, region, and nation) through lectures, sketch exercises, student projects, walking tours.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

## **LDA 010 – World Regional Geography (3 units)**

*Course Description:* Major geographic regions of the world; physical and human geography of each region; interactions between the people and the environment; culture and landscape; major resources; physical environments; population distribution and major cities.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## **LDA 021 – Landscape Representation I (4 units)**

*Course Description:* Introduction to landscape architectural representation techniques. Fundamentals of orthographic drafting, freehand drawing, photography, and basic digital representation.

*Prerequisite(s):* LDA 001 (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

## **LDA 023 – Landscape Representation II (4 units)**

*Course Description:* Methods to explore and communicate environmental design intentions through digital media.

*Prerequisite(s):* LDA 021; or consent of instructor.

*Learning Activities:* Studio 6 hour(s), Project.

*Enrollment Restriction(s):* Fall quarters restricted to Landscape Architecture majors. Spring quarters restricted to Sustainable Environmental Design majors.

*Grade Mode:* Letter.

**LDA 030 – History of Environmental Design (4 units)**

*Course Description:* History of Environmental Design across disciplines, including landscape architecture, architecture, planning, and urban design.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**LDA 050 – Site Ecology (4 units)**

*Course Description:* Introduction to ecological concepts, including nutrient dynamics, population regulation, community structure, ecosystem function. Principles will be applied to human activities such as biological conservation, ecological restoration, landscape planning, and management. Weekly lab devoted to field exercises in local ecosystems.

*Prerequisite(s):* BIS 002B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

**LDA 060 – Landform & Grading Studio (6 units)**

*Course Description:* Introduction of landform and topography as landscape medium and utilization of grading and drainage to design meaningful and functional spaces. Intro to site analysis and site planning, with specific attention to topography.

*Prerequisite(s):* LDA 070.

*Learning Activities:* Studio 8 hour(s), Extensive Problem Solving, Project.

*Enrollment Restriction(s):* Pass One restricted to Pre-Landscape Architecture majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL).

**LDA 070 – Introduction to Spacemaking (4 units)**

*Course Description:* Introduction to basic principles of design towards the creation of space. Design methodologies and skills to define, manipulate, and represent the built environment. Workshops in 3D physical modeling for spacemaking.

*Prerequisite(s):* LDA 021; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

**LDA 098 – Directed Group Study in Landscape Architecture (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**LDA 099 – Special Study for Undergraduates in Landscape Architecture (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**LDA 101 – Advanced Theory in Environmental Design (3 units)**

*Course Description:* Provides exploration of contemporary theories and philosophies impacting design of landscapes and the built environment. Includes exploring competing definitions of "landscape," "nature," and "culture."

*Prerequisite(s):* LDA 070 (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to Landscape Architecture and Sustainable Environmental Design majors only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LDA 102 – Methods in Design & Landscape Research (3 units)**

*Course Description:* Research, design, and planning methods employed in landscape architecture. Exercises allow students to design independent landscape research. Lectures provide a historical overview of research methodology.

*Prerequisite(s):* LDA 171; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to Landscape Architecture majors only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**LDA 120 – Landscape Representation III (4 units)**

*Course Description:* Studio to explore advanced representation and modeling skills. Digital drawing applied as an analytical research method, generative design technique and presentation tool.

*Prerequisite(s):* LDA 023; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Enrollment Restriction(s):* Restricted to Landscape Architecture majors.

*Grade Mode:* Letter.

**LDA 140 – Green Building, Design, & Materials (4 units)**

*Course Description:* Sustainable design and construction techniques at site and building scales. Emphasizes real-world case studies, analysis of opportunities for actual sites, and application of LEED and Sustainable Sites green rating systems.

*Prerequisite(s):* LDA 050; LDA 070.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Sustainable Environmental Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Visual Literacy (VL).

**LDA 141 – Community Participation & Design (4 units)**

*Course Description:* Introduction to community participation and design. Incorporates social and cultural factors, public and community processes, theories and practices related to human-environment behavior; community involvement in design, social analysis, community engagement, accessibility, diversity and politics of place.

*Prerequisite(s):* LDA 021; LDA 030; LDA 050; LDA 070.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Enrollment Restriction(s):* Open to Landscape Architecture and Sustainable Environmental Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL).

**LDA 142 – Applying Sustainable Strategies (6 units)**

*Course Description:* Capstone class examines case studies and techniques of sustainable development. Student teams will develop detailed proposals for real-world sites.

*Prerequisite(s):* LDA 140; LDA 141.

*Learning Activities:* Lecture 3 hour(s), Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to Sustainable Environmental Design Majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**LDA 150 – Introduction to Geographic Information Systems (4 units)**

*Course Description:* Basic concepts, principles, and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Landscape Architecture and Sustainable Environmental Design majors.

*Credit Limitation(s):* Not open to credit for students who have completed ABT 180, PLS 180, ABT 181N.

*Cross Listing:* ABT 150.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**LDA 152 – Conservation Planning & Design (4 units)**

*Course Description:* Theories and practice of conservation planning and design. Relationships between ecological theory, conservation principles, reserve design and policy. Applications to real-world conservation planning problems are presented in discussion/lab.

*Prerequisite(s):* BIS 002B; LDA 150 D or better or ABT 150 D or better.

*Learning Activities:* Lecture 3 hour(s); Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**LDA 160 – Design & Build Studio (6 units)**

*Course Description:* Introduction to the spatial design and construction of small-scale projects. Hands-on approach to learning and understanding materials (including wood, concrete, and stone) and methods in landscape construction, and the application of technical skills (including detailing, cost estimation, and specifications).

*Prerequisite(s):* LDA 001; LDA 002; LDA 003; LDA 021; LDA 030; LDA 050; LDA 070.

*Learning Activities:* Studio 8 hour(s), Extensive Problem Solving, Fieldwork.

*Enrollment Restriction(s):* Restricted to Landscape Architecture majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

**LDA 161 – Professional Practice & Construction Documents (6 units)**

*Course Description:* Legal and professional aspects of landscape architecture, including the development of construction documents (drawings and specifications), proposal writing, fee calculations, project management, cost estimation, and insurance.

*Prerequisite(s):* LDA 171.

*Learning Activities:* Studio 8 hour(s), Project, Fieldwork.

*Enrollment Restriction(s):* Open to Landscape Architecture majors only.

*Grade Mode:* Letter.

**LDA 170 – Site Planning & Design Studio (6 units)**

*Course Description:* Application of place-making and problem-solving skills to local landscape sites. Analysis of social and environmental conditions in the field. Lectures link design projects to contemporary theories and practices.

*Prerequisite(s):* LDA 160.

*Learning Activities:* Studio 8 hour(s), Fieldwork.

*Enrollment Restriction(s):* Open to Landscape Architecture majors only.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

**LDA 171 – Urban Design & Planning Studio (6 units)**

*Course Description:* Studio designing large-scale landscapes at regional, sub-regional, and neighborhood scales. Focuses on understanding complex social, economic, and environmental factors, developing sustainability priorities and strategies, and applying them through design and policy.

*Prerequisite(s):* LDA 170.

*Learning Activities:* Studio 8 hour(s).

*Enrollment Restriction(s):* Restricted to Landscape Architecture majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Oral Skills (OL); Visual Literacy (VL).

**LDA 172 – Architectural Design (4 units)**

*Course Description:* Conceptual design process as practiced by the discipline of architecture. Concepts of program, massing, structure, building systems and materials. Hand and computer aided drawing and physical model building.

*Prerequisite(s):* LDA 070 C or better; or consent of Instructor.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Sustainable Environmental Design majors.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS).

**LDA 180 – Advanced Design & Planning Studio (6 units)**

*Course Description:* Application of advanced theories and methods of design and planning to real-world projects.

*Prerequisite(s):* LDA 060; LDA 160; LDA 170; LDA 171; LDA 172.

*Learning Activities:* Studio 8 hour(s), Fieldwork, Extensive Problem Solving.

*Enrollment Restriction(s):* Restricted to Landscape Architecture majors or consent of instructor.

*Repeat Credit:* May be repeated 18 unit(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL).

**LDA 182 – Advanced Landscape Architecture Studio I (6 units)**

*Course Description:* Landscape architecture studio featuring advanced studies and applications of creative work, design, technology and/or theory. One day-long field trip required.

*Prerequisite(s):* LDA 171.

*Learning Activities:* Studio 8 hour(s).

*Enrollment Restriction(s):* Restricted to Landscape Architecture majors or consent of instructor.

*Grade Mode:* Letter.

**LDA 183 – Advanced Landscape Architecture Studio II (6 units)**

*Course Description:* Landscape architecture studio featuring advanced studies and applications of creative work, design, technology and/or theory. One day-long field trip required.

*Prerequisite(s):* LDA 182.

*Learning Activities:* Studio 8 hour(s).

*Enrollment Restriction(s):* Restricted to Landscape Architecture majors or consent of instructor.

*Grade Mode:* Letter.

**LDA 184 – Capstone Landscape Architecture Studio (6 units)**

*Course Description:* Capstone studio that synthesizes learning objectives within the senior-level Landscape Architecture studio sequence. Students required to apply creative problem solving, design theory, technology, and representation skills towards a design approach that addresses complex, real-world environmental design problems.

*Prerequisite(s):* LDA 183.

*Learning Activities:* Studio 8 hour(s).

*Enrollment Restriction(s):* Restricted to Landscape Architecture majors or consent of instructor.

*Grade Mode:* Letter.

**LDA 190 – Proseminar in Landscape Architecture (1 unit)**

*Course Description:* Lectures and discussion of critical issues in landscape architecture.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

**LDA 191 – Landscape Architecture Planning & Design Studio (2-12 units)**

*Course Description:* Faculty initiated workshops featuring advanced studies and applications of original work in landscape architecture. May be taught abroad.

*Prerequisite(s):* LDA 001; LDA 070; LDA 170; or consent of instructor.

*Learning Activities:* Seminar 1 hour(s), Workshop 3 hour(s).

*Enrollment Restriction(s):* Priority to Landscape Architecture majors.

*Repeat Credit:* May be repeated 20 unit(s).

*Grade Mode:* Letter.

**LDA 192 – Internship in Landscape Architecture (1-12 units)**

*Course Description:* Professional field experience in landscape architecture.

*Prerequisite(s):* Consent of instructor; senior standing in Landscape Architecture.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**LDA 193A – Senior Project in Landscape Architecture (3 units)**

*Course Description:* Projects will focus on a critical area of landscape architectural design, planning, planning, analysis, communication, or research. Required of all Landscape Architecture majors.

*Prerequisite(s):* Senior standing in Landscape Architecture.

*Learning Activities:* Studio 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

**LDA 193B – Senior Project in Landscape Architecture (4 units)**

*Course Description:* Projects will focus on a critical area of landscape architectural design, planning, planning, analysis, communication, or research. Required of all Landscape Architecture majors.

*Prerequisite(s):* LDA 193A; senior standing in Landscape Architecture.

*Learning Activities:* Studio 8 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Pass/No Pass only.

**LDA 197T – Tutoring in Landscape Architecture (1-5 units)**

*Course Description:* Tutoring in Landscape Architecture courses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

## **LDA 198 – Directed Group Study in Landscape Architecture (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **LDA 199 – Special Study for Advanced Undergraduates in Landscape Architecture (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **LDA 200 – Citizenship, Democracy, & Public Space (4 units)**

*Course Description:* Introduction to seminal works in political theory, philosophy, and the social sciences that focus on citizenship and the public sphere; development of critical perspective regarding restructuring of public space in a pluralistic and global culture; discussion of contemporary case studies.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Cross Listing:* GEO 230.

*Grade Mode:* Letter.

## **LDA 201 – Theory & Philosophy of the Designed Environment (4 units)**

*Course Description:* Examines the major theories of environmental design. Epistemology of design serves as framework to examine modern landscape architecture, architecture, urban design and planning. Normative theories of design are reviewed along with the social and environmental sciences.

*Prerequisite(s):* LDA 140; or the equivalent; graduate standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **LDA 202 – Methods in Design & Landscape Research (4 units)**

*Course Description:* Explores many of the research and advanced design and planning methods employed in landscape architecture. Exercises provide the student with a vehicle for designing independent landscape research and creative activities. Lectures provide an historical overview of research methodology.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **LDA 204 – Case Studies in Landscape Design & Research (4 units)**

*Course Description:* Real-world designed environment situations where creative activity and/or basic research is the primary product.

*Prerequisite(s):* Graduate standing in Landscape Architecture, Ecology, Geography or Community Development or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Letter.

## **LDA 205 – Urban Planning & Design (4 units)**

*Course Description:* Regulation, design, and development of the built landscape, planning and land development processes, zoning and subdivision regulation, site planning, urban design goals and methods, public participation strategies, creatively designing landscapes to meet community and ecological goals.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited to graduate students.

*Cross Listing:* GEO 233.

*Grade Mode:* Letter.

## **LDA 210 – Advanced Landscape Architecture Studio (4 units)**

*Course Description:* Exposes students to real-world, designed-environment situations where creative activity and/or basic research is the primary product. Advanced landscape problems will be utilized at the site, urban or rural scale.

*Prerequisite(s):* LDA 113 or the equivalent; graduate standing or consent of instructor.

*Learning Activities:* Laboratory 8 hour(s).

*Grade Mode:* Letter.

## **LDA 215 – What is Infrastructure: Critical Infrastructure Studies (3 units)**

*Course Description:* Introduction to interdisciplinary scholarship and design on expanding conceptions of infrastructure, that include social, technical, ecological, political and aesthetic dimensions of the medium. Focus on application of theory to case studies and thinking through landscape as infrastructure.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students or consent of instructor.

*Cross Listing:* GEO 215.

*Grade Mode:* Letter.

## **LDA 216 – Food & the City (4 units)**

*Course Description:* Exploration of theory and practice related to the design and planning of alternative and resilient food systems, including urban agriculture, agrihoods, and agri-/rural tourism. Includes investigation of urban-rural connections and case-studies of regional urban agriculture projects.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Open to graduate standing or consent of instructor.

*Grade Mode:* Letter.

## **LDA 270 – Environment & Behavior (4 units)**

*Course Description:* Factors that influence human's interaction with their surroundings and the mechanisms used for recognizing and addressing general and specific human needs in community design and development decisions.

*Prerequisite(s):* Graduate standing or consent of instructor; PSC 144 recommended.

*Learning Activities:* Seminar 3 hour(s), Tutorial 1 hour(s).

*Grade Mode:* Letter.

**LDA 280 – Landscape Conservation (3 units)**

*Course Description:* Focus is on land planning, design, and management techniques to further the goal of resource preservation. Examines current critical theory in the establishment and management of conservation areas.

*Prerequisite(s):* Contact department for prerequisite courses; graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**LDA 290 – Graduate Seminar in Landscape Architecture (2 units)**

*Course Description:* Seminar on selected topics in landscape architecture research, analysis, planning, design, communication, or education.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LDA 297 – Practicum in Landscape Architecture (1-10 units)**

*Course Description:* Opportunity for students to work directly in the field with academics at other institutions or with professionals in an office setting. Gives experience beyond the confines of campus and allows direct interaction with the community.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Independent Study 1-10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LDA 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LDA 299 – Directed Individual Research for Graduate Students (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Independent Study.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LDA 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Latin (LAT)**

College of Letters & Science

**LAT 001 – Elementary Latin (5 units)**

*Course Description:* Introduction to basic grammar and vocabulary and development of translation skills with emphasis on Latin to English.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Students who have successfully completed LAT 002 or LAT 003 in the 10th grade or higher grade in high school may receive unit credit for this course on a P/NP grading basis only; although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LAT 002 – Elementary Latin (5 units)**

*Course Description:* Continuation of LAT 001.

*Prerequisite(s):* LAT 001; or equivalent.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LAT 003 – Intermediate Latin (5 units)**

*Course Description:* Continuation of LAT 002. Selected readings from Latin authors.

*Prerequisite(s):* LAT 002; or equivalent.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LAT 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**LAT 100 – Readings in Latin Prose (4 units)**

*Course Description:* Review of Latin morphology, grammar, and vocabulary.

Readings in prose authors, including Julius Caesar.

*Prerequisite(s):* LAT 003; or equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LAT 101 – Livy (4 units)**

*Course Description:* Livy.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 102 – Roman Comedy (5 units)**

*Course Description:* Roman comedy.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 103 – Vergil: Aeneid (4 units)**

*Course Description:* Vergil: Aeneid.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 104 – Sallust (4 units)**

*Course Description:* Sallust.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 105 – Catullus (4 units)**

*Course Description:* Catullus.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 106 – Horace: Odes & Epodes (4 units)**

*Course Description:* Horace: Odes & Epodes.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 108 – Horace: Satires & Epistles (4 units)**

*Course Description:* Horace: Satires & Epistles.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 109 – Roman Elegy (4 units)**

*Course Description:* Roman elegy.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 110 – Ovid (4 units)**

*Course Description:* Translation and discussion of selected readings from the works of Ovid.

*Prerequisite(s):* LAT 100; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor and when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 112 – Cicero (4 units)**

*Course Description:* Translation and discussion of selected readings from the works of Cicero.

*Prerequisite(s):* LAT 100; or equivalent.

*Learning Activities:* Recitation 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor and when readings differ.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 115 – Lucretius (4 units)**

*Course Description:* Lucretius.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 116 – Vergil: Eclogues & Georgics (4 units)**

*Course Description:* Vergil: Eclogues & Georgics.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 118 – Roman Historians (4 units)**

*Course Description:* Readings in Latin from one or more of the major Roman historians and biographers. Authors may include Sallust, Nepos, Livy, Tacitus, Suetonius, and Ammianus Marcellinus.

*Prerequisite(s):* LAT 100; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 119 – Readings in Republican Latin Literature (4 units)**

*Course Description:* Translation and discussion of selected readings from Republican Latin literature.

*Prerequisite(s):* LAT 100; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 120 – Readings in Imperial Latin Literature (4 units)**

*Course Description:* Readings in Imperial Latin literature.

*Prerequisite(s):* LAT 100; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 121 – Latin Prose Composition (4 units)**

*Course Description:* Intensive grammar and vocabulary review through exercises in Latin prose composition.

*Prerequisite(s):* LAT 100; or equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LAT 122 – Early Christian Writers (4 units)**

*Course Description:* Latin style of selected early Christian writers. Topics may include: Latin translations of Greek and Hebrew scriptures, Christian Latin, with focus on North Africa, Palestine, or Spain; High literary Christian Latin; Christian Latin oratorical style.

*Prerequisite(s):* LAT 100 (can be concurrent); or consent of instructor.

*Learning Activities:* Extensive Writing, Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 124 – Post-Vergilian Latin Epic (4 units)**

*Course Description:* Readings from Post-Vergilian Latin epic. Study of Lucan's Bellum Civile, Silius Italicus' Punica, Valerius Flaccus' Argonautica, and/or Statius' Thebaid and Achilleid.

*Prerequisite(s):* LAT 100 (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s); Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 125 – Medieval Latin (4 units)**

*Course Description:* Selected readings from the Vulgate and various medieval authors provide an introduction to the developments in the Latin Language and literature from the 4th to the 15th centuries.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**LAT 130 – Readings in Late Latin (4 units)**

*Course Description:* Translation and discussion of selected readings from late imperial-early medieval Christian and pagan literature.

*Prerequisite(s):* LAT 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 135 – Themes in Latin Literature (4 units)**

*Course Description:* Readings in Latin that trace a theme across times, genres, and authors.

*Prerequisite(s):* LAT 100 (can be concurrent); or consent of instructor.

*Learning Activities:* Extensive Writing, Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**LAT 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**LAT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**Law (LAW)****School of Law****LAW 200 – Introduction to Law (1 unit)**

*Course Description:* Introduction to basic concepts of the law, the historical roots of common law and equity, the precedent system in its practical operation, the modes of reasoning used by courts and attorneys, and the fundamentals of statutory interpretation.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 200A – U.S. Legal System Seminar (LL.M.) (2 units)**

*Course Description:* History and fundamental principles of the United States legal system. Important current legal issues, developments and trends. Required for LL.M. students who have not attended a U.S. law school. Fall semester only.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 200B – U.S. Legal Methods I (LL.M.) (3 units)**

*Course Description:* Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the US legal methods which includes learning various forms of legal writing and speaking.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

**LAW 200BT – U.S. Legal Methods A (LL.M.) (3 units)**

*Course Description:* Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the U.S. legal method which includes learning various forms of legal writing and speaking.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 200C – U.S. Legal Methods II (LL.M.) (3 units)**

*Course Description:* Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the US legal method which includes learning various forms of legal writing and speaking.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

**LAW 200CT – U.S. Legal Methods B (LL.M.) (3 units)**

*Course Description:* Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the U.S. legal method which includes learning various forms of legal writing and speaking.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## LAW 200D – American Legal Concepts I (LL.M.) (3 units)

*Course Description:* Designed to provide basic skills necessary to succeed in both law school and legal practice.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

## LAW 200DT – Advanced Introduction to American Legal Concepts & Methods (LL.M.) (3 units)

*Course Description:* Building on the Introduction to American Law course, provides additional instruction in American law and legal methods. Audit selected substantive courses and produce a series of legal memoranda.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

## LAW 200E – American Legal Concepts II (LL.M.) (3 units)

*Course Description:* Designed to provide basic skills necessary to succeed in both law school and legal practice.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

## LAW 200L – Lawyering Process Lab (0 units)

*Course Description:* Lab which accompanies Lawyering Skills course for first-year law students.

*Learning Activities:* Laboratory.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 200S – Lawyering Process (2 units)

*Course Description:* Hone interactive lawyering skills needed for effective transactional and litigation work, including client interviewing and negotiation. Learn the role that interpersonal skills play in effective lawyering and contemplate the professional identity they wish to cultivate.

*Learning Activities:* Discussion.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 201 – Property (4 units)

*Course Description:* Study of doctrines and concepts of property law with primary emphasis on real property. Coverage includes: the estates in land system; the landlord-tenant relationship, conveyancing, and private and public land use control.

*Prerequisite(s):* AAS 010; LAW 200A; or consent of instructor.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## LAW 202 – Contracts (4 units)

*Course Description:* Examines sorts of promises that are enforced and the nature of protection given promissory obligations in both commercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine adjusts or fails to adjust to changing social demands.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## LAW 203 – Civil Procedure (5 units)

*Course Description:* Study of the fundamental and recurrent problems in civil actions including the methods used by federal and state courts to resolve civil disputes.

*Learning Activities:* Discussion 5 hour(s).

*Grade Mode:* Letter.

## LAW 204 – Torts (4 units)

*Course Description:* Familiarizes students with legal rules, concepts and approaches pertinent to the recovery for personal injuries, property damages and harm done to intangible interests.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## LAW 205 – Constitutional Law I (4 units)

*Course Description:* Principles, doctrines and controversies regarding the basic structure of and division of powers in American government. Specific topics include judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immunities, and the separation of powers among the branches of the federal government.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## LAW 206 – Criminal Law (3 units)

*Course Description:* Study of the bases and limits of criminal liability. Coverage of the constitutional, statutory, and case law rules which define, limit, and provide defenses to individual liability for the major criminal offenses.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## LAW 207 – Legal Research & Writing I (2 units)

*Course Description:* Integrated legal research and writing skills course taught by Wydick Fellowship Program faculty. Basic legal research resources and strategies are introduced and practiced. Fall semester.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

## LAW 207A – Legal Research (LL.M.) (1 unit)

*Course Description:* Description of the evolution and use of sources of law and secondary authority.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to LL.M. students only.

*Grade Mode:* Letter.

## LAW 207B – Advanced Legal Research (2 units)

*Course Description:* Introduction to advanced legal research tools and techniques used in practice, including efficient computer research techniques.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to 35 students.

*Grade Mode:* Letter.

**LAW 207C – California Civil Procedure Research (1 unit)**

*Course Description:* Includes lectures and in-class exercises working with print, and electronic, legal research materials to prepare responses to various fact patterns. Extensive use of real-world case scenarios to mimic conditions likely encountered by legal practitioners. Half of the course time is lecture; half is in-class practical assignments or discussion designed to enhance the students' understanding of the concepts introduced.

*Prerequisite(s):* LAW 207; LAW 208.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 207D – Intellectual Property Research (1 unit)**

*Course Description:* Includes lectures and in-class exercises working with print, and electronic, legal research materials to prepare responses to various fact patterns. Extensive use of real-world case scenarios to mimic conditions likely encountered by legal practitioners working in the intellectual property legal practice.

*Prerequisite(s):* LAW 207; LAW 208.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 208 – Legal Research & Writing II (2 units)**

*Course Description:* Focuses on persuasive writing and oral advocacy. Complete integrated research and writing assignments, including a complaint, a strategic defense office memorandum, a motion to dismiss in federal court, and an appellate brief, with oral arguments by all students.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 208A – Legal Research & Writing II (LL.M.) (2 units)**

*Course Description:* Persuasive writing and oral advocacy. LL.M. students complete integrated research and writing assignments, including a complaint, a strategic defense office memorandum, a motion to dismiss in federal court, and an appellate brief with oral arguments.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 208E – Introduction to U.S. Legal Methods A (3 units)**

*Course Description:* Designed to provide foreign students with background skills at a more basic level than U.S. Legal Methods A and B. Audit carefully selected courses in the regular curriculum and complete assignments related to those courses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

**LAW 208F – Introduction to U.S. Legal Methods B (LLM) (3 units)**

*Course Description:* Designed to provide foreign students with background skills at a more basic level than U.S. Legal Methods A and B. Audit carefully selected courses in the regular curriculum and complete assignments related to those courses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar.

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

**LAW 208G – U.S. Legal Methods A (LL.M.) (3 units)**

*Course Description:* Designed to provide foreign and other students with background skills necessary to succeed in both law school and legal practice.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Restricted to LL.M. students.

*Grade Mode:* Letter.

**LAW 208H – U.S. Legal Methods B (LL.M.) (3 units)**

*Course Description:* Description of the evolution and use of sources of law and secondary authority.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 208M – LL.M. Legal Essay Writing A (1 unit)**

*Course Description:* Improve legal writing skills with a focus on law school essay exams. Focuses on the following skills: 1) how to understand the goals of a US law school exam and the expectations of the professor; 2) how to structure an answer logically; 3) how to write clearly; 4) how to explain reasoning and discuss complex legal issues. Experiential class.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 208N – LL.M Legal Essay Writing B (1 unit)**

*Course Description:* Improve legal writing skills with a focus on bar essay exams. Focuses on the following skills: 1) how to understand the goals of a US bar; 2) how to structure an answer logically; 3) how to write clearly; 4) how to explain reasoning and discuss complex legal issues. Experiential class.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 209A – Patent Law (3 units)**

*Course Description:* Covers all essential aspects of patent law: patentable subject matter, novelty, utility, nonobviousness, enablement, prosecution, infringement, and remedies.

*Prerequisite(s):* LAW 274; or consent of instructor.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 209B – Patent Prosecution & Practice (2 units)**

*Course Description:* Examines core requirements and strategies for drafting and prosecuting a patent application before the U.S. Patent & Trademark Office. Interact with real inventors and US PTO examiners to gain the experience of getting a patent issued.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 209BP – Patent Prosecution Practicum (2 units)**

*Course Description:* Analyze if an invention is directed to patentable subject matter, identify prior art, analyze patentability, and draft and electronically file a provisional patent application with the US Patent & Trademark office.

*Prerequisite(s):* Patent Law as pre-requisite or co-requisite.

*Learning Activities:* Lecture/Laboratory.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

## **LAW 209C – Patentable Subject Matter: Genes, Methods, & Software (2 units)**

*Course Description:* In-depth look at recent cases and debates behind genetic patenting, software; business models; diagnostic methods, and others. Reviews the crucial and rapidly evolving field of patent law which affects some of the most important hi-tech industries.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 209DT – Innovation Law (2 units)**

*Course Description:* Explores range of legal issues that innovation lawyers face, from establishing a start-up to high stakes technology mergers & acquisitions, to data protection and privacy, protecting intellectual property through strategic patent litigation.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 209E – Patent Litigation (1 unit)**

*Course Description:* Introduces the basics of Patent Law and examines the U.S. patent enforcement system. Learn how a patent litigation proceeds, focusing on both pre- and post-trial proceedings and examines substantive patent laws.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

## **LAW 209G – Privacy, Technology, & the Law (2 units)**

*Course Description:* Seminar evaluates the privacy law issues that arise from technological advancements and data trade transactions. Likely topics that the course will cover include the Internet of Things and legal responses to privacy related problems, such as the European General Data Protection Regulation and the California Consumer Privacy Act of 2018.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 209T – Innovation & Technology Transfer Seminar (2 units)**

*Course Description:* From biomedicine to cleantech, public institutions are playing leading roles in developing cutting-edge technologies. Explores the law and policy of publicly-supported innovation and technology transfer.

*Prerequisite(s):* LAW 209A or LAW 274, recommended but not required.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to 15 students.

*Grade Mode:* Letter.

## **LAW 210 – Reforming the Police & Criminal Justice (2 units)**

*Course Description:* Focus on major current issues: policing ethnic neighborhoods; use of deadly force; modernizing the work of prosecutors and defense counsel.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Grade Mode:* Letter.

## **LAW 210A – Privatization of Criminal Justice Seminar (2 units)**

*Course Description:* Analyze the legal, historical, and sociological aspects of the growing private sector provision of criminal justice services traditionally assumed by government, including prisons, policing, and adjudication.

*Prerequisite(s):* Prior social theory or criminal procedure knowledge not required; completion of LAW 227A strongly recommended.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to 10 students.

*Grade Mode:* Letter.

## **LAW 210B – Law of Policing (2 units)**

*Course Description:* What are the expectations and roles of the police in a democratic society? We need order maintenance and crime control, but to assume these tasks the police sometimes intrude upon interests considered fundamental to free societies.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 210C – Sexual Assault & the Law (2 units)**

*Course Description:* Criminal law of sexual assault, traditional and modern offenses, and proposals for reform. Discussion of procedural developments, victim's counsel, evidentiary reform, and ADR. Implications for civil law, tort liability, Title VI, Title IX, and civil liability of perpetrators.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 210D – Comparative Criminal Justice (3 units)**

*Course Description:* Explores ways political units in different countries attempt to maintain social order and advance criminal justice.

Examine people, policies, and institutions responsible for adjudicating alleged criminal law violations around the globe, learning how rules of professional responsibility and legal ethics guide the behavior of institutional actors who participate in criminal processes. Engage in research, formal presentations, and produce a publishable final paper.

*Prerequisite(s):* LAW 227A, LAW 219, and LAW 258 recommended, but not required.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 210DT – Wrongful Convictions (2 units)**

*Course Description:* Explore the magnitude and complexity of the wrongful convictions, their causes and remedies under existing law, and possible fixes (reforms). Emphasizes relevant legal rules (Criminal Procedure, Evidence, Post-Conviction Review).

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 210ET – Race, Mass Incarceration & Policing (2 units)**

*Course Description:* Explores key issues in the historical development and the current state of modern American imprisonment, policing structures, and the criminal justice system in relation to race.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## LAW 210F – Restorative Justice (2 units)

*Course Description:* Explore both the theory and practice of restorative justice as an alternative approach to the retributive justice model of our current criminal law system and many other institutions.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## LAW 210FA – Aoki Center Restorative Justice Practicum I (2 units)

*Course Description:* Part one of a two-part practicum. Learn about restorative justice principles and practices, receive training in restorative justice facilitation, and participate in and lead restorative justice circles in Davis & Sacramento schools, Yolo County Juvenile Hall, and other venues.

*Learning Activities:* Seminar.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 210FB – Aoki Center Restorative Justice Practicum II (2 units)

*Course Description:* Part two of a two-part practicum. Learn the principles and practices of restorative justice, receive training in restorative justice facilitation, participate in & conduct restorative justice circles with young people in Davis & Sacramento schools and the Yolo County Juvenile Hall.

*Learning Activities:* Seminar.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 210G – Aoki Center Restorative Justice Practicum (2 units)

*Course Description:* Learn about restorative justice principles and practices, receive training in restorative justice facilitation, and participate in and lead restorative justice circles in Davis & Sacramento schools, Yolo County Juvenile Hall, and other venues.

*Learning Activities:* Fieldwork.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 210H – Aoki Federal Court Amicus Project (3 units)

*Course Description:* Work on actual federal criminal cases in the Ninth Circuit Court of Appeals and United States Supreme Court. File briefs amicus curiae on critical issues, and develop research, writing, and oral advocacy skills.

*Prerequisite(s):* LAW 219; LAW 227A; both required or consent of instructor.

*Learning Activities:* Project.

*Grade Mode:* Letter.

## LAW 210J – Best Practices for Justice Seminar: Advocates Working to Improve the Criminal Justice System (2 units)

*Course Description:* The Criminal Justice System continues to evolve as perceptions regarding judges, police officers and criminal attorneys change. Analyzes how our sense of justice is formed and what it looks like in the actual practice of criminal law.

*Prerequisite(s):* LAW 206; LAW 227A (can be concurrent).

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## LAW 210K – Sexual Assaults in the Criminal Justice System (2 units)

*Course Description:* Focuses on the criminal prosecution and defense of sexual assaults, from reporting to sentencing, through examination of pertinent criminal statutes, evidence code sections, jury instructions, court documents and specific case studies.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## LAW 210M – Criminal Justice in the Era of Prison Downsizing (2 units)

*Course Description:* Learn about how different parts of the criminal justice system work and to consider practical solutions to addressing crime in a context where the emphasis on incarceration is declining.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## LAW 210N – Aoki Conviction & Sentence Integrity Practicum (3 units)

*Course Description:* Work on criminal justice projects for prosecutors' offices, including individual cases involving excessive sentences and miscarriages of justice, and criminal justice policy reforms designed to reduce mass incarceration and advance racial justice.

*Learning Activities:* Fieldwork.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

## LAW 210P – Post-Conviction Practicum (3 units)

*Course Description:* King Hall Post-Conviction Practicum students learn to effectively represent indigent and incarcerated individuals in the post-conviction process, with an emphasis on direct appeals in the California Court of Appeal and/or the California Supreme Court.

*Learning Activities:* Lecture/Laboratory.

*Grade Mode:* Letter.

## LAW 210Q – Advanced Aoki Criminal Justice Practicum (3 units)

*Course Description:* Students who completed one semester of the Criminal Justice Practicum will work on claims of innocence, wrongful conviction, and other miscarriages of justice. Students will draft papers for prosecutors' offices, will make formal internal presentations, and possibly appear in court.

*Prerequisite(s):* LAW 210N.

*Learning Activities:* Practice.

*Grade Mode:* Letter.

## LAW 211 – Negotiations (2 units)

*Course Description:* Skills course teaches theoretical and empirical approaches to negotiation strategy for the purposes of making deals and resolving disputes. Participate in simulations to hone their negotiation skills, and write analytical papers.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 211A – Advanced Negotiations Strategy & Client Counseling (3 units)**

*Course Description:* Understand the dynamics of interviewing and counseling process. Designed to be relevant to a broad spectrum of negotiation problems that are faced by legal professionals.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 3 hour(s).

*Enrollment Restriction(s):* Application course; must apply and secure professor approval to enroll; will involve participating in discussions and a series of simulations; your classmates will be counting on you to actively participate and be well prepared for every simulation; do not apply to take this course unless you are willing and able to participate fully and can accept constructive feedback; if you anticipate missing more than two class sessions, do not apply to take this course.

*Grade Mode:* Letter.

## **LAW 211B – International Business Negotiations (3 units)**

*Course Description:* Structured around a simulated negotiation exercise with students from a similar class at Stanford Law School. Experience the development of a business transaction over an extended negotiation in a context that replicates actual legal practice.

*Prerequisite(s):* LAW 215 (can be concurrent); prior or concurrent enrollment in Business Associations (LAW 215) required; prior enrollment in Negotiations (LAW 211) and/or International Business Transactions (LAW 270) preferred.

*Learning Activities:* Lecture/Discussion.

*Grade Mode:* Letter.

## **LAW 211C – Negotiating Joint Ventures (2 units)**

*Course Description:* Business negotiation and dispute resolution strategies through simulations, reading, and writing assignments.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 211D – Treatymaking: International Agreement Negotiations (3 units)**

*Course Description:* Negotiation simulation intended to produce a multinational convention on a subject to be determined that is timely and meaningfully contributes to the real-world discourse. Begins with lectures/discussions of the fundamentals of treaty law. Followed by the class seeking Circular-175 authorization to enter into negotiations, and a variety of written and oral exercises/simulations leading to eventual conclusion of a multinational instrument.

*Learning Activities:* Lecture/Discussion.

*Grade Mode:* Letter.

## **LAW 212A – Medical Liability Law & Policy (2 units)**

*Course Description:* Considers the many ways in which society seeks to establish and maintain quality in patient care.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 213A – Transnational Criminal Law (3 units)**

*Course Description:* Examines the laws responses to a particular aspect of globalization, transnational crime. Explore the phenomenon of transnationality and how it affects the power of nation-states, acting alone or together, to prosecute certain crimes.

*Prerequisite(s):* LAW 205; LAW 206.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 213T – Terrorism & International Law (2 units)**

*Course Description:* International terrorism remains a pressing concern. Devising effective remedies for responding to it within the bounds of the law is critical. The new generation of international lawyers needs to be familiar with the relevant law and standards.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 214 – Tax Issues Related to Estate Planning (2 units)**

*Course Description:* Tax issues Related to estate planning.

*Prerequisite(s):* LAW 221 recommended.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 214A – Migration, Work, & Taxation (2 units)**

*Course Description:* Explores workers' and prospective workers' choices to move from one place to another, both across and within national borders. In particular, explores how tax policy and broader economic forces shape those choices.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 215 – Business Associations (4 units)**

*Course Description:* Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associational forms.

*Learning Activities:* Discussion 4 hour(s).

*Enrollment Restriction(s):* Not open to students who have previously taken LAW 215C.

*Grade Mode:* Letter.

## **LAW 215A – The Law of Corporate Governance Seminar (2 units)**

*Course Description:* Advanced issues in the governance of publicly held corporations. Separation of ownership and control and how the law has addressed this issue at the theoretical level and in the context of topics such as the duties of corporate directors, shareholder voting rights, and competition among states to attract corporate charters.

*Prerequisite(s):* LAW 215.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 215B – Corporate Integrity & Responsibility (2 units)**

*Course Description:* Equips future business lawyers with the legal knowledge and technical skills to better understand, the U.S., European and Asian (select jurisdictions) regulatory responses to ethical and socially responsible corporate governance practices. Instruction seeks to re-define the aim of corporate governance as a tool to address efficiency, reduce agency costs and improve access to capital, as well as an emerging anti-corruption tool and a means to ensure more ethical corporate behavior.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 215C – Business Associations (3 units)**

*Course Description:* Provides a broad survey of the legal rules and concepts applicable to business associations, both public and closely held. Principal attention given to the corporate form of organization, although partnerships and other associational forms are also treated briefly.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Students who take this course are ineligible for LAW 215.

*Grade Mode:* Letter.

**LAW 215D – Business in Society (3 units)**

*Course Description:* The pandemic, racial injustice, income inequality, and climate change have heightened the demands for companies to minimize their negative externalities. Explore how these stakeholder demands are shifting business practices, and transforming corporate law.

*Prerequisite(s):* LAW 215 (can be concurrent).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 215E – Business Law & Climate Change (3 units)**

*Course Description:* Climate change is redefining corporate law. Through case studies of the business and investment community, we will explore the intersection of business law and climate risk and discuss and debate how the climate crisis is impacting traditional corporate law paradigms.

*Prerequisite(s):* LAW 215 (can be concurrent); or LAW 215C (can be concurrent).

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**LAW 215S – Special Session Business Associations (4 units)**

*Course Description:* Provides a broad survey of the legal rules and concepts applicable to business associations, both public and closely.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

**LAW 216A – Law & Religion (2 units)**

*Course Description:* Federal constitutional law relating to religion; the interpretation and application of the Free Exercise Clause and the Establishment Clause of the First Amendment.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to 20 students.

*Grade Mode:* Letter.

**LAW 217 – Insurance Law (2 units)**

*Course Description:* Covers the following topics: I. Insurance Law and Society, II. The Impact of Insurance, III. Contract Law Foundations, IV. First-Party Insurance, V. Liability Insurance: Coverage Issues, VI. Liability Insurance: Relationship Issues.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

**LAW 217A – Comparative Telecommunications Law (2 units)**

*Course Description:* Explores the key issues facing policy-makers in designing telecommunications regulatory systems (e.g. licensing, universal service, economic regulation, relationship with antitrust law), and the various ways in which different jurisdictions have chosen to address these issues.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 218 – Constitutional Law II (4 units)**

*Course Description:* Principally covers the First Amendment and the Equal Protection Clause.

*Learning Activities:* Discussion 4 hour(s).

*Enrollment Restriction(s):* Not open to students who have completed LAW 218A or LAW 218B.

*Grade Mode:* Letter.

**LAW 218A – Constitutional Law II: Equal Protection (2 units)**

*Course Description:* Focuses on the Equal Protection Clause of the Fourteenth Amendment.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Not open to students who have previously taken LAW 218, or who plan to take LAW 218 for 4 units; students enrolled in LAW 218A given priority registration in LAW 218B.

*Grade Mode:* Letter.

**LAW 218B – Constitutional Law II: First Amendment (2 units)**

*Course Description:* Principally covers the free speech clause of the First Amendment.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Not open to students who have previously taken LAW 218, or who plan to take LAW 218 for 4 units; students enrolled in LAW 218A given priority registration in LAW 218B.

*Grade Mode:* Letter.

**LAW 218C – Critical Perspectives on Equal Protection (1 unit)**

*Course Description:* Discussion-based course focusing on academic articles, drawn from critical race and critical gender traditions, that examine the doctrine covered in LAW 218A. Choice and sequence of readings are tied to those assigned in LAW 218A.

*Prerequisite(s):* Must be taken concurrently with LAW 218A; or consent of instructor if previously taken LAW 218 or LAW 218A.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**LAW 218D – Constitutional Theory Seminar (2 units)**

*Course Description:* Provides students with a broad understanding of the shape of modern constitutional theory, and the ability to understand the implications of that theory for concrete historical and modern constitutional disputes.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 218E – Direct Democracy in California (3 units)**

*Course Description:* Many significant developments in California law and politics have been the result of the power of initiative, referendum, and recall. Explore how these mechanisms work and study some of the most consequential initiatives in California history.

*Prerequisite(s):* Constitutional Law I (prerequisite).

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 218ET – California Constitutional Law (2 units)**

*Course Description:* Reviews, interpretive meta-rules for constitutional construction, structure and institutions of state government, civil liberties under the Declaration of Rights, the impact of race in California society, and criminal law.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 218F – Implicit Bias & the Law: Modern Forms of Discrimination (2 units)**

*Course Description:* Provides an opportunity to analyze modern forms of discrimination, learn about cutting edge developments in this area, and explore effective ways to address these issues through the law.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 218T – Selected Topics in Constitutional Law (2 units)**

*Course Description:* Examines two core themes of Constitutional Law I and Federal Jurisdiction: federalism and separation of powers. Concentrates on habeas corpus and the Eleventh Amendment as vehicles for examining the constitutional themes in greater depth.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 218TA – Separation of Powers (2 units)**

*Course Description:* Study of the separation of powers in our federal government by focusing on certain historical events and their impact on constitutional law.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 218TB – Law of War (3 units)**

*Course Description:* Surveys the law of armed conflict as it applies to today's battlefields.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 218TC – Antidiscrimination Law (4 units)**

*Course Description:* Offers an overview of federal constitutional and statutory anti-discrimination law in the United States.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

**LAW 219 – Evidence (4 units)**

*Course Description:* Covers rules regarding the admissibility of proof during civil & criminal cases, including rules governing relevancy, hearsay, the examination & impeachment of witnesses, expert opinion, and constitutional & statutory privileges.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 219A – Advanced Evidence (3 units)**

*Course Description:* Public interest lawyers often spend much time in the courtroom. Prosecution, defender, and legal aid offices usually don't have resources to train lawyers in trial work. Seeks to help remedy this deficiency by helping develop witness interrogation skills.

*Prerequisite(s):* LAW 219.

*Learning Activities:* Discussion 3 hour(s).

*Enrollment Restriction(s):* Limited to six students; selected by professor. Interested students complete an application form; available in the Law Registrar's Office. Credit is contingent on attending all classes and participating in all exercises. Participation is crucial to the success of the course, as students will be working in teams of three. Do not take this course unless you are willing and able to participate fully and can accept criticism.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 219B – E-Discovery & Digital Evidence (2 units)**

*Course Description:* Examines the interplay between the significant e-discovery rules and case law, and the process of electronic discovery, beginning with the duty to preserve electronically stored information (ESI), to the search, identification, collection, review and production of ESI in litigation.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 219C – Evidence (4 units)**

*Course Description:* Covers rules regarding the admissibility of proof during civil & criminal cases, including rules governing relevancy, hearsay, the examination & impeachment of witnesses, expert opinion, and constitutional & statutory privileges.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**LAW 220 – Federal Income Taxation (4 units)**

*Course Description:* Surveys the federal income tax system, with consideration of the nature of income, when and to whom income is taxable, exclusions from the tax base, deductions and credits, and tax consequences of property ownership and disposition.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 220A – State & Local Taxation (3 units)**

*Course Description:* Introduction to fundamentals of state and local taxation. Beginning with historical and constitutional aspects, analyze recent developments in state and local taxation and their impact on client representation.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 220B – Tax & Distributive Justice (3 units)**

*Course Description:* Advanced tax course designed as an introduction to issues of tax policy, with particular emphasis on tax distribution (i.e., who or what should pay taxes in society) and tax incidence (i.e., who or what ends up paying taxes in society).

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 220BT – Law of Banking & Financial Institutions (2 units)**

*Course Description:* Guide to dual regulatory system, and an understanding of banks and other financial institutions, such as thrifts, credit unions, industrial banks, finance companies, and money transmitters, as well as large versus community banks.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 220C – Tax Controversy & Procedure (2 units)**

*Course Description:* Focuses on the practical and procedural aspects of tax controversy before federal and state tax authorities. Provides a mix of theory and practical skills for students wishing to engage in controversy practice before the IRS and the various California tax agencies (FTB, CDTFA, BOE, and OTA).

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 220S – Special Session Federal Income Taxation (2 units)**

*Course Description:* Introduction to the basic principles of federal income taxation using the American federal tax model. Topics include identification of income subject to taxation, gains and losses from property transactions, the timing of income and deductions and the identity of people subject to tax on particular items of income.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 220T – State & Local Taxation (3 units)**

*Course Description:* Introduction to fundamentals of state and local taxation. Beginning with historical and constitutional aspects, analyze recent developments in state and local taxation and their impact on client representation.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 221 – Trusts, Wills & Estates (3 units)**

*Course Description:* Study of the law of decedent's trusts, wills, and estates.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## **LAW 221A – Practical Skills in Will & Trust Drafting & Administration (2 units)**

*Course Description:* Provides the skills to practice law in the area of estate planning and probate/trust administration. Follow an estate planning client and draft actual estate plan documents. A series of related topics will be explored.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 222 – Critical Race Theory Seminar (2 units)**

*Course Description:* Examines race relations and racial discrimination in America through the perspectives of proponents of the Critical Race Theory (CRT) movement, a collection of legal scholars who challenge both conservative and liberal political orthodoxies.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 222A – Latinos & Latinas & the Law (2 units)**

*Course Description:* Seminar analyzes some of the legal issues of particular relevance to the Latino community in the United States, including racial identity, immigration, language regulation, national and transnational identity issues, affirmative action, and civil rights.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 222B – Asian Pacific Americans & Law (3 units)**

*Course Description:* Examines how American Law has shaped Asian Pacific American demographics, experiences, and status in American society.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 222CT – Anti-Corruption Law in India (2 units)**

*Course Description:* Addresses the impact of large corruption scandals on long term social trust, in light of Indian coal block and 2G spectrum allocation scandals.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 222D – Race & Law (2 units)**

*Course Description:* Examines major cases, statutes and events in U.S. law dealing with non-whites, including African Americans, Asian Pacific Americans, Indigenous People, and Latinx People, and the present effects of discrimination.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 223 – Estate Planning Seminar (2 units)**

*Course Description:* Selected topics in the estates and trusts area. Content varies with instructor.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 224 – Animal Law Seminar (2 units)**

*Course Description:* An introduction to legal principles affecting animals and their use.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 225 – Marital Property (2 units)**

*Course Description:* Covers the California community property system, including the rights of marital and domestic partners during the ongoing relationship, and upon the end of the relationship by death or divorce.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 226 – Disability Rights Law (3 units)**

*Course Description:* Examines disability law and theory. Devoted to the Americans with Disabilities Act (particularly Titles I, II, and III) as it applies to employment, education, public accommodations, and government services and programs.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 226ET – Mental Disability Law (3 units)**

*Course Description:* Examine the civil and constitutional bases of mental disability law, as well as its history, and explore the role of mental disability in the policing and criminal trial process.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 227A – Criminal Procedure (3 units)**

*Course Description:* Federal constitutional limits on government authority to gather evidence and investigate crime. Topics include Fourth Amendment limits on search, seizure, and arrest; the Fifth Amendment privilege against self-incrimination; and the Sixth Amendment right to counsel.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 227B – Advanced Criminal Procedure (3 units)**

*Course Description:* Examines a range of issues, including bail, charging decisions, preliminary hearings, discovery, statute of limitations, venue, joinder and severance, pleas, plea bargaining, assistance of counsel, trial, double jeopardy, sentencing, appeal and collateral remedies.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 227C – Topics in California Criminal Practice (2 units)**

*Course Description:* Advanced criminal law and procedure class aimed at students planning to practice criminal law in California, either as an extern or summer clerk, or after graduation.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 228 – Startups & Venture Capital (3 units)**

*Course Description:* Introduction to the various legal and business considerations involved in forming and operating an emerging growth business.

*Prerequisite(s):* LAW 215; must be completed, prerequisite will not be waived.

*Learning Activities:* Lecture/Discussion.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LAW 228A – Mergers & Acquisitions (3 units)**

*Course Description:* Practical approach to mergers and acquisitions, with an in-depth look at the planning, negotiation, documentation and completion of mergers and acquisitions.

*Prerequisite(s):* LAW 215.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

**LAW 228B – Accounting for Lawyers (2 units)**

*Course Description:* Exposure to basic principles of accounting, from the perspective of the practicing attorney.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 228C – Law & Statistics (3 units)**

*Course Description:* Introduction to fundamentals of statistical analysis and how statistical analysis is used in the law and public policy. Goal is to assist in becoming excellent consumers of statistical information and evidence.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 229 – Scientific Evidence (3 units)**

*Course Description:* In addition to examining the evidence law governing the admission of scientific testimony, considers trial advocacy in presenting and attacking such testimony.

*Prerequisite(s):* LAW 219.

*Learning Activities:* Discussion 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LAW 230 – International Environmental Law (3 units)**

*Course Description:* Elective Course for Environmental Law Certificate Program. May satisfy Advanced Writing Requirement with professor's permission. Provides an overview of the structure and basic principles of international environmental law and policy.

*Prerequisite(s):* Prior course work in environmental law and/or international law is helpful.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 230A – Wine & the Law (1 unit)**

*Course Description:* Surveys the legal landscape of this multi-billion dollar industry, focusing on contemporary debates and developments in judicial, legislative, and administrative arenas.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 230B – Sustainability Law (2 units)**

*Course Description:* Covers research and practice of "environmental law" to show it is too narrow to adequately address 21st century needs. "Environmental law" often emphasizes public governance interventions without addressing pollution reducing opportunities that lay with private environmental governance. Explores how the legal profession can accelerate progress in addressing the climate crisis by expanding the study of "environmental law" into the broader and more applicable "sustainability law".

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 230C – California Environmental Cases & Places (3 units)**

*Course Description:* Focuses on a four-day trip to world-class teaching locations throughout California. Approaches the locations from two distinctly different perspectives: law and environmental science. Learn hands-on water, environmental, and public lands law.

*Learning Activities:* Fieldwork.

*Grade Mode:* Letter.

**LAW 230T – Free Trade & the Environment (2 units)**

*Course Description:* Examines the relationship between legal rules relating to trade and rules for the protection of the environment.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 231 – Race, Gender & Inequality Seminar (2 units)**

*Course Description:* Examines gender and race and how they are constructed, contested, and regulated within legal, legislative, and juridical frameworks. Includes interdisciplinary theoretical perspectives across legal, sociolegal, and feminist studies. Topics include education, criminal justice, political representation, health and reproductive rights, privacy, civil rights.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 231A – Gender, Sexuality, & the Law (3 units)**

*Course Description:* Examines the legal and social regulation of sexual orientation and gender identity.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 231B – Military Justice and Social Change: Race, Gender, and SOGI (2 units)**

*Course Description:* The U.S. military has laws tailored to the mission. As society changes, these laws can limit or promote change. Explore race, gender, and LGBTQ identity through military law and analyze where the military promoted and hindered change.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 232 – Real Estate Finance (2 units)**

*Course Description:* Examination of the problems involved in the acquisition, financing, and development of real estate, and of lender remedies and debtor protections in the event of debtor default. Stresses the practical application of California legal doctrines.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 232AT – Real Estate Transactions (2 units)**

*Course Description:* Review of legal issues in the purchase, sale, financing of residential real estate in US, with non-exclusive focus on California. Roles of parties involved, mechanisms of financing and security, survey of remedies, and role of mortgage lending beginning in 2008.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 232T – Property Law & Race (2 units)**

*Course Description:* Seminar explores the extent to which property law (common law, federal, state, and local statutes, and administration regulations) historically impacted and currently shapes conceptions of race, racial groups, and racial relations.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 233 – Asylum & Refugee Law (3 units)**

*Course Description:* Surveys U.S. and international law concerning refugees and asylum-seekers. Questions the meaning of persecution, the definition of "particular social groups" in U.S. law, protections for gender-related violence, statutory bars to asylum, and U.S. refugee policy.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 233B – A Comparative Study of Forced Migration (2 units)**

*Course Description:* Compares the Central American and Venezuelan forced migration phenomena in the Americas through the lens of history, politics, law, and morality. Considers the push and pull factors of forced migration from each nation and attempt to contextualize these factors within a broader understanding of history and modern politics.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 234 – Drug Law & Policy (2 units)**

*Course Description:* Engage with the wide variety of policy and legal issues presented in the area of drug law and policy with a particular focus on one of the fastest-evolving fields in drug policy: marijuana law and policy.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 235 – Administrative Law (3 units)**

*Course Description:* Examines how the U.S. Constitution and the federal Administrative Procedure Act constrain and regulate decision making by government agencies and officials.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 235B – Counseling & Legal Strategy in the Digital Age (2 units)**

*Course Description:* Explores the complex challenges that entrepreneurs, businesses, and other organizations face when trying to address legal issues relating to technology. Approach is both practical and multidisciplinary. Encourages exploring the roles of a wide range of stakeholders (including lawyers, policy advocates and policymakers, businesspersons, and technologists) in developing legal and business strategies.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 235C – Advanced Topics in Administrative Law (2 units)**

*Course Description:* Explore several topics in administrative law (e.g., nondelegation, deference, and judicial vacatur) that have faced increased scrutiny from members of the Supreme Court in recent years, and will assess the arguments for and against revisiting them.

*Prerequisite(s):* Recommended that students complete LAW 235 Administrative Law before enrolling in this seminar.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 236 – Securities Regulations (3 units)**

*Course Description:* Regulation of the distribution of securities under the Securities Act of 1933 and SEC Rules adopted there under, registration and reporting provisions of the 1934 Securities Exchange Act.

*Prerequisite(s):* LAW 215.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 236A – Securities Regulation I (2 units)**

*Course Description:* Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associational forms.

*Prerequisite(s):* LAW 215; or consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 236B – Securities Regulation II (2 units)**

*Course Description:* Securities Exchange Act of 1934 and the regulation of securities markets. Topics covered include regulation of securities markets and securities professionals, responsibilities of securities lawyers, continuous reporting, transnational securities fraud, and enforcement of the securities acts.

*Prerequisite(s):* LAW 215; or consent of instructor; LAW 236A recommended.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 236C – Securities Enforcement (3 units)**

*Course Description:* Examines the civil and criminal enforcement of the securities laws by both the Securities and Exchange Commission and Justice Department. Surveys the administrative rules and investigative procedures that govern the SEC and the substantive related crimes.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 237 – Legal History (2 units)**

*Course Description:* Traces the development of the common law from its origins in medieval England through the 20th century.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 237B – Special Topics in Legal Theory: Ancient Athenian Law (2 units)**

*Course Description:* Athenian legal system was different from our own and was far less formal. How did it work? Why did it work? Why have political and legal theorists misunderstood Athens for so long and what can we learn from that failure?

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 239 – Mediation (2 units)**

*Course Description:* Interactive focus on attorney representation of clients in mediation.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Restricted to 24 students.

*Grade Mode:* Letter.

**LAW 239A – Federal Court Mediation (2 units)**

*Course Description:* Fundamental mediation skills through both lectures and hands-on simulation practice. Students will consider the challenges of working with sophisticated parties with entrenched positions, and will consider the role of irrationality.

*Learning Activities:* Practice 2 hour(s).

*Grade Mode:* Letter.

**LAW 240 – Reforming Campaign Finance Law & the Initiative Process (2 units)**

*Course Description:* Recent elections exposed many campaign finance and initiative issues. Focuses on reforms as well as current law.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited to 25 students.

*Grade Mode:* Letter.

**LAW 240A – Law of the Political Process (3 units)**

*Course Description:* Covers many of the foundational issues in the "law of democracy," as that body of statutory and constitutional law has developed in the United States.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 241 – Voting Rights Seminar (2 units)**

*Course Description:* Seminar explores the right to vote under the U.S. Constitution.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 241A – Election Law Seminar I: The Right to Vote (2 units)**

*Course Description:* Investigate the right to vote as a matter of constitutional and statutory law. Covers the Warren Court cases that established the right to vote as a fundamental right under the Equal Protection clause; the emergence and transformation of the right of racial minorities to an "undiluted" vote under the Equal Protection clause and the federal Voting Rights Act; and the limits of the non-dilution principle, as reflected in partisan gerrymandering cases.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 241B – Election Law: Campaign Finance, Political Speech, & Rights of Political Association (2 units)**

*Course Description:* Investigate constitutional and statutory frameworks that channel and regulate the efforts of individuals, corporate & nonprofits, and political groups to convey their ideas to the electorate, to mobilize voter turnout, and to get their preferred candidates on the ballot and elected to office. Examine the legal status of contributions and expenditures of money and other goods. Consider political groups' "internal" affairs, the selection of nominees, and the ballot.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 242 – Conflict of Laws (2 units)**

*Course Description:* Study of how law operates across state and national borders. Topics include choice of applicable law in transactions involving multiple jurisdictions, recognition of judgments, and the exercise of jurisdiction.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 242S – Special Session Conflict of Laws (2 units)**

*Course Description:* Study of transactions with multi-state and international contracts. Topics include jurisdiction, recognition of foreign judgments, and choice of applicable law. Addresses problems that international lawyers encounter in a wide variety of deals with the emphasis on international commercial deals.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 243 – Commercial & Bankruptcy Law (4 units)**

*Course Description:* Remedies available to creditors to force payment, along with devices that creditors may use to give themselves priority against limited assets. Bankruptcy both as a means for providing funds for creditors and as a device for maximizing asset value.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

**LAW 243A – Secured Transactions (2 units)**

*Course Description:* Covers secured transactions (where a lender takes an interest in the debtor's property as "collateral," or security, for repayment of a loan) in personal property, such as auto loans and bank loans against business inventory.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 243B – Bankruptcy (3 units)**

*Course Description:* Introduction to essentials of U.S. law governing bankruptcy of consumers and businesses. Addresses bankruptcy under Chapter 7, Chapter 11, and Chapter 13.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 243C – Advanced Bankruptcy Practice: Corporate Reorganization (2 units)**

*Course Description:* Corporate chapter 11 bankruptcy under the Federal Bankruptcy Code and alternatives to corporate bankruptcy. Selection of venue. Formation of strategic objectives. Analysis of different professionals' roles.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 245 – Corporate & White Collar Crime (2 units)**

*Course Description:* Covers the law of conspiracy, corporate criminal liability, mail & wire fraud, the Hobbs Act, RICO, money laundering, obstruction of justice, and other white collar crimes and their associated defenses.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 245A – Corporate Responsibility: Case Studies in (Un)Ethical Leadership (2 units)**

*Course Description:* Explores corporate responsibility and leadership through case studies of contemporary scandals. Reviews business forms and the consequences of an institution failing to comply with legal & ethical duties to employees, shareholders, and the public.

*Prerequisite(s):* LAW 215 (can be concurrent).

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 245B – Death Penalty Seminar (2 units)**

*Course Description:* Offers overview of the constitutional law governing the death penalty in the United States.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LAW 245C – White Collar Investigations & Prosecutions (2 units)**

*Course Description:* Explore a fictional white-collar crime, learning how to establish probable cause through cooperative witnesses; search warrants, the utilization of informants, and indemnity agreements will be analyzed. Learn about indictments, complaints, laws surrounding arrests, bail hearings, evidentiary suppression motions, and grand jury indictments.

*Prerequisite(s):* LAW 227A recommended.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 246 – Federal Jurisdiction (3 units)**

*Course Description:* Study of subject-matter jurisdiction of federal courts.

*Prerequisite(s):* LAW 205.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 246A – California Civil Procedure: A Practical Approach (2 units)**

*Course Description:* Provides a practical, hands-on approach to California Civil Procedure through case studies, drafting of common litigation documents, and studying the application of the Code of Civil Procedure to practical case scenarios. Issues of general civil litigation emphasizing bar exam topics are included.

*Prerequisite(s):* LAW 203.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 247 – Taxation of Partnerships & LLCs (3 units)**

*Course Description:* Study of the federal income tax treatment of partnerships and partners; including entities classified as partnerships.

*Prerequisite(s):* LAW 220.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 247A – International Taxation (3 units)**

*Course Description:* Introduction to the international aspects of taxation and how the regime bears on broader social debates. Includes how U.S. tax law generally treats "foreign" income, as well as contemporary and evolving controversies, including how recent federal tax reforms treat global intangible low-taxed income (GILTI).

*Prerequisite(s):* LAW 220 (can be concurrent); completion or current enrollment in a course covering the domestic taxation of corporations is suggested but not required; Corporate Tax can be concurrent.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 247B – Corporate Tax (3 units)**

*Course Description:* Examination of the federal income tax relationship between corporations and their owners. Covers the transfer of funds into a corporation on formation and the re-transfer of money and property from the corporation to its shareholders.

*Learning Activities:* Discussion/Laboratory.

*Grade Mode:* Letter.

**LAW 247C – Taxation of Business Entities (4 units)**

*Course Description:* Introduction to federal income taxation of business entities.

*Prerequisite(s):* LAW 220.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**LAW 248 – International Law (3 units)**

This version has ended; see updated course, below.

*Course Description:* Introduction to basic international law concepts and the law-making process.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 248 – International Law (3 units)**

*Course Description:* Foundational survey of core international law concepts and institutions and their role in global affairs.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

This course version is effective from, and including: Spring Semester 2024.

**LAW 248A – Jurisdiction in Cyberspace Seminar (2 units)**

*Course Description:* Review concepts in international law, conflicts of law, cyberlaw, and federal jurisdiction to address the growing multi-jurisdictional conflicts created by the Internet. Examine European efforts at crafting intra-Europe jurisdictional rules, as well as other international jurisdiction treaty projects such as those at the Hague.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LAW 248B – International Human Rights (2 units)**

This version has ended; see updated course, below.

*Course Description:* Introduces international human rights legal system through an examination of its historical origins and precursors and a review of its international legal backdrop, including the character and sources of international law, the UN Charter and the UN system.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 248B – Human Rights in Context (2 units)**

*Course Description:* Explores the theory and practice of international human rights in historical and contemporary perspective, with an emphasis on current issues and debates.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

This course version is effective from, and including: Spring Semester 2024.

**LAW 248C – Business & Human Rights (2 units)**

*Course Description:* Explores the human rights responsibilities of businesses from legal, ethical, historical, and comparative perspectives. Equips students with the tools to be sensitive to human rights considerations as legal practitioners or in other fields of endeavor.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 248CA – United Nations Human Rights Practicum I (2-3 units)**

*Course Description:* Opportunity to work in support of the mandate of the United Nations Special Rapporteur in the field of cultural rights.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**LAW 248CB – United Nations Human Rights Practicum II (2-3 units)**

*Course Description:* Build on the knowledge of the workings of the United Nations human rights system they gained in Practicum I, and gain further advanced experience working with UN documents, with individual cases in the field and with thematic reports.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**LAW 248D – Globalization & the Law (3 units)**

*Course Description:* Globalization of people, finance, goods, services, and information puts pressure on the nation-state form. In a world of diasporas and multinational corporations, what does citizenship mean?

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 248ET – Transitional Justice & Memory Politics in the Asia-Pacific (2 units)**

*Course Description:* Transitional justice (legal responses to wrongdoings of repressive predecessor regimes) can help resolve "memory politics" that plague the relations and societies of many Asia-Pacific states. Examine relevant roles of governments, novel institutions, the judiciary, and civil society.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 248G – Legal Spanish for U.S. Lawyers (2 units)**

*Course Description:* Designed for law students who are native Spanish-speakers or who have achieved proficiency in Spanish through study or experiences in a Spanish-speaking country.

*Prerequisite(s):* Must satisfy one of the following: undergraduate degree in Spanish; a minor in Spanish with experience living in a Spanish-speaking country; grew up in a Spanish-speaking household and achieved proficiency; able to pass an informal assessment by the instructor.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 248T – Advanced International Law (2 units)**

*Course Description:* Review books of international law; Hugo Grotius and Judge Rosalyn Higgins. Themes include peaceful resolutions of dispute, law of war and peace, and international legal process.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 248TA – Human Rights in Post Soviet Central Asia: Legal Tools For Repression & Redress (2 units)**

*Course Description:* Provides a historical context for the current political and human rights situation in Central Asia.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LAW 248TC – International Economics Law (3 units)**

*Course Description:* Examine the architecture of the international economic system, with a focus on both trade and investment.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 248TT – Theories of International Law (2 units)**

*Course Description:* International law, once critiqued as powerless and ineffective, is now challenged as a threat to American democracy.

Introduction to competing theories of international law, including natural law, positivism, realism, liberalism, constructivism, fairness, legal process, and world public order.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 249 – Comparative Law (2 units)**

*Course Description:* Uses of comparative method, principal differences between common law and civil law and the styles of legal reasoning that prevail in these two great legal cultures. Topics include the evolution of the civil law, the phenomenon of codification, the structure of European civil codes and the interpretation of their provisions, the respective roles of counsel, judges and law teachers, civil law procedure, and the analysis of selected areas of substantive law. Knowledge of a foreign language is not required.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 249A – First Gen Experience in Scholarly & Popular Literature (3 units)**

*Course Description:* Provides an opportunity for students who are first in their family to go to college, or first in their family to go to law school, to reflect on their own educational journeys and to see how their trajectory of formal education is similar to and/or different from the journeys of famous First Gen lawyers, e.g., Barack Obama and Sonia Sotomayor. Principles of memoir writing used to guide student writing.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 249S – Special Session Comparative Law (1 unit)**

*Course Description:* Provides a comparative perspective of American law. After an initial look at the uses of the comparative method, discussions is centered around the main differences between common law and civil law and the different styles of legal thinking. Topics to be covered are the evolution of the civil law & the idea of codification, the structure of European civil codes & the interpretation of their provisions, the personnel of the law & procedure in civil law countries, and the analysis of selected problems of substantive law. Knowledge of a foreign language not required.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Letter.

**LAW 250 – Jurisprudence Seminar (3 units)**

*Course Description:* Deals principally with the question of how judges should decide "hard cases," where the content of the law is in doubt and competent arguments have or could be offered for mutually inconsistent decisions in favor of either party.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LAW 250A – Aoki Legal Scholarship Seminar (3 units)**

*Course Description:* For students participating in the Aoki Center for Race and Nation Studies' Immigration Law Journal. Research, and write a note on a topic related to immigration. Expectation is production of papers of publishable quality.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 250B – Advanced Writing Workshop (1 unit)**

*Course Description:* Second- and third-year students produce a piece of academic writing that satisfies the King Hall writing requirement and is of publishable quality. Receive feedback both from the instructor and from one another in a workshop setting.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 250T – Asian American Jurisprudence (3 units)**

*Course Description:* Legal, social, and political discourse on race relations has traditionally been framed in Black-White terms. Disrupts the traditional view by taking Asian Americans seriously.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 251 – Labor Law (3 units)**

*Course Description:* Survey of the legislative, administrative, and judicial regulation of labor relations under federal law. Historical development of labor law, the scope of national legislation, unions, strikes, picketing, and collective bargaining agreements.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 251B – Labor Law Practicum (2 units)**

*Course Description:* Develop a theoretical and practical understanding of the labor movement, and the ways in which lawyers support and interact with the movement. Students are placed in labor organizations, labor-related law firms, and non-profits where they will gain experience with different aspects of labor organizing, labor campaigns, and collective bargaining.

*Prerequisite(s):* LAW 251 (can be concurrent).

*Learning Activities:* Practice 2 hour(s).

*Grade Mode:* Letter.

**LAW 251T – Labor Law I (2 units)**

*Course Description:* Survey of the legislative, administrative, and judicial regulation of labor relations under federal law.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to students who previously took Labor Law in Fall 2008 may not enroll in Labor Law I.

*Grade Mode:* Letter.

**LAW 251TB – Labor Law II (2 units)**

*Course Description:* Survey of the legislative, administrative, and judicial regulation of labor relations under federal law.

*Prerequisite(s):* LAW 251T preferred; not required.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 252 – International Litigation & Arbitration (3 units)**

*Course Description:* Current developments in international law, conflict of laws, civil procedure, arbitration, and comparative law in the context of transactions and disputes that cut across national boundaries.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 252A – Introduction to Criminal Litigation; Pre-Trial (2 units)**

*Course Description:* Utilizes experiential learning techniques to teach advocacy skills during the life of a criminal case and simulates critical stages of the proceedings by conducting mock hearings throughout the semester.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 253 – Policy Advocacy (2 units)**

*Course Description:* In-depth examination of the legislative process both within the California Legislature and from the advocates' perspective.

Train in key policy advocacy skills by legislative leaders and social justice advocates.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## **LAW 253A – Community Lawyering (3 units)**

*Course Description:* Study the need for community lawyering including the structural inequalities and privileges embedded in the legal system and society. Skills necessary for community lawyering as well as sites and models for practice will be examined.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## **LAW 253B – International Public Interest Law and Advocacy (3 units)**

*Course Description:* Simulation course introduction to the applied legal and policy skills necessary to become effective lawyers and advocates in the international public interest/nongovernmental organization community.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 254 – Housing Law (2 units)**

*Course Description:* Survey course covers legal and policy issues related to developing, protecting and preserving affordable, safe and accessible housing and sustaining viable, diverse communities.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 254A – Law & Rural Livelihoods (3 units)**

*Course Description:* Seminar considers rural manifestations of various legal, social and economic issues. Survey various subfields of legal study; e.g., criminal justice, poverty, environment and land use, local government, family, constitutional, agricultural, access to justice, as they relate to the rural-urban continuum. Debate rurality as an aspect of identity and consider its intersections with race, gender, sexuality, (dis)ability and other identity variables.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 254B – Access to Justice (2 units)**

*Course Description:* Study of a variety of barriers that impede the access of unrepresented litigants to the courts—including poverty, racial bias, limited English proficiency and the digital divide—and critically examine existing solutions. Opportunity to develop and propose student's own solution to an access barrier.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 254C – White Working Class & the Law (2 units)**

*Course Description:* Considers the social, cultural, economic, and legal situation of low-income and/or low-education whites in contemporary U.S. society.

*Learning Activities:* Seminar.

*Enrollment Restriction(s):* Students who have taken LAW 254A previously are not eligible for this course.

*Grade Mode:* Letter.

## **LAW 254T – Practicum in Rural Community Advocacy (3 units)**

*Course Description:* Provides an opportunity to learn about Participatory Action Research (PAR) methods and community-based lawyering in the context of rural community development and advocacy. Using these skills and knowledge to serve rural California communities.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 255 – Pension & Employee Benefits Law (3 units)**

*Course Description:* Federal regulation and taxation of private pensions and employee benefits. Covers the Employee Retirement Income Security Act (ERISA) and Internal Revenue Code issues.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 256 – Land Use (2 units)**

*Course Description:* Local agencies, developers, environmental interest groups, and others who regularly deal with the administrative and legislative applications of land use planning and development laws. Topics include zoning, general plans, local government land use regulation, and related areas of litigation. Expanding role of the California Environmental Quality Act.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 257 – Legislative Process (2 units)**

*Course Description:* Fundamental elements of the legislative process, including legislative procedure; the legislature as an institution; lobbying; statutory interpretation, legislative-executive relations; and the legislature's constitutional powers and limitations.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 257A – Legislative Intent Seminar (2 units)**

*Course Description:* Theories and principles of statutory and constitutional interpretation. Original intent vs. living constitution; permissible kinds of evidence for determining legislative intent; canons of construction; extent to which initiatives should be interpreted similarly to legislative enactments.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 257B – Statutory Interpretation (3 units)**

*Course Description:* Elective course for Environmental Law Certificate Program. Provides an introduction to the theory and practice of statutory interpretation.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 257C – Applied Statutory Interpretation: California's Housing-Framework Legislation (3 units)**

*Course Description:* Theory and practice of statutory interpretation, taught using California statutes that address local barriers to housing supply. Writing intensive.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 257D – Legislative Drafting (2 units)**

*Course Description:* Legislative Drafting at UC Davis School of Law provides practical experience in researching, analyzing, and drafting legislative measures in the State of California, including bills, resolutions, and constitutional amendments. Skills-based course to obtain training in drafting and amending legislative measures.

*Prerequisite(s):* Legislative Process (recommended).

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 258 – Professional Responsibility (3 units)**

*Course Description:* The ABA's Model Rules of Professional Conduct and the Code of Judicial Conduct, which are tested on the MPRE, and the California Rules of Professional Conduct, which are tested on the California Bar Examination.

*Learning Activities:* Discussion.

*Enrollment Restriction(s):* Closed to students who have taken LAW 258A.

*Grade Mode:* Letter.

**LAW 258A – Legal Ethics & Corporate Practice (3 units)**

*Course Description:* Focus on corporate practice to explore the ethical responsibilities of lawyers.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Closed to students who have taken LAW 258.

*Grade Mode:* Letter.

**LAW 258B – Mindfulness & the Law (2 units)**

*Course Description:* Reviews the American Bar Association's Model Rules of Professional Conduct and the Code of Judicial Conduct, as tested on the Multistate Professional Responsibility Examination, and covers California Rules of Professional Conduct, which are tested on the California Bar Examination.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

**LAW 258CT – The Business of Lawyering (2 units)**

*Course Description:* Desired outcome is a thorough understanding of the business side of law practice and to promote an understanding of the relationship and balance between legal skills, business requirements of a practice, client needs and a work-life balance.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 258D – Starting & Managing a Small Law Practice (2 units)**

*Course Description:* Using real practice examples, in this discussion/simulation-based course learn how to open and successfully run a small law practice. Included topics: structure and organization, office set-up, billing, fees, time management, client handling, overseeing office staff, trust accounting, and ethical rules.

*Learning Activities:* Discussion.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 258DT – Setting Up & Maintaining Solo Law Practice (1 unit)**

*Course Description:* Introduction/overview of how to start a successful solo practice.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**LAW 258E – Utility of Law School & Careers in the Law (1 unit)**

*Course Description:* Despite improvements in the economy, some observers continue to question whether law school is a viable option for college graduates. Considers the controversy and expose students to the variety of careers in the legal profession.

*Learning Activities:* Lecture.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 258F – Practice Ready Seminar (2 units)**

*Course Description:* Includes a discussion and review of the role of the junior attorney within a law firm/legal department, professional goal-setting, strategies for effective communication and work within teams, delegation and resource management, organization and time management, an introduction to common junior-level assignments and how to complete them efficiently and effectively, building a professional network, and an introduction to business development, among other topics.

*Learning Activities:* Seminar.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 258G – Business Fundamentals for Lawyers (3 units)**

*Course Description:* Surveys accounting and financial statements, basic financial concepts (e.g., time value of money), business valuation, capital markets, and major transaction types. Should help with other business law courses and be useful for communicating with business clients.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 259 – Feminist Legal Theory (2 units)**

*Course Description:* Provides an overview of feminist legal theory and considers how its various strands inform legislative and judicial law making. Satisfies Advanced Writing Requirement.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 259A – Women, Islam & the Law (2 units)**

*Course Description:* Study legal and religious reform movements for women's rights within Muslim communities in the context of current scholarly and political debates about fundamentalism, democracy, equality, secularism, universalism, and multiculturalism.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment seminar.

*Grade Mode:* Letter.

**LAW 259B – Women's Human Rights (2 units)**

*Course Description:* Overview of international legal and institutional system for the protection of women's human rights from an academic perspective and the view of the practitioner. Includes the (CEDAW), violence against women, sexual and reproductive rights, economic rights, and more.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 259P – Women & the Law Practicum (1 unit)**

*Course Description:* Complements the content of the feminist legal theory course by providing the opportunity to consider how feminist theory may be used to inform law-making.

*Prerequisite(s):* LAW 259 (can be concurrent).

*Learning Activities:* Discussion/Laboratory.

*Grade Mode:* Letter.

**LAW 260 – Employment Discrimination (3 units)**

*Course Description:* Examine federal laws prohibiting employment discrimination, including Title VII of the Civil Rights Act of 1964, the Equal Pay Act, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act of 1973, and § 1981.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 260A – Employment Law (3 units)**

*Course Description:* Provides an overview of employment law, labor law and employment discrimination law and aims to serve as a foundation for understanding the law and policy (statutory and common law) that surround the employer-employee relationship.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 261 – Judicial Process (2 units)**

*Course Description:* Examines a variety of issues concerning the judicial process. Focus is on judge's role in the legal process, the administration of justice, ethical issues, decision making, bias, and critical examination of the strengths and weaknesses in our current judicial system.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 262 – Antitrust (3 units)**

*Course Description:* Focus on the federal antitrust laws, concentrating on basic substantive areas of the Sherman and Clayton Acts.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 262AT – US Antitrust Law & Indian Competition****Law: A Comparative Perspective (2 units)**

*Course Description:* Fundamental principles of Indian Competition Law and US Antitrust Law in a comparative perspective. Helps American students, interested in future corporate law careers, to develop effective strategies for better managing cross border deals in India.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 262B – Regulated Industries (2 units)**

*Course Description:* Examines regulation of business in sectors, traditionally described as "common carrier" and "utility" industries, where because of market failures normal competitive mechanism will not protect consumers from exercises of market power.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 262C – Antitrust & Intellectual Property (1 unit)**

*Course Description:* Explores the challenges antitrust law faces in protecting the innovation incentives of dynamic technology-led market competition, motivating and incentivizing companies to innovate and allowing them to retain the profits of such market growth.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 262S – Special Session Antitrust (1 unit)**

*Course Description:* A study of the federal antitrust laws including price fixing, limits on distribution, tying arrangements, monopolization and mergers.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

**LAW 263 – Criminal Trials: Theory & Practice (3 units)**

*Course Description:* Trial advocacy centered on client relationship building, preparation for trial, and courtroom practice.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 263A – Trial Practice (3 units)**

*Course Description:* Introduction to the preparation and trial of cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic drills. Laboratory held on Tuesday, Wednesday, and Thursday evening.

*Prerequisite(s):* LAW 219 (can be concurrent).

*Learning Activities:* Discussion 2 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 263B – Advanced Trial Practice (2 units)**

*Course Description:* Train on the organization and presentation of a complex trial, including pretrial preparation, jury selection, strategy considerations, evidentiary issues, and effective handling of plaintiff and defense cases through verdict.

*Prerequisite(s):* LAW 219; LAW 263A.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Class limited to 40 students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 263C – Voir Dire: Theory & Practice (1 unit)

*Course Description:* Teaches (1) the law that restricts and supports jury selection in criminal law trials, (2) the most effective methods of engaging in jury selection, (3) how to think critically and strategically about voir dire questioning and juror challenges.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* S/U only.

## LAW 264 – Water Law (3 units)

*Course Description:* Property rights in surface waters, including riparian rights, prior appropriation, and public rights use of water bodies; environmental constraints on exercise of water rights; groundwater rights and management; federal allocation and control of water resources; legal aspects of interstate allocation.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## LAW 264A – Ocean & Coastal Law (3 units)

*Course Description:* Introduction to the goals and challenges of coastal and ocean policy; the complicated web of public and private interests in coastal lands and ocean waters; regulation of coastal development; domestic and international fisheries management; and preservation of ocean resources.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## LAW 265 – Natural Resources Law Seminar (2 units)

*Course Description:* In-depth coverage of two foundational principles of natural resources law: public trust doctrine and private property rights protected under the Takings Clause of the U.S. and many state constitutions.

*Prerequisite(s):* LAW 285 or LAW 256 recommended, but not required.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to 15 students.

*Grade Mode:* Letter.

## LAW 266 – Commercial Law (3 units)

*Course Description:* Survey of commercial transactions law under the Uniform Commercial Code (UCC). Covers a number of topics under Articles 2, 3, & 9 of the UCC. Topics include attachment and perfection of security interests in personal property and general principles of negotiability. Primary goals are to provide a foundational knowledge and understanding of several articles of the UCC and improve problem-solving skills in this area.

*Prerequisite(s):* LAW 202.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## LAW 266A – Cyberlaw (3 units)

*Course Description:* Emerging legal issues crucial to the conduct of business in cyberspace. Discussion of the evolution and current administration of the Internet and the World Wide Web.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## LAW 267 – Civil Rights Law (2 units)

*Course Description:* Civil remedies for civil rights violations under the primary United States civil rights statute. Specifically, covers actions for constitutional and statutory violations under 42 USC §1983, affirmative defenses, and abstention doctrines.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## LAW 267B – Civil Rights Seminar (2 units)

*Course Description:* Social, political, legal and historical factors which led to the creation of the United States Commission on Civil Rights (USCCR) in 1957. The United States Commission on Civil Rights is a bipartisan, independent agency established by the Civil Rights Act. It is directed to investigate complaints alleging deprivations of the right to vote, and voter fraud; to study and collect information relating to discrimination and the denial of equal protection of the laws under the Constitution on the basis of race, color, religion, sex, age, disability, or national origin; and submit reports, findings and recommendations to the President and to Congress. The role that the USCCR has played and continues to play in American politics, legislative enactments and the national dialogue on equality, fairness and justice in the context of civil and human rights. Satisfies Advanced Legal Writing Requirement.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## LAW 267C – DFEH Civil Rights Practicum (4-7 units)

*Course Description:* Yearlong practicum (4-7 units/semester) has (1) weekly two-hour in-class lectures and case review, and (2) student participation in DFEH investigations (fall) and mediations (spring). Gain experience analyzing and applying the Fair Employment and Housing Act (FEHA).

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 268A – Blockchain & the Law: Introduction for Lawyers (2 units)

*Course Description:* Student-led review of blockchain/distributed ledger technology (dlt) and its impact on law and transactions, from the basic functioning of a blockchain to the implication of smart contracts in areas such as cryptocurrencies, decentralized autonomous organizations, and self-sovereign identity.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## LAW 268T – Suing the Government: Civil Rights, Torts, Takings, & More (2 units)

*Course Description:* Explores the basic requirements of suing government, including sovereign immunity, particular schemes for litigating against government (Federal Tort Claims Act, APA, False Claims Act, etc.), direct constitutional claims and the procedural pitfalls and remedies available against government.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 269 – Basic Finance for Lawyers (2 units)**

*Course Description:* Basic techniques of analysis that are part of the core curriculum in a good business school. Gives background necessary for understanding and advising your clients and for understanding other business-related law school courses.

*Prerequisite(s):* Students with a non-law basic finance course will not be admitted, except with consent of instructor.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

**LAW 269AT – The Financial Crisis: Law & Policy & Inequality (2 units)**

*Course Description:* Examines the regulation of financial intermediaries. Stated goal of regulation is to ensure systemic stability and to pursue consumer protection. Question asked whether there is an imbalance between systematic stability and consumer protection before the crisis of 2008.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 269B – Consumer Protection & Financial Regulation (3 units)**

*Course Description:* Examines efforts to ensure a "fair" financial marketplace, focusing on the 2010 Dodd-Frank Act and its creation of the Consumer Financial Protection Bureau and regimes enacted to protect consumers.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 269C – Corporate Finance (3 units)**

*Course Description:* Focus on how corporations raise money, stocks and bonds, etc.; how deals are structured and why corporations use one strategy instead of another.

*Prerequisite(s):* LAW 215 or concurrent enrollment recommended.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 269D – Seminar on Financial Regulation (2 units)**

*Course Description:* Introduction to the legal and regulatory issues presented by contemporary capital markets.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 269E – Public Finance (2 units)**

*Course Description:* Introduction to the basic concepts of public finance, the underlying law governing public finance: in particular state law, federal tax law and federal securities law.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 269F – Fintech Innovation & Financial Inclusion (2 units)**

*Course Description:* Focuses on fintech innovation and financial inclusion. Explores how fintech is transforming traditional financial services and providing new opportunities and challenges for financial inclusion.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 270 – International Business Transactions (3 units)**

*Course Description:* Select legal problems arising from international business transactions.

*Learning Activities:* Lecture/Discussion.

*Grade Mode:* Letter.

**LAW 270A – Life-Cycle Transactions & Drafting (2 units)**

*Course Description:* Focuses on analysis of contract drafting design for various types of transactions and actual transactional documents typically encountered.

*Prerequisite(s):* Business Associations and/or Trusts, Wills Estates are recommended for enhanced comprehension.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

**LAW 270B – Technology Transactions (2 units)**

*Course Description:* Practical overview of technology transactions, including licensing. In addition to substantive lectures, instruction via hypotheticals and scenarios to illustrate key issues in these transactions, drafting exercises, negotiation exercises, and group presentation exercises.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 270C – Contract Drafting & Development (3 units)**

*Course Description:* Complete complex contracts. Learn various approaches to completing contracts (from term sheet to final document) and complete exercises and assignments to hone contract skills. Build a "contract skills toolbox" with the tools needed for completing and drafting contracts.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 270D – Transactional Lawyering Skills: Contract Drafting for Tech (2 units)**

*Course Description:* Skills-based course applies legal concepts to client counselling and drafting of effective business documents with emphasis on the tech industry. Solve problems, analyze risk, and draft contracts in a real-world context.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

**LAW 270S – Special Session International Business Transactions (2 units)**

*Course Description:* A consideration of select legal problems arising from international business transactions. Topics include the international sales contract, letters of credit, transfers of technology, regulation of bribery, repatriation of profits, and national efforts to control imports.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 271 – Nonprofit Organizations & Drafting (4 units)**

*Course Description:* Learn special legal rules and concepts applicable to non-profit organizations; particularly IRC 501(c)(3) nonprofits. Combination skills class and lecture class.

*Prerequisite(s):* LAW 215; or consent of instructor.

*Learning Activities:* Extensive Writing/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to 13 students.

*Grade Mode:* Letter.

## **LAW 271A – NonProfit Organizations: State & Local Governance Issues (2 units)**

*Course Description:* Focuses on the state and local laws applicable to nonprofit organizations; i.e., public interest, cultural, religious, educational and other not-for-profit entities.

*Prerequisite(s):* LAW 215 (can be concurrent); or consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 271B – Nonprofit Organizations: Tax Exemptions & Taxation Focus (2 units)**

*Course Description:* Focuses on the conceptual basis and substantive law criteria for the federal and state income tax exemption of nonprofit organizations.

*Prerequisite(s):* LAW 215; or consent of instructor; LAW 220 recommended.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 271T – Nonprofit Organizations-Key Legal Topics (2 units)**

*Course Description:* Legal issues raised in operating and governing a nonprofit organization, primarily a public charity.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 272 – Family Law (3 units)**

*Course Description:* An introduction to the legal regulation of the family.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## **LAW 273A – Education Policy & the Law (3 units)**

*Course Description:* Topics include civil rights, inequality and the "right" to an education, bilingual education, school finance litigation, educational access, No Child Left Behind Act, Common Core Standards and charter schools. For students interested in educational policy and social regulatory policy.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 273B – Special Education Law & Policy (2 units)**

*Course Description:* Introduction to the law of special education including the Individuals with Disabilities in Education Act (IDEA), Section 504 of the Rehabilitation Act, and federal regulations governing special education law.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## **LAW 274 – Intellectual Property (3 units)**

*Course Description:* Provides a broad survey of intellectual property law.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 274A – International Intellectual Property & Development (2 units)**

*Course Description:* Examines international trade law, national customs law, intermediary liability rules, claims for rights in traditional knowledge and genetic resources, protections for geographical indications, technology transfer, and intellectual property piracy.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## **LAW 274AS – Special Session Intellectual Property (2 units)**

*Course Description:* Provides a broad survey of the field of intellectual property. Areas covered will include trademarks, patents, trade secrets, idea protection, unfair competition, and copyright.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 274B – Trade Secrets (2 units)**

*Course Description:* Examines effects of a burgeoning intellectual property regime on cultural conflict and formation.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## **LAW 274CT – Knowledge Commons, Collaborative Authorship, Open Access (2 units)**

*Course Description:* Focuses on the increasingly global diffusion and success of collaborative forms of cultural and technoscientific production rooted in copyright-based licenses.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 274D – Intellectual Property in Historical Context Seminar (2 units)**

*Course Description:* How the legal system has adapted to earlier periods of rapid change by creating, delimiting, and expanding intellectual property rights (IPRs). Required paper satisfies advanced writing requirement.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 274ET – Intellectual Property, Human Rights & Social Justice (2 units)**

*Course Description:* Examine the implications of copyright and patents for a broad set of social justice values, with particular emphasis on the interaction between intellectual property law and human rights law on the global stage.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 274FT – Censorship in the Global Age (2 units)**

*Course Description:* Examines from a globalized perspective a broad range of censorship issues, drawing from established cases and practices. This seminar attempts to identify a globally consistent set of theories that have gained traction in relevant regional or international debates.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 274GT – Race, National Identity & Intellectual Properties (2 units)**

*Course Description:* Drawing upon methods taken from critical race theory, critical/cultural studies, and rhetoric this course addresses the relationships between intellectual properties and processes racial/national identity formation in the US, particularly as exemplified in legal, popular cultural, and political texts.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 274H – Theory & History of Intellectual Property (2 units)**

*Course Description:* Seminar traces development of intellectual property law in the U.S. and Europe because it is not possible to understand the logic and shape of current Intellectual Property concepts outside of their messy history.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 274J – Current Controversies in Intellectual Property Law (2 units)**

*Course Description:* Examine controversial topics in intellectual property law and policy across a wide range of issues, from technology to the arts, to social justice, in their national and international dimensions.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 274K – International & Comparative Intellectual Property (3 units)**

*Course Description:* Examines the international regulation of intellectual property rights and explores the place of the United States in the international IP community. Discusses international treaties and legal harmonization efforts, legislation and case law from different jurisdictions, and the role of technology.

*Prerequisite(s):* Completion or simultaneous enrollment in Copyright and/or Intellectual Property.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 275 – Complex Litigation in a Civil Rights Context (2 units)**

*Course Description:* Study of the issues that frequently arise in large complex litigation involving multiple parties and multiple claims.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 275B – Federal Courts for Civil Rights Litigators (2 units)**

*Course Description:* Tackles the complex strategic questions facing civil rights litigators. Evaluated cases include Floyd v. City of New York, Dukes v. Wal-Mart, and others. includes guest speakers involved in these cases.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 275TA – Intellectual Property Agreement Drafting for Biotech & Pharma (2 units)**

*Course Description:* Covers the negotiation and drafting of intellectual property agreements common in the biotechnology and pharmaceutical arena.

*Prerequisite(s):* Upper division Business Law course or Intellectual Property course; priority given to students that have completed LAW 274.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 276 – Juvenile Justice Process (2 units)**

*Course Description:* Legal and philosophical bases of a separate juvenile justice process for crimes committed by minors. The role of counsel at each phase of the process is examined.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **LAW 276A – Child Welfare & the Law (2 units)**

*Course Description:* Focuses on the welfare and legal rights of children, especially the most at risk in society, including those in foster care and victims of crime and civil torts. Learn the substantive law of juvenile dependency and the special duties of lawyers representing children in dependency and civil cases, as well as child witnesses in criminal cases.

*Prerequisite(s):* Constitutional Law I (required); Family Law (recommended); Juvenile Justice (recommended).

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 277 – Federal Indian Law (3 units)**

*Course Description:* Focuses on legal relations between Native American tribes and the federal and state governments.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 277A – Tribal Justice (2 units)**

*Course Description:* Examines the administration of justice within tribal governments and courts and the efforts of advocates to achieve justice for tribes through litigation, policy advocacy, public education, organizing, and inter-governmental collaboration.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## **LAW 277T – Indian Gaming Law Seminar (2 units)**

*Course Description:* Examines unique historical, political and legal context in which Indian tribes operate casinos, including impacts on tribal sovereignty, relations between tribes, states and local governments and changing relationships among the tribes themselves members, with particular reference to experience of California.

*Learning Activities:* Seminar 20 hour(s).

*Grade Mode:* Letter.

## **LAW 278 – Pretrial Skills (2 units)**

*Course Description:* Uses role-playing exercises, videotaped simulations, and related projects to introduce students to lawyering skills basic to the practice of law, including client interviewing, witness interviewing and discovery, including depositions.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 279 – Legal Analysis (2 units)**

*Course Description:* Focuses on skills critical to law school success, and ultimately, bar exam success.

*Prerequisite(s):* Consent of Instructor; restricted to second year law students only.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment; for 2Ls only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **LAW 280 – Advanced Legal Writing: Analytical & Persuasive Writing (2 units)**

*Course Description:* Develop essay writing skills and performance test drafting typically employed on the bar examination.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to third-year Law students only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 280B – Problem Solving & Analysis (2 units)

*Course Description:* Skills focused on the development of legal analytical and organizational methods essential to successful completion of the Performance Test component of the California Bar Exam (and other states), and, by extension, to success in the practice of law.

*Learning Activities:* Lecture.

*Enrollment Restriction(s):* Restricted to third-year Law students only.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 281 – State & Local Government Law (3 units)

*Course Description:* Topics include: federalism, relations between states & localities, governmental liability, zoning, educational equity, and public finance. Readings drawn not only from case law and statutes, but from history, theory and public policy.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## LAW 282 – Energy Law (2 units)

*Course Description:* Explores the history, law, and public policy of energy regulation in the United States, emphasizing economic and environmental regulation. Competitive restructuring of the natural gas and electric utility industries is emphasized. Basic regulatory schemes for other energy sources—hydroelectric power, coal, oil, and nuclear power—are explored depending on class interest.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## LAW 282A – Renewable Energy Seminar (2 units)

*Course Description:* Provides a broad overview of renewable energy law and policy with a particular focus on the California policy context. Topics include renewable electricity, California's renewable portfolio standard, and project development.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## LAW 283 – Remedies (3 units)

*Course Description:* Survey of modern American civil remedies law in both private and public law contexts. Topics include equitable remedies, equitable defenses, contempt power, injunctive relief, restitution, and money damages in torts and contracts.

*Learning Activities:* Lecture/Discussion.

*Grade Mode:* Letter.

## LAW 284 – Law & Economics (3 units)

*Course Description:* Introduction to the economic analysis of law. Prior study of economics is not required.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## LAW 285 – Environmental Law (4 units)

*Course Description:* Introduction to environmental law, focusing primarily on federal law.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

## LAW 285A – California Environmental Issues (2 units)

*Course Description:* The "Nation-state" of California has for many years been a national and global leader in environmental law and policy. Survey of key California environmental law and policy issues.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## LAW 285B – Environmental Practice (3 units)

*Course Description:* Examines underlying theory and practice in securing compliance with our major environmental laws.

*Prerequisite(s):* LAW 285 recommended.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## LAW 285BT – Food Justice (2 units)

*Course Description:* Focus on the law and policy of the emerging "food justice movement," which combines the goals and principles of the environmental justice movement with some of the policy initiatives involved in "ethical consumption" and "sustainable agriculture" movements.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## LAW 285C – Food Systems Law & the Environment (2 units)

*Course Description:* Explores the various legal structures surrounding the governance of our food system; we will cover environmental regulation (or lack thereof), food safety laws, trade laws, and labor laws.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## LAW 285D – Farmworkers & the Law (2 units)

*Course Description:* Provides an overview of California and federal laws impacting farmworkers and how such laws have been applied to regulate working conditions in agriculture.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

## LAW 285E – Climate Change Law & Policy (3 units)

*Course Description:* Addresses the legal and public policy dimensions of climate change, perhaps the most important environmental issue of our time.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## LAW 285F – Environmental Justice (2 units)

*Course Description:* Introduction to the field of environmental justice.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## LAW 285G – Environmental Law Seminar: Emerging Technologies & the Environment (2 units)

*Course Description:* Examines legal regimes that might apply to various emerging technologies and consider governance mechanisms and reforms that might enable more foresighted and participatory development and management of technology.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## LAW 285H – Comparative Environmental Law (2 units)

*Course Description:* Focus on Pacific Rim, examining factors, similarities/differences in countries environmental regulation and success of environmental law. Including information and market-based regulatory approaches; compliance and enforcement gaps; citizen and community mobilization; the role of legal institutions; variations in regulatory style.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## LAW 285J – Drafting a Solar Farm Bill Practicum (2 units)

*Course Description:* Drafting a Solar Farm Bill is a practicum in which the class acts as an advisory law firm for its client, a solar farm bill solution and its facilitator, the educational non-profit Climate Solutions Advocacy Institute (CSAI). The class objective is to provide the client with a white paper that can advise CSAI in its development of a massive solar farm bill, financed by green bonds.

*Prerequisite(s):* LAW 285 recommended (can be concurrent).

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* S/U only.

## LAW 285K – Biodiversity Law (1 unit)

*Course Description:* Covers the law of biodiversity, with a focus on the laws of the United States, including both science and federal, state, and local policies. Graded based on short response papers and participation in class discussions.

*Prerequisite(s):* LAW 285 recommended.

*Grade Mode:* Letter.

## LAW 285TA – Environmental Law Seminar: Emerging Technologies & the Environment (2 units)

*Course Description:* Examines legal regimes that might apply to various emerging technologies and consider governance mechanisms and reforms that might enable more foresighted and participatory development and management of technology.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## LAW 286 – Health Care Law (3 units)

*Course Description:* Addresses legal issues raised in general areas: access to health care and health care financing. Course materials and discussion focus on both public and private aspects of these issue areas.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## LAW 286A – Topical Issues in Health Law (2 units)

*Course Description:* Focuses on four-six issues at the interface of law, medicine, bioethics, and health policy that are currently the subject of major litigation, legislation, and/or contentious debate in the domains of bioethics and public policy.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## LAW 286B – Public Health Law (2 units)

*Course Description:* Public health law, seen broadly, is the government's power and responsibility to ensure the conditions for the population's health.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to 15 students.

*Grade Mode:* Letter.

## LAW 286C – Bioethics (3 units)

*Course Description:* Examines the ethical and legal issues that arise from biomedical research and use of medical technologies.

*Learning Activities:* Discussion.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## LAW 286D – Legal Psychology Seminar (2 units)

*Course Description:* Examines how psychological theory and research can be used to shape laws and policies to make them better reflect what we know empirically about how individuals process information, make decisions and behave.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## LAW 286E – Reproductive Rights, Law, & Policy (3 units)

*Course Description:* Addresses a variety of laws and practices that affect reproductive health and procreative decision making.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## LAW 286F – Neuroscience & the Law (2 units)

*Course Description:* Explore current topics at the crossroads of neuroscience and the law. Cover topics including neuroscience evidence at sentencing, brain-based lie detection, tort liability for brain injuries, brain based enhancement and the boundaries between life and death.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## LAW 286G – Representing Life Science Companies (2 units)

*Course Description:* Biotechnology and Pharmaceuticals are two of the fastest-growing industries in the U.S., and the legal issues that arise in connection with representing them are complex and evolving. Seminar focuses on the transactional, intellectual property, and regulatory legal issues that challenge lawyers working with clients in these industries.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## LAW 287 – Public Land Law (2 units)

*Course Description:* Legal aspects of federal land management, including the history of public land law, the scope of federal and state authority over the federal lands, and the allocation of public land resources among competing uses.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## LAW 287A – Poverty Law (2 units)

*Course Description:* Explore the theory and practice of law pertaining to the enactment and enforcement of laws regulating or aiding the poor and other disadvantaged persons.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## LAW 287T – Law & Society Seminar (2 units)

*Course Description:* Study of law and society challenges traditional legal scholarship by exploring multiple ways in which law both shapes and is shaped by societies and social interactions. Seminar introduction to important literature and debates in the field.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 288 – Advanced Constitutional Law Seminar (2 units)**

*Course Description:* Seminar explores in-depth selected topics or problems in constitutional law and theory. The current focus will include diverse topics including abortion rights, the development of Second Amendment jurisprudence, and other subject areas.

*Prerequisite(s):* LAW 218 (can be concurrent) or LAW 218A (can be concurrent).

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 288A – Presidential Powers Seminar (2 units)**

*Course Description:* Explores the Constitutional powers of the President in Article II and how they intersect with Congressional power. Emphasis on executive and legislative power, executive orders, appointment and removal powers, executive privilege and immunity, pardons, impeachment, Congressional investigations, independent and special counsels, and the 25th Amendment.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

## **LAW 288B – Supreme Court Simulation Seminar (3 units)**

*Course Description:* Take on the role of Justices of, and advocates before, the Supreme Court of the United States.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **LAW 288C – National Security Law (2 units)**

*Course Description:* Examines the allocation of national security powers among the three branches of government, and the laws & policies that govern military operations, the collection & use of intelligence, homeland security, and other current national security issues.

*Prerequisite(s):* LAW 205.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## **LAW 288CS – National Security Law: Crisis Simulation Seminar (3 units)**

*Course Description:* Explore Constitutional allocation of national security powers among three branches of government, and the vital role lawyers play in national security decision-making. Conduct deep dives on national security law case studies.

*Prerequisite(s):* Constitutional Law I; Public International Law (recommended).

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## **LAW 289A – Biotechnology Law & Policy (2 units)**

*Course Description:* Coverage includes the regulation of biotechnology research, including restrictions on cloning and fetal stem cell research; regulation of the products of biotechnology to protect human health or the environment, including restrictions on use or distribution of genetically modified organisms; the availability and scope of intellectual property protection for biotechnology products, including genes and engineered organisms; and the international law governing access to the natural resources that provide the starting materials for biotechnology and trade in bioengineered organisms or their products.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **LAW 290 – International Trade Law (3 units)**

*Course Description:* China has become factory to the world, India its back office, and the US its information intermediary. Trade law affects goods, safety of foods, and conditions under which clothes are produced. Reviews trade regulation from the World Trade Organization to regional organizations such as NAFTA. Considers the implications for developing economies and analyze strengths and weaknesses of the current international trade order.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **LAW 290AT – Privacy, Surveillance, & “Sousveillance” (3 units)**

*Course Description:* Issues of privacy and surveillance are important to businesses, governments and citizens. Surveillance raises issues of autonomy and the abuse of power. “Sousveillance,” (citizen holds the camera), is a mechanism for rooting out corruption and exposing individuals to societal scrutiny.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## **LAW 290BT – Surveillance & States (3 units)**

*Course Description:* Examines the tensions between democracy and the rise of government power entailed by the growth of state surveillance, United States surveillance law and practice, and surveillance law and practice across the world. Considers international legal constraints on government surveillance.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **LAW 290C – Information Privacy Law (2 units)**

*Course Description:* Examine several topics that arise in field of information privacy law, with a special emphasis on law enforcement access to this information.

*Prerequisite(s):* Criminal Procedure strongly recommended.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory Only.

### LAW 290D – Comparative Privacy Law (3 units)

*Course Description:* Compares regulatory privacy framework. Core lecturing focuses on the EU General Data Protection Regulation (GDPR) and how it compares with U.S. law. Core concepts include controller/processor, personal data/personal information, data subject/consumer, etc.

*Prerequisite(s):* Recommended passing one of the IAPP certifications or Privacy Law Seminar.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

### LAW 291A – International Finance (4 units)

*Course Description:* Money makes the world go round. We will try to follow that money, learning how a framework of national and international laws and institutions regulates (or perhaps fails to regulate) its flow.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

### LAW 291B – International Investment Dispute Seminar (2 units)

*Course Description:* This seminar will examine the law of investor-State dispute resolution.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

### LAW 291T – International Arbitration & Investment Law (2 units)

*Course Description:* Covers international arbitration involving States, individuals, and corporations; including: the parties; the agreement to arbitrate; the arbitrators; the arbitral proceeding; and, the arbitral award.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

### LAW 292 – Immigration Law & Procedure (3 units)

*Course Description:* Surveys the history of U.S. immigration law and policy.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

### LAW 292A – Advanced Topics in Immigration & Citizenship Law Seminar (2 units)

*Course Description:* Conducts a closer examination of various topics and subject matters that relate to immigration and citizenship law.

*Prerequisite(s):* LAW 292; may be waived by the professor.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

### LAW 292B – Immigration Crimes (2 units)

*Course Description:* Every year, tens of thousands of people are charged with immigration-related crimes in the federal court system; almost all of the people prosecuted in these cases come from Spanish-speaking countries to the south of the United States. Examine the history of such immigration-related prosecutions, explores how they are currently conducted, and looks in particular at the streamlined proceedings that happen in districts along the southern border.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

### LAW 292C – Humanizing Deportation (2 units)

*Course Description:* Focus on student's investigation, research, interviewing and client counseling skills. Review the stories in the UC Humanizing Deportation archive, research possible forms of immigration relief for deported individuals, and identify possible candidates for legal screening. After in-depth training, students travel to Tijuana, Mexico to provide know-your-rights and educational workshops with deported individuals.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Letter.

### LAW 293 – Public Interest Law (2 units)

*Course Description:* This class will examine the issues and problems associated with providing civil legal services to persons and interests in American society that typically have been unable to afford or otherwise obtain representation from the private bar.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

### LAW 293AT – Contemporary Issues in Economic Justice (2 units)

*Course Description:* Provides an introduction to the social justice critique of free markets.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

### LAW 293B – Representing Spanish-Speaking Clients: Language, Culture, & Emotional Intelligence (1 unit)

*Course Description:* Goal is to prepare future attorneys to effectively represent Spanish-speaking clients through various key tools, including litigation tools, language, culture, and emotional intelligence.

*Prerequisite(s):* Spanish proficiency or consent of instructor.

*Learning Activities:* Lecture.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 293T – Public Interest Lawyering, Civil Rights & Employment Law (2 units)

*Course Description:* Advanced course covers employment law issues through the lens of public interest lawyers and their constituencies.

*Prerequisite(s):* LAW 260; LAW 260AT.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

### LAW 294A – Law & Popular Culture (2 units)

*Course Description:* Examines works of popular culture, films, and legal texts. Each session focuses on a particular film and its cultural implications, particular problem or problems of law, law practice, legal ethics, traditional ethics, or public policy.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

### LAW 294B – Video Game Law (2 units)

*Course Description:* Focuses primarily on intellectual property law through the lens of video game-related litigation, and addresses the ways in which video games and the video game industry shape law and society. Addresses the video game business, the structure and form of video-game-related legal transactions, and other current legal issues surrounding video games.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 294C – Business of Professional Sports (2 units)**

*Course Description:* Provides a basic understanding of how sports teams are legally structured; diversification of business lines, e.g., real estate, hospitality, non-profits, venture capital, marketing; role, structure, and importance of arena/facility as the modern community campfire; legal areas of focus, e.g., contracts, IP, finance, legislation, administrative law, risk management, construction; cutting edge legal issues, e.g., music license rights on social media, gambling, equal pay, eSports.

*Prerequisite(s):* LAW 215.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

**LAW 295A – Trademark & Unfair Competition Law (2 units)**

*Course Description:* Intensive look at selected issues in Trademark Law, including the concepts of trademarks & unfair competition, acquisition & loss of trademark rights, infringement, trademarks as speech, and international aspects of trademark protection.

*Prerequisite(s):* LAW 274 recommended, not required.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 295B – University Brands (3 units)**

*Course Description:* Universities gain from developing brands, to draw donors and students and lend prestige to a range of activities—merchandise, publishing, technology transfer, continuing education, hospitals, distance learning, etc. Whether private, public, elitist, or inclusive, the university can no longer avoid to brand itself. Discusses the role of trademarks in the university and changes affecting it.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

**LAW 295T – Brands (3 units)**

*Course Description:* Takes a close, interdisciplinary look at branding. Preparation to understand modern branding strategies and the challenges such strategies may pose to traditional trademark law and policy. Topics include merchandising rights, unfair competition, and counterfeits.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**LAW 296 – Copyright (3 units)**

*Course Description:* Thorough examination of the law of copyright, including its application to literature, music, films, television, art, computer programs, and the Internet.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 296B – Entertainment Law (2 units)**

*Course Description:* Provides a working knowledge of legal issues in the entertainment industry with general and more specialized knowledge in established media, including film, literature, music and television, as well as emerging online media and video games.

*Learning Activities:* Discussion.

*Grade Mode:* Letter.

**LAW 296C – Fictional Characters & Real People (2 units)**

*Course Description:* Celebrities and fictional characters both have a powerful hold on the human imagination and are important parts of our modern myths. Examines legal protection available for each.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 296D – Art Law (3 units)**

*Course Description:* Selected issues in Art Law, including meaning of art, how to represent artists, copyright, publicity, first amendment rights, censorship, street art, government regulation, art markets, international protection of art and cultural property; and more.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

**LAW 296E – Art & Cultural Heritage Law (3 units)**

*Course Description:* Exploration of the law relevant to art and cultural heritage, including copyright, cultural property, and cultural heritage laws in international and comparative perspective. Studied issues include creativity, artists' moral rights, forgery, and repatriation.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 297 – Alternative Dispute Resolution (3 units)**

*Course Description:* Introduction to a wide variety of alternative dispute resolution procedures, with an emphasis on negotiation, mediation and arbitration.

*Learning Activities:* Discussion 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LAW 297A – Federal Arbitration Act Seminar (2 units)**

*Course Description:* Trace the development of commercial arbitration law, with a special emphasis on hot-button contemporary issues like consumer and employment arbitration, the separability doctrine, preemption of state law, and the arbitrability of statutory claims.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**LAW 297BT – International Commercial Arbitration (2 units)**

*Course Description:* Introduction to international arbitration; the preferred method of dispute-resolution in international business. Discuss both commercial arbitration (between private parties) and investor-state arbitration (between private parties and sovereign states).

*Prerequisite(s):* LAW 202 highly recommended.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**LAW 298 – Sociology of the Legal Profession Seminar (2 units)**

*Course Description:* Comprehensive look at the organization, operation, and ideology of the legal profession.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

### LAW 298A – Leadership & the Law (2 units)

*Course Description:* Preparation for responsible leadership and service in the many roles that lawyers perform in and out of legal practice. Introduction to the basic principles of leadership, conflict resolution and ethical decision-making in the legal profession.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

### LAW 298B – Trauma-Informed Lawyering (2 units)

*Course Description:* Equip students with knowledge and skills to navigate the landscape of trauma. Explore the science of trauma, and develop strategies for working with trauma in clients, ourselves, and others.

*Learning Activities:* Seminar.

*Grade Mode:* Letter.

### LAW 298C – Empirical Legal Studies (2 units)

*Course Description:* Learn how to read and critique Empirical Legal Studies (ELS); e.g., legal writing that relies upon data as one of its primary sources of evidence. Write a data-focused research prospectus on a topic of the student's choosing.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

### LAW 400A – Study Abroad: University College Dublin, Ireland (12 units)

*Course Description:* Semester away study abroad at the University College Dublin, Ireland. Enhance knowledge of international legal regimes and obtain a global legal educational experience. Taught abroad.

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Students must apply and be accepted into the International Study Abroad Program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 400B – Study Abroad: University of Copenhagen, Denmark (12 units)

*Course Description:* Semester study abroad at the University of Copenhagen, Denmark. Enhance knowledge of international legal regimes and obtain a global legal educational experience. Taught abroad.

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Students must apply and be accepted into the International Study Abroad Program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 400C – Study Abroad: China University of Political Science & Law (12 units)

*Course Description:* Semester-away study abroad at the China University of Political Science and Law. Enhance knowledge of international legal regimes and obtain a global legal educational experience. Taught abroad.

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Student must apply and be acceptance in the International Study Abroad Program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 400D – Study Abroad: University of Lausanne, Switzerland (12 units)

*Course Description:* Semester-away study abroad at the University of Lausanne, Switzerland. Enhance knowledge of international legal regimes and obtain a global legal educational experience. Taught abroad.

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Student must apply and be accepted in the International Study Abroad Program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 400E – Study Abroad: Comillas Pontifical University Madrid, Spain (12 units)

*Course Description:* Semester-away study abroad at the Comillas Pontifical University in Madrid, Spain. Enhance knowledge of international legal regimes and obtain a global legal educational experience. Taught abroad.

*Learning Activities:* Independent Study.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 400F – Study Abroad: Université Paris Nanterre, Paris (12 units)

*Course Description:* Semester-away study abroad at the Universite Paris Nanterre, Paris. Enhance knowledge of international legal regimes and obtain a global legal educational experience. Taught abroad.

*Learning Activities:* Seminar.

*Enrollment Restriction(s):* Student must apply and be accepted in the International Study Abroad Program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 400G – Study Abroad: Newcastle University, U.K. (12 units)

*Course Description:* Semester-away study abroad at Newcastle University, U.K. Enhance knowledge of international legal regimes and obtain global legal educational experience.

*Learning Activities:* Independent Study.

*Grade Mode:* S/U only.

### LAW 400S – Critical Topics in Environmental Law in a Comparative Perspective (2 units)

*Course Description:* Intensive, two-week program provides an opportunity for U.S. and international law students to study environmental law by examining and comparing European Union and U.S. environmental law policies and regulatory regimes.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Enrollment by application only.

*Grade Mode:* Letter.

### LAW 408 – Community Education Seminar (3 units)

*Course Description:* Trains students to educate the community about basic legal rights and responsibilities. Students attend an initial four-hour orientation, followed by weekly seminars that will prepare students to teach in a local high school at least two times per week.

*Learning Activities:* Seminar 3 hour(s), Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 409 – Environmental Law Moot Court (1 unit)**

*Course Description:* During the first eight weeks of fall semester, students research and submit briefs as appellants, respondents, or third parties on a problem of environmental law that is prepared by the National Environmental Law Moot Court Board.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 410A – Appellate Advocacy I (2 units)**

*Course Description:* Basic appellate practice and procedure. Beginning instruction in oral advocacy skills and an opportunity to practice these skills in front of a moot court.

*Learning Activities:* Discussion/Laboratory.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 410B – Appellate Advocacy II (Moot Court) (2 units)**

*Course Description:* Continuation of LAW 410A. Focuses on the development of effective appellate brief writing skills and the refinement of oral advocacy skills.

*Learning Activities:* Practice 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 411A – Journal of International Law & Policy (1-2 units)**

*Course Description:* The UC Davis Journal of International Law & Policy publishes semi-annually and strives to contribute pertinent and interesting scholarly works to the field of international law.

*Learning Activities:* Variable 1-2 hour(s).

*Repeat Credit:* May be repeated 5 time(s) allowing participation in the journal for more than one term.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 411B – Social Justice Law Review (1-2 units)**

*Course Description:* The Social Justice Law Review is a publication of the UC Davis School of Law that addresses the unique concerns of social justice in the American legal system.

*Learning Activities:* Independent Study 1-2 hour(s).

*Repeat Credit:* May be repeated 5 time(s) allowing participation in the journal for more than one term.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 411C – UC Davis Business Law Journal (1-2 units)**

*Course Description:* The UC Davis Business Law Journal is run by dedicated law students who are committed to providing current and valuable legal and business analysis.

*Learning Activities:* Independent Study 1 hour(s).

*Repeat Credit:* May be repeated 5 time(s) allowing participation in the journal for more than one term.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 411D – Immigration & Nationality Law Review (1-2 units)**

*Course Description:* The Immigration & Nationality Law Review (INLR) is in part a reprint journal and serves as an anthology of seminal articles in immigration, nationality, and citizenship law. INLR has republished a number of articles authored by King Hall faculty. INLR also creates space for student Notes. The INLR also hosts a symposium or other immigration-related project each year and publishes materials from that enterprise in the year's volume.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study.

*Repeat Credit:* May be repeated 5 time(s) allowing participation in the journal for more than one term.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 412 – Carr Intraschool Trial Advocacy Competition (1 unit)**

*Course Description:* Named after the late Justice Frances Carr, this competition is open to secondand third-year students. A preliminary round is followed by quarter-finals,semi-finals, and a final round. Students participate in mock trials presided over by judges and critiqued by experienced litigators.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 413 – Interschool Competition (1-3 units)**

*Course Description:* Participation in interschool moot court and lawyering skills competitions. Competition must be authorized by the appropriate faculty advisor. Faculty advisor may condition the award of academic credit for any particular competition on the performance of such additional work as may be reasonable to justify the credit. May satisfy advanced legal writing requirement.

*Prerequisite(s):* Consent of appropriate faculty advisor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited to students actually representing the School in the interschool competitions.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 414 – Moot Court Board (1 unit)**

*Course Description:* Members of Moot Court Board may receive 1 unit for each semester of service on the board; maximum of 2 units. Credit awarded only after certification by Moot Court Board and approval of the faculty advisors to Moot Court Board.

*Prerequisite(s):* LAW 410A; LAW 410B.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 414A – Negotiations Board (1 unit)**

*Course Description:* Members of the King Hall Negotiations Board assist in the administration of the King Hall Negotiation Team by performing a variety of tasks under the supervision of the course instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Credit Limitation(s):* Only 1 unit of credit for each semester of service on the board; up to a maximum of 2 units per academic year (4 units maximum); credit awarded only after approval by the instructor.

*Grade Mode:* S/U only.

### LAW 415 – Trial Practice Honors Board (1 unit)

*Course Description:* Members of the Trial Practice Honors Board administer the Frances Carr competition. Members are nominated by their individual Trial Practice I adjunts.

*Learning Activities:* Variable.

*Credit Limitation(s):* Receive 1 unit for serving on the Board; awarded upon approval of the faculty advisor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 416 – Law Review Writer (1-2 units)

*Course Description:* Writing of a law review article under the editorial supervision of editors of the UC Davis Law Review. Office hours (including but not limited to Bluebooking and cite-checking) are required. 1 or 2 units.

*Learning Activities:* Variable 1-2 hour(s).

*Credit Limitation(s):* In the spring semester, credit is obtained only upon achieving status as a member of the UC Davis Law Review, which requires that the student has made substantial progress towards completing an editorship article; credit is awarded only after certification by the editor in chief and approval of the faculty advisors; 1 unit of credit is earned the first semester; 2 units are earned the second semester upon nomination and acceptance of nomination to the Editorial Board; 1 unit is earned second semester if only a membership draft and office hours are completed.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 417A – Law Review Editor (1-2 units)

*Course Description:* Editors must have completed an editorship article and must perform editorial duties (a substantial time commitment). Credit is awarded only after completion of both semesters.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 417B – Law Review Editor (1-2 units)

*Course Description:* Editors must have completed an editorship article and must perform editorial duties (a substantial time commitment). Credit is awarded only after completion of both semesters.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 418 – Environmental Law & Policy Journal (1-2 units)

*Course Description:* Enviros is a biannual environmental law and policy journal that provides an open forum for the discussion of current environmental issues, particularly those pertaining to the state of California.

*Learning Activities:* Independent Study.

*Repeat Credit:* May be repeated 5 time(s) allowing the student to participate in the journal for more than one term.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 419 – Advanced Writing Project (1-4 units)

*Course Description:* Completion of a writing requirement project under the active and regular supervision of a faculty member in satisfaction of the legal writing requirement. Writing project must be an individually authored work of rigorous intellectual effort of at least 20 typewritten double-spaced pages, excluding footnotes. Project may take any of several forms, for example, a paper, a brief, a memorandum of law, a proposed statute, a statutory scheme or set of administrative regulations (with explanatory comments), or a will or agreement (with explanatory comments). Advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. Number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 419A – Advanced Writing Project (1-4 units)

*Course Description:* Completion of a writing requirement project under the active and regular supervision of a faculty member in satisfaction of the legal writing requirement. Writing project must be an individually authored work of rigorous intellectual effort of at least 20 typewritten double-spaced pages, excluding footnotes. Project may take any of several forms, for example, a paper, a brief, a memorandum of law, a proposed statute, a statutory scheme or set of administrative regulations (with explanatory comments), or a will or agreement (with explanatory comments). Advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. Number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 419S – Special Session Advanced Writing Project (1-4 units)

*Course Description:* Completion of a writing requirement project under the active and regular supervision of a faculty member in satisfaction of the legal writing requirement. Writing project must be an individually authored work of rigorous intellectual effort of at least 20 typewritten double-spaced pages, excluding footnotes. Project may take any of several forms, for example, a paper, a brief, a memorandum of law, a proposed statute, a statutory scheme or set of administrative regulations (with explanatory comments), or a will or agreement (with explanatory comments). Advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. Number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### LAW 420 – Civil Rights Clinic (2-6 units)

*Course Description:* Clinic provides practical experience in providing legal services to indigent clients who have filed civil rights actions in state and federal trial and appellate courts. Students work on clinic cases under the supervision of the clinic director.

*Prerequisite(s):* LAW 219 (can be concurrent); and consent of instructor.

*Priority given to students enrolled in or have taken LAW 267.*

*Learning Activities:* Clinical Activity 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**LAW 423 – Corporate Counsel Externship (2-6 units)**

*Course Description:* Earn academic credit for field placements in a corporate counsel office, working under attorney supervision.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 424 – Professional Development Seminar (1 unit)**

*Course Description:* Create strategic goals for their placement, focus on professionalism and professional identity issues in seminar meetings and with their small section coaches, and engage in reflection on what they are learning through discussion and written assignments.

*Learning Activities:* Seminar.

*Enrollment Restriction(s):* Only for students enrolled in an externship.

*Repeat Credit:* Students repeating a placement will have the option to enroll in the seminar in the spring.

*Grade Mode:* Satisfactory/Unsatisfactory Only.

**LAW 425 – Judicial Clinical (2-12 units)**

*Course Description:* Students may arrange judicial clerkship clinical programs with an approved list of state and federal judges through the Clinical office and under the sponsorship of the faculty member in charge. All students must complete weekly time records and bi-weekly journals.

*Prerequisite(s):* LAW 261; Required for full-time clinical students and recommended for part-time clinical students.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 430 – Taxation Externship (2-6 units)**

*Course Description:* Opportunity to work with the Internal Revenue Service or other governmental tax agency. Journals and attendance at group meetings required.

*Prerequisite(s):* LAW 220; consent of instructor.

*Learning Activities:* Clinical Activity 2-12 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LAW 435 – Family Protection Clinic (4 units)**

*Course Description:* Represent low-income persons in family law and related matters arising out of situations involving family violence.

*Prerequisite(s):* LAW 219 (can be concurrent); Full-Year Clinic: prior or concurrent enrollment in LAW 219 to qualify for state court certification; prior or concurrent enrollment in LAW 272 and LAW 263A recommended, not required;

*Learning Activities:* Clinical Activity 2 hour(s).

*Enrollment Restriction(s):* Full-Year Clinic: each student required to enroll for two semesters, receiving 4 units each semester for total of 8 units.

*Grade Mode:* Letter.

**LAW 435A – Family Protection Clinic (4 units)**

*Course Description:* Represent low-income persons in family law and related matters arising out of situations involving family violence.

*Prerequisite(s):* LAW 219 (can be concurrent); consent of instructor. Full-Year Clinic: LAW 219 is required to qualify for state court certification; prior or concurrent enrollment in LAW 272 and LAW 263A recommended not required. One-Semester Clinic: prior or concurrent enrollment in LAW 272 and LAW 263A recommended not required.

*Learning Activities:* Clinical Activity 2 hour(s).

*Enrollment Restriction(s):* Full-Year Clinic: each student required to enroll for two semesters receiving 4 units each semester for total of 8 units; class limited to seven students.

*Grade Mode:* Letter.

**LAW 435B – Family Protection Clinic (4 units)**

*Course Description:* Represent low-income persons in family law and related matters arising out of situations involving family violence.

*Prerequisite(s):* LAW 219 (can be concurrent); and consent of instructor. Full-Year Clinic: LAW 219 is required to qualify for state court certification; prior or concurrent enrollment in LAW 272 and LAW 263A recommended not required.

*Learning Activities:* Clinical Activity 2 hour(s).

*Enrollment Restriction(s):* Full-Year Clinic: each student required to enroll for two semesters receiving 4 units each semester for total of 8 units; class limited to seven students.

*Grade Mode:* Letter.

**LAW 440 – Immigration Law Clinic (4 units)**

*Course Description:* Provides legal representation to indigent non-citizens in removal proceedings before U.S. Immigration Courts, the Board of Immigration Appeals, and federal courts, including the Ninth Circuit Court of Appeals.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 8 hour(s).

*Enrollment Restriction(s):* Prior or concurrent enrollment in LAW 292 and LAW 219, recommended, not required.

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Letter.

**LAW 440A – Immigration Law Clinic (4 units)**

*Course Description:* Provides legal representation to indigent non-citizens in removal proceedings before U.S. Immigration Courts, the Board of Immigration Appeals, and federal courts, including the Ninth Circuit Court of Appeals.

*Prerequisite(s):* LAW 292 (can be concurrent).

*Learning Activities:* Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Each student is required to enroll for two semesters, receiving 4 units each semester for total of 8 units.

*Grade Mode:* Letter.

**LAW 440B – Immigration Law Clinic (4 units)**

*Course Description:* Provides legal representation to indigent non-citizens in removal proceedings before U.S. Immigration Courts, the Board of Immigration Appeals, and federal courts, including the Ninth Circuit Court of Appeals.

*Prerequisite(s):* LAW 292 (can be concurrent); consent of instructor.

*Learning Activities:* Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Each student is required to enroll for two semesters, receiving 4 units each semester for total of 8 units.

*Grade Mode:* Letter.

## LAW 445 – Legislative Process Externship (2-5 units)

*Course Description:* Practical experience in the operation of the office of a legislator or a legislative committee. The major thrust of the program is to enable students to become familiar with the give and take realities of making laws, as contracted with their interpretation and enforcement. Journals are required.

*Prerequisite(s):* LAW 240 (can be concurrent); or consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 445A – Aoki Water Justice Clinic (3-5 units)

*Course Description:* Aoki Water Justice Clinic trains students to use community lawyering and transactional legal tools to ensure that low-income, California communities receive safe, clean, and affordable drinking water.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## LAW 445B – Advanced Aoki Water Justice Clinic (2-5 units)

*Course Description:* The Advanced Aoki Water Justice Clinic allows students to leverage their legal research and practical lawyering skills to advance policies that ensure that low-income, California communities receive safe, clean, and affordable drinking water.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## LAW 446 – UC Davis Capital Law Scholars Externship Program (2-12 units)

*Course Description:* Program is designed to provide students with hands-on lawyering experience in a legislative office, with a legislative committee, or with a government/nonprofit office engaged in legislative and policy work. Grading is on a S/U basis.

*Learning Activities:* Fieldwork.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 446A – UC Davis Capital Law Scholars Seminar (1 unit)

*Course Description:* May be required for students enrolled in Capital Law Scholars Externship. Covers issues related to lawyering in California's state capital, and help students maximize educational and professional experience in their externship placements.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Letter.

## LAW 450 – Environmental Law Externship (2-6 units)

*Course Description:* Practical experience in environmental law. Students will work in an approved government, non-profit or private law office engaged in some form of environmental law work for a minimum of eight hours per week. Students must prepare a journal describing and reflecting upon their clinical experience, and meet periodically with the instructor.

*Prerequisite(s):* LAW 285; or consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 455 – Employment Relations Externship (2-6 units)

*Course Description:* Practical experience in employment relations, including employment discrimination and public sector labor law. Work under the direct supervision of a government lawyer. Opportunity to participate in a range of with emphasis on observation and participation in actual investigation, interviewing, drafting pleading, and attendance at hearings.

*Prerequisite(s):* LAW 251 or LAW 260 (can be concurrent).

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 460 – Public Interest Law Externship (2-6 units)

*Course Description:* Opportunity to work with a public interest practitioner in a nonprofit organization. Journals and attendance at two group meetings required. Students must complete an evaluative final paper of approximately eight pages. Hours completed in public interest setting may be applied toward the practicum requirement for the Public interest Law Program.

*Prerequisite(s):* Prior or concurrent enrollment in LAW 293 recommended.

*Learning Activities:* Clinical Activity 2-6 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 465 – Intellectual Property Externship (2-6 units)

*Course Description:* Opportunity to work for government, academic, and nonprofit entities.

*Prerequisite(s):* LAW 293 and Comparative Public Services recommended.

*Learning Activities:* Clinical Activity 2-6 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 470 – Administration of Criminal Justice Externship (2-12 units)

*Course Description:* Gain practical experience working full or part time in a District Attorney's or Public Defender's office in one of several surrounding counties or in a federal Public Defender or U.S. Attorney's office. Participate in the many activities associated with the office for which they extern: observation, interviewing, research, counseling, motion practice, and trials under State Bar rules.

*Prerequisite(s):* LAW 219 (can be concurrent); LAW 227 (can be concurrent); completion of or concurrent enrollment in LAW 219 and LAW 227; LAW 263A recommended.

*Learning Activities:* Clinical Activity 2-12 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 475 – Washington UC-DC Law Program (2-10 units)

*Course Description:* Uniquely collaborative externship program in Washington, D.C., combining weekly seminars with full-time field placement offering an unparalleled opportunity to learn how federal statutes, regulations, and policies are made, changed, and understood in the nation's capital. Taught in Washington, D.C.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Open to 2L & 3L students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **LAW 475A – Law Making & Law Changing in the Nation's Capital (3 units)**

*Course Description:* Companion seminar to the Washington UC-DC Externship. Designed to enhance the externship experience in three principal ways. Taught in Washington, D.C.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **LAW 475B – Law & Lawyering in the Nation's Capital (1 unit)**

*Course Description:* Companion seminar to a remote/part-time externship where the organization or the supervisor is based in Washington DC. Designed to enhance a part-time/remote Washington D.C. experience.

*Prerequisite(s):* LAW 475 (concurrent enrollment required).

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Letter.

## **LAW 480 – Clinical Program in Prison Law (2-6 units)**

*Course Description:* Provides practical experience in providing legal services to real clients who have various problems related to their incarceration in state prison. The services require analysis and application of Constitutional Law, state statutory law, agency regulations, and the rules of professional responsibility.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 2 hour(s).

*Grade Mode:* Letter.

## **LAW 485 – California Supreme Court Clinic (6 units)**

*Course Description:* California Supreme Court Clinic provides students with an immersive experience in litigating cases before the state's highest court.

*Learning Activities:* Clinical Activity 6 hour(s).

*Enrollment Restriction(s):* Limited to 6 students.

*Grade Mode:* Letter.

## **LAW 490T – Aoki Federal Public Defender Clinic (4 units)**

*Course Description:* Outgrowth of the work of the Aoki Center on Race and Nation. As part of its work, the Aoki Center provides educational opportunities to students interested in critical race perspectives in practice.

*Learning Activities:* Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Students submit applications for the course.

*Grade Mode:* Letter.

## **LAW 495 – Legal Research & Writing Mentor (1-2 units)**

*Course Description:* Participants assist in instructing the Legal Research & Writing programs for first-year students under the direction of the Legal Research & Writing instructors.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **LAW 495LS – Lawyering Skills Mentor (2 units)**

*Course Description:* Assist the faculty in Lawyering Skills course for first-year students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion.

*Enrollment Restriction(s):* Approval of the Lawyering Skills instructor is required.

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **LAW 498 – Group Study (1-4 units)**

*Course Description:* Groups of students with common interest in studying a stated legal problem may plan and conduct their own research and seminar program under the direction of faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Enrollment Restriction(s):* Limited to no fewer than 4 or more than 10 students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **LAW 498A – Group Study (1-4 units)**

*Course Description:* Groups of students with common interest in studying a stated legal problem may plan and conduct their own research and seminar program under the direction of faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **LAW 499 – Independent Research Project (1-4 units)**

*Course Description:* Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than 5 students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **LAW 499A – Independent Research Project (1-4 units)**

*Course Description:* Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than 5 students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member. Grading is on a Satisfactory/Unsatisfactory basis unless a request for letter grading has been made in advance.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **LAW 499B – Law Students Study Away (10 units)**

*Course Description:* Students studying away from UC Davis, School of Law. Taught abroad or off campus.

*Learning Activities:* Independent Study.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 499C – Joint Degree Student-GSM (10 units)

*Course Description:* Joint degree course for graduate School of Management students.

*Learning Activities:* Internship.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## LAW 499S – Special Independent Research Project (1-4 units)

*Course Description:* Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member.

*Learning Activities:* .

*Grade Mode:* Letter.

## LAW 499SA – Special Session Independent Research Project (1-4 units)

*Course Description:* Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member. Grading is on a Satisfactory/Unsatisfactory basis unless a request for letter grading has been made in advance.

*Learning Activities:* .

*Grade Mode:* Letter.

## LAW 499SB – Special Session Independent Research Project (1-4 units)

*Course Description:* Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each project will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than 5 students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

# Linguistics (LIN)

College of Letters & Science

## LIN 001 – Introduction to Linguistics (4 units)

*Course Description:* Introduction to the study of language; its nature, diversity, and structure.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## LIN 001Y – Introduction to Linguistics (4 units)

*Course Description:* Introduction to the study of language; its nature, diversity, and structure.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Students may not take both LIN 001 and LIN 001Y for credit.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## LIN 003 – Language & the Body (4 units)

*Course Description:* Perspectives on the role of language in issues about bodies. Language-related disabilities. Social implications of language use in discussing body-related conditions.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to all students regardless of major. Enrollment will be restricted to 80-100 students.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL).

## LIN 005 – Global English & Communication (4 units)

*Course Description:* English as a global language and its uses in intercultural communication. Cultural, historical, and political dimensions of varieties of English spoken around the world. Experiential grounding in strategies for increasing interpretive and verbal communicative competence for a globalized world.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Cross Listing:* CMN 005.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC).

## LIN 006 – Language & Society (4 units)

*Course Description:* Language as a social phenomenon. Topics include linguistic diversity, language policy, language and identity, language and social structure, speech communities and social networks, the effect of social factors on language variation, linguistic consequences of language contact.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## LIN 015 – Academic Oral Communication (3 units)

*Course Description:* Structure of oral communication, critical thinking, and persuasion in classroom discourse in American English and in cross-cultural perspective.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL).

## LIN 096 – Directed Group Study in English as a Second Language (1-5 units)

*Course Description:* Directed group study of topic in English as a Second Language (ESL).

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1.50-1.50 hour(s).

*Repeat Credit:* May be repeated with consent of the ESL coordinator.

*Grade Mode:* Pass/No Pass only.

**LIN 098 – Directed Group Study (1-5 units)**

*Course Description:* Intended for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**LIN 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Intended for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**LIN 103A – Linguistic Analysis I: Phonetics, Phonology, Morphology (4 units)**

*Course Description:* Introduction to fundamental methods and concepts used in linguistic analysis, focusing on phonetic, phonological, and morphological phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages.

*Prerequisite(s):* LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed LIN 139.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 103B – Linguistic Analysis II: Morphology, Syntax, Semantics (4 units)**

*Course Description:* Introduction to fundamental methods and concepts used in linguistic analysis, focusing on morphological, syntactic, and semantic phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages.

*Prerequisite(s):* LIN 001 or LIN 001Y recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed LIN 140.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 105 – Topics in Language & Linguistics (4 units)**

*Course Description:* Detailed examination of a major contemporary linguistic theory, a major contemporary issue or related set of issues in linguistics, or the structure of a particular language or language family.

*Prerequisite(s):* Consent of instructor; LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**LIN 106 – English Grammar (4 units)**

*Course Description:* Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers; their development; and their usefulness in describing the conventions of English.

*Prerequisite(s):* LIN 001 or LIN 001Y or ENG 003 or UWP 001 or UWP 001V or UWP 001Y; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ENL 106, UWP 106.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 111 – Introduction to Phonological Theory (4 units)**

*Course Description:* Modern approaches to phonological theory with emphasis on considering a broad range of theoretical perspective in accounting for variation across and within languages.

*Prerequisite(s):* LIN 001 or LIN 001Y or LIN 103A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 112 – Phonetics (4 units)**

*Course Description:* Detailed examination of articulatory and acoustic phonetics.

*Prerequisite(s):* LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**LIN 121 – Morphology (4 units)**

*Course Description:* Introduction to the analysis of word structure and the relation of word structure to the lexicon and other grammatical components.

*Prerequisite(s):* LIN 103A, 103B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 127 – Text Processing & Corpus Linguistics (4 units)**

*Course Description:* Investigation of the lexical organization of human languages through corpus linguistics. Application of principles of linguistic analysis, automatic text processing, and statistical research to solving problems of textual evaluation and classification, as well as information retrieval and extraction.

*Prerequisite(s):* LIN 001, LIN 005, LIN 006, or ANT 004 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Quantitative Literacy (QL).

**LIN 131 – Introduction to Syntactic Theory (4 units)**

*Course Description:* Introduction to syntactic theory, primarily through the examination of a major theory of syntax, emphasizing theoretical reasoning, argumentation, and problems of theory building in syntax.

*Prerequisite(s):* LIN 103B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 141 – Semantics (4 units)**

*Course Description:* Linguistic study of meanings of words and phrases, meanings expressed by lexical items and compositional structures. Truth-conditional models of semantics, evaluated in context and against social conventions.

*Prerequisite(s):* LIN 103B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 150 – Languages of the World (4 units)**

*Course Description:* Survey of the world's languages, their geographical distribution and classification, both genetic and typological. Illustrative descriptions of several major languages from different geographical areas; pidgins and creoles, lingua francas and other languages of widespread use.

*Prerequisite(s):* LIN 001 or ANT 004 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed LIN 050.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**LIN 151 – Historical Linguistics (4 units)**

*Course Description:* Description and methods of the historical study of language, including the comparative method and internal reconstruction; sound change, morphological change, syntactic change, semantic change.

*Prerequisite(s):* LIN 103A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 152 – Language Universals & Typology (4 units)**

*Course Description:* Investigation into common features of all human languages and the classification of languages in terms of their structural features. Theories of universal grammar. Detailed discussion of non-Indo-European languages and comparison with English.

*Prerequisite(s):* LIN 103B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**LIN 160 – American Voices (4 units)**

*Course Description:* Explores the forms of American English: traditional notions of regional dialects and increasingly important social dialects, reflecting age, class, gender, race, ethnicity, and sexual orientation.

Influence of language attitudes on perception of dialect speakers; dialect in media, education, and literature.

*Prerequisite(s):* LIN 001 or LIN 001Y or ANT 004; or upper division standing recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**LIN 161 – Global Sociolinguistics (4 units)**

*Course Description:* Overview of key sociolinguistic concepts from a global perspective, focusing on language variation, language use and language policy. Processes of language maintenance, shift and change; the construction of identities in interactions through the use of dialects, styles, and registers. Cross-cultural communication and politeness.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to LIN majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

**LIN 163 – Language, Gender, & Society (4 units)**

*Course Description:* Investigation of real and putative (stereotyped) gender-linked differences in language structure and usage, with a consideration of some social and psychological consequences of such differences. Focus is on English, but other languages are also discussed.

*Prerequisite(s):* LIN 001 or ANT 004 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**LIN 164 – Discourse Analysis (4 units)**

*Course Description:* Methods of analyzing spoken and written chunks of language as they happen in various contexts, including doctor's offices, classrooms, sports arenas, news media, etc.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**LIN 165 – Introduction to Applied Linguistics (4 units)**

*Course Description:* Applications of linguistic principles and the analysis of language-related issues in the world. Exploration of a range of language-related problems including issues related to language learning and teaching to issues concerning language and gender, race, class and the media.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**LIN 166 – The Spanish Language in the United States (4 units)**

*Course Description:* Linguistic features of the varieties of the Spanish language spoken throughout the United States; phonology, morphology, syntax, vocabulary. Focus on the relationship between United States Spanish and other world varieties of Spanish, within a historical framework.

*Prerequisite(s):* LIN 001 or LIN 001Y or SPA 111N; SPA 023; or equivalent to SPA 023 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**LIN 171 – Introduction to Psycholinguistics (4 units)**

*Course Description:* Introduction to psychological issues relating to the implementation of language and linguistic structure during speech production and comprehension and to the implications of research in psychology and related fields for linguistic theory.

*Prerequisite(s):* (LIN 001 or LIN 001Y); LIN 103A, LIN 103B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**LIN 173 – Language Development (4 units)**

*Course Description:* Theory and research on children's acquisition of their native language, including the sound system, grammatical systems, and basic semantic categories.

*Prerequisite(s):* (LIN 001 or LIN 001Y); or consent of instructor; LIN 103A, 103B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* EDU 173.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**LIN 175 – Biological Basis of Language (4 units)**

*Course Description:* Overview of issues in the field of neurolinguistics and techniques used to explore representation of language in the human brain.

*Prerequisite(s):* Consent of instructor; LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**LIN 177 – Computational Linguistics (4 units)**

*Course Description:* Understanding the nature of language through computer modeling of linguistic abilities. Relationships between human cognition and computer representations of cognitive processing.

*Prerequisite(s):* Consent of instructor; LIN 001 or LIN 001Y recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken LIN 007.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**LIN 180 – Second Language Learning & Teaching (4 units)**

*Course Description:* Psycholinguistic and sociolinguistic theories of second language learning. Connections between theoretical perspectives and pedagogical practices in formal and informal second language settings, with focus on tutoring. Impact of sociocontextual factors (e.g., gender, ethnicity). Fieldwork requirement.

*Prerequisite(s):* LIN 001 or LIN 001Y; or equivalent recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**LIN 182 – Multilingualism (4 units)**

*Course Description:* Issues in multilingualism from a global perspective: e.g., multilingual communities; multilingualism and identity (gender, ethnicity, nationality); language ideologies and educational and sociopolitical policies surrounding multilingualism; acquisition of multilingualism; discursive practices of multilinguals.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**LIN 192 – Internship in Linguistics (1-12 units)**

*Course Description:* Internship applying linguistic-related skills to a fieldwork project in areas such as media, law, or industry, in approved organizations or institutions. Maximum of 4 units applicable toward major.

*Prerequisite(s):* LIN 001 or LIN 001Y; or equivalent course; consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**LIN 194H – Special Study for Honors Students (1-5 units)**

*Course Description:* Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis.

*Prerequisite(s):* Consent of instructor; open only to linguistics majors of senior standing who qualify for Honors Program.

*Learning Activities:* Independent Study 1-5 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

**LIN 197T – Tutoring in Linguistics (1-4 units)**

*Course Description:* Leading of small voluntary discussion groups affiliated with one of the department's regular courses.

*Prerequisite(s):* Consent of instructor. Upper division standing and consent of department chairperson.

*Learning Activities:* Discussion 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**LIN 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**LIN 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**LIN 200A – Foundations of Linguistics I (4 units)**

*Course Description:* Survey of fundamental issues raised by pre-generative linguistics in the 20th century, with emphasis on issues crucial to applications of linguistics.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed LIN 203A.

*Grade Mode:* Letter.

**LIN 200B – Foundations of Linguistics II (4 units)**

*Course Description:* Survey of fundamental issues raised by orthodox generative linguistics, with emphasis on issues crucial to applications of linguistics.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed LIN 203B.

*Grade Mode:* Letter.

**LIN 200C – Foundations of Linguistics III (4 units)**

*Course Description:* Survey of fundamental issues raised by contemporary linguistic theories lying outside the generative grammar orthodoxy, with emphasis on issues crucial to applications of linguistics.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

### **LIN 201 – Proseminar (1 unit)**

*Course Description:* Introduction to research activity of faculty in the Graduate Group in Linguistics and guest speakers.  
*Learning Activities:* Seminar 1 hour(s).  
*Repeat Credit:* May be repeated 4 unit(s).  
*Grade Mode:* Satisfactory/Unsatisfactory only.

### **LIN 205A – Topics in Linguistic Theory & Methods (4 units)**

*Course Description:* Advanced study of current problems in linguistic theory and methodology.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

### **LIN 205B – Topics in Linguistic Theory & Methods (4 units)**

*Course Description:* Advanced study of current problems in linguistic theory and methodology.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

### **LIN 205C – Topics in Linguistic Theory & Methods (4 units)**

*Course Description:* Advanced study of current problems in linguistic theory and methodology.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

### **LIN 205D – Topics in Linguistic Theory & Methods (4 units)**

*Course Description:* Advanced study of current problems in linguistic theory and methodology.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Repeat Credit:* May be repeated when topic differs.  
*Grade Mode:* Letter.

### **LIN 211 – Advanced Phonological Theory & Analysis (4 units)**

*Course Description:* Critical examination of current phonological theories.  
*Prerequisite(s):* LIN 111.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

### **LIN 212 – Advanced Phonetics (4 units)**

*Course Description:* Advanced investigation of the physiological basis of speech articulation and acoustic phonetics.  
*Prerequisite(s):* LIN 112.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

### **LIN 231 – Advanced Syntactic Theory & Analysis (4 units)**

*Course Description:* Critical survey of contemporary theories of syntax.  
*Prerequisite(s):* LIN 131.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

### **LIN 241 – Advanced Syntactic Theory & Analysis (4 units)**

*Course Description:* Advanced critical exploration of contemporary theories of linguistic semantics.  
*Prerequisite(s):* LIN 141; or consent of instructor.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

### **LIN 250 – Principles of Typological Linguistics (4 units)**

*Course Description:* Cross-linguistic comparison and typology, including word order, morphological typology, complex clauses, semantic categories and their grammaticalization, and applications of typology to language acquisition.

*Learning Activities:* Seminar 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

### **LIN 251 – Principles of Historical Linguistics (4 units)**

*Course Description:* Advanced analysis of the theory and methods of historical linguistics.  
*Prerequisite(s):* LIN 151.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

### **LIN 252 – Romance Linguistics (4 units)**

*Course Description:* Examination of the development of the Romance languages from Proto-Romance to the modern era. Application and critical examination of methods of historical and comparative linguistics in particular areas of structural change in Romance.

*Prerequisite(s):* LIN 151.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

### **LIN 253 – Speech Perception (4 units)**

*Course Description:* Investigation into how listeners map a continuous and variable acoustic signal to a linguistic interpretation. Phonetic context, variation, linguistic knowledge, and sociolinguistics as factors in perceiving speech.  
*Learning Activities:* Discussion 3 hour(s), Extensive Writing.  
*Grade Mode:* Letter.

### **LIN 260 – Variation in Speech Communities (4 units)**

*Course Description:* Linguistic variability in time, space, and society. Theoretical issues related to social and linguistic constraints in variation; issues and methods in the quantitative analysis of variation. Speech community, quantitative analytic methods, and the scope of sociolinguistic competence.  
*Prerequisite(s):* LIN 281; or consent of instructor.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

**LIN 263 – Discourse Analysis: Text in Context (4 units)**

*Course Description:* Introduction to and application of leading theoretical approaches to the analysis of discourse. Approaches to the analysis of (spoken and written) text in context, tools for analyzing different types of texts (narration, conversation, etc.). Theme/rheme, given/new, anaphora, discourse markers, and other lexical/grammatical features.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**LIN 264 – Current Issues in Language & Gender (4 units)**

*Course Description:* Exploration of the construction and performance of gender through language in cross-cultural perspective and in a variety of contexts: informal conversations, narratives, workplaces, schools, households, the mass media. Special topics may include: language acquisition; multilingualism; ecofeminism; queer theory.

*Prerequisite(s):* Graduate standing; prior coursework in Linguistics, Gender Studies, or Cultural Studies is desirable; no expectation of bilingual proficiency.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

**LIN 265 – Language, Performance, & Power (4 units)**

*Course Description:* Exploration of the intersection between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Political economic, sociolinguistic, and ethnographic approaches to understanding linguistic inequality.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate standing or consent of instructor.

*Cross Listing:* ANT 265.

*Grade Mode:* Letter.

**LIN 272 – Computational Psycholinguistics (3 units)**

*Course Description:* Probabilistic models of psycholinguistic phenomena. Introduction to probability theory and Bayesian modeling. Linguistic phenomena covered include speech processing, sentence processing, pragmatics, and acquisition.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to Graduate students only.

*Grade Mode:* Letter.

**LIN 275 – Neurobiology of Language (4 units)**

*Course Description:* Survey of historical and modern conceptions of the neurobiology of language. Aphasia, functional neuroimaging, functional neuroanatomy of human language.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**LIN 280 – Theories of Second Language Acquisition (4 units)**

*Course Description:* Covers theoretical perspectives that direct or have directed research in second language acquisition; explores the relationship between linguistics and language teaching and deals with the individual variables that influence second language learning.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**LIN 281 – Research Methods in TESOL/SLD (4 units)**

*Course Description:* Students will study a variety of research methods in second language research; evaluate research designs and methods of analyses, formulate research questions and hypotheses and design a study of their own, think about various kinds of data they can collect.

*Prerequisite(s):* LIN 280.

*Learning Activities:* Lecture 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

**LIN 282 – Individual & Social Aspects of Bilingualism (4 units)**

*Course Description:* Broad overview of bi-and multilingualism, with focus on theoretical and descriptive research; topics covered range from language processing in bilinguals to code-switching to language as political issue in multilingual states.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**LIN 283 – Politics of Bi & Multilingual Literacies (4 units)**

*Course Description:* Anthropological, psycho-social, political, and educational perspectives on bi- and multi-lingualism. Power, colonialism, "native/non-native" speakers, and varieties and the unequal distribution of social goods. Analysis of how competing factors keep peoples disenfranchised.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**LIN 289 – Pedagogical Applications of Second Language Acquisition Theory (4 units)**

*Course Description:* Pedagogical implications of various theories of second language acquisition, facilitation of language acquisition in classroom settings, and techniques for conducting classroom-based research in language learning.

*Prerequisite(s):* LIN 280.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**LIN 297T – English as a Second Language Teaching/Tutoring (1-4 units)**

*Course Description:* Teaching classes for ESL graduate students. Aiding the ESL undergraduate composition classes; tutoring foreign graduate student Teaching Assistants in pronunciation. Does not fulfill requirement toward the M.A. degree.

*Prerequisite(s):* LIN 300 or LIN 301 or LIN 302 (can be concurrent); consent of instructor.

*Learning Activities:* Tutorial 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LIN 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LIN 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**LIN 300 – Language Pedagogy (4 units)**

*Course Description:* Methods of teaching second languages to nonnative speakers, stressing particularly recent linguistic methodology and techniques, as related to teaching and tutoring in the UC Davis ESL program.

*Prerequisite(s):* Graduate standing in Linguistics or consent of instructor; concurrent enrollment in LIN 297T recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**LIN 301 – Teaching Academic Literacy (4 units)**

*Course Description:* Methods of teaching advanced academic literacy in a second language, with a focus on ESL composition. Lesson development, teaching and tutoring in the UC Davis ESL program.

*Prerequisite(s):* LIN 300; or consent of instructor; graduate standing.

*Learning Activities:* Seminar 3 hour(s), Tutorial 14 hour(s), Project, Practice.

*Grade Mode:* Letter.

**LIN 302 – Recent Research & Special Projects in TESOL (4 units)**

*Course Description:* Review of recent research in second language acquisition and the teaching of English to speakers of other languages. Continued teaching and tutoring in the UC Davis ESL clinic. Each student designs and reports on a classroom research project.

*Prerequisite(s):* LIN 300; LIN 301.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**LIN 305 – Second Language Literacy & Technology (4 units)**

*Course Description:* Exploration of literacy theory and critical pedagogy in relation to new instructional and communication technologies.

Practicum experience in teaching second language literacy; reflection on connections between theory and practice. Fieldwork requirement.

*Prerequisite(s):* LIN 002 or equivalent coursework/experience in second language pedagogy; consent of instructor; graduate students only.

*Learning Activities:* Lecture/Discussion 1.50 hour(s), Web Electronic Discussion 1.50 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**LIN 310 – Language Pedagogy for Teacher Educators (4 units)**

*Course Description:* Current issues in second language pedagogy, with a focus on communicative methodology, participatory curriculum design, academic literacy, and the social contexts of teaching. Emphasis on reflective teaching and action research. Mentoring of new language teachers.

*Prerequisite(s):* Admission to Ph.D. program in Linguistics or Foreign Languages, or permission of instructor; significant language teaching experience.

*Learning Activities:* Seminar 3 hour(s), Tutorial, Project, Fieldwork.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Letter.

**LIN 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Management (MGT)**

Graduate School of Management

**MGT 011A – Elementary Accounting (4 units)**

*Course Description:* Basic concepts of accounting; interpreting and using financial statements; understanding accounting principles.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**MGT 011B – Elementary Accounting (4 units)**

*Course Description:* Theory of product costing; Analyzing the role and impact of accounting information on decision making; planning and performance evaluation.

*Prerequisite(s):* MGT 011A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**MGT 012Y – Navigating Life's Financial Decisions (3 units)**

*Course Description:* Survey of major life financial decisions (e.g., career choice, consumption v. saving, investments, mortgages, insurance) and how decision-making biases (e.g., overconfidence, present bias, limited attention) can lead to suboptimal choice. Draws on research from economics, psychology, and sociology.

*Learning Activities:* Lecture 2 hour(s), Web Virtual Lecture 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

**MGT 098 – Directed Group Study (1-5 units)**

*Course Description:* Open to all undergraduates, but is primarily intended for lower division students.

*Learning Activities:* Seminar 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**MGT 100 – Introduction to Financial Accounting (3 units)**

*Course Description:* Introduction to the concepts, methods, and uses of accounting and financial reporting.

*Prerequisite(s):* MGT 011A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to all upper division undergraduate and graduate students, except those in the Graduate School of Management.

*Grade Mode:* Letter.

## **MGT 101 – Sources & Uses of Accounting Information (4 units)**

*Course Description:* Develops an understanding of the supply and demand of accounting information. Topics include the generation and processing of accounting information, the examination of accounting information by auditors, and the use of accounting information by capital markets and tax authorities.

*Prerequisite(s):* MGT 011A C- or better; MGT 011B C- or better; must have C- or better in all prerequisite courses.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MGT 103 – Intermediate Financial Accounting I (4 units)**

*Course Description:* Begin to develop expertise in the accounting for assets and introduce analysis of financial statements.

*Prerequisite(s):* MGT 011A; MGT 011B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MGT 105 – Intermediate Financial Accounting II (4 units)**

*Course Description:* Continue to develop expertise in the preparation of financial statements by studying the accounting for liabilities and stockholders' equity. Examines the accounting for contracts that can have significant effects on firms' financial statements.

*Prerequisite(s):* MGT 103.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MGT 107 – Intermediate Financial Accounting III (4 units)**

*Course Description:* Finishes the Intermediate Financial Accounting series by examining in depth the accounting for contracts related to pensions and leases. Preparation of the statement of cash flows and footnote disclosures.

*Prerequisite(s):* MGT 105.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MGT 120 – Managing & Using Information Technology (4 units)**

*Course Description:* Develop an analytical framework to manage and monitor business systems concerned with operational, human, and organizational interactions. Introduction to computer hardware, systems software, and information systems. Management of information technology and the impact of information systems on modern management.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **MGT 140 – Marketing for the Technology-Based Enterprise (4 units)**

*Course Description:* Quantitative analysis of needs in a product (technology-based) economy, with emphasis on how scientists, engineers, and business people interact to develop and market products and services.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **MGT 150 – Technology Management (4 units)**

*Course Description:* Management of firms in high technology industries such as software development and biotechnology research. Motivating and managing workers, organizing for innovation, and making decisions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **MGT 151 – Management of Innovation & Entrepreneurship (4 units)**

*Course Description:* Innovation and entrepreneurship in established companies or new ventures. Knowledge, skills, and hands-on experiences in creative problem-solving, decision-making, building new ventures, and innovation strategy.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **MGT 160 – Financing New Business Ventures (4 units)**

*Course Description:* Concepts/methods used to structure and finance new business ventures. Topics include evaluating the net social (financial) benefit of new investment projects; raising venture capital; the role of the venture capitalist; and the choice of organizational structure in new ventures.

*Prerequisite(s):* MGT 011A; (STA 013 or STA 013Y).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **MGT 170 – Management Accounting & Control (4 units)**

*Course Description:* Covers the design of cost accounting systems, the preparation of financial budgets and forecasts, cost analysis, and the use of cost and other financial data to motivate and evaluate the performance of business units and managers.

*Prerequisite(s):* MGT 011A; MGT 011B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **MGT 180 – Supply Chain Planning & Management (4 units)**

*Course Description:* Develops key concepts and relationships between supply chain design and business models and strategies. Much of the focus is on quantitative techniques for analysis & management of the production and delivery of goods & services by an organization.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **MGT 190 – Special Topics in Accounting (4 units)**

*Course Description:* Seminar in the theory and practice of advanced or emerging areas related to the practice of professional accountancy. Specific topics will vary according to the interests of the instructor or students.

*Prerequisite(s):* MGT 011A; MGT 011B; MGT 101.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

### **MGT 198 – Directed Group Study (1-5 units)**

*Course Description:* Open to all undergraduates, but primarily intended for upper division students.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated 6 unit(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

### **MGT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special Study for Advanced Undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

### **MGT 200A – Financial Accounting (3 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 200B – Managerial Accounting (3 units)**

*Course Description:* Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations.

*Prerequisite(s):* MGT 200A or MGB 200A or MGP 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 201A – The Individual & Group Dynamics (3 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 201B – Organizational Strategy & Structure (3 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Prerequisite(s):* Completion of first year courses in Graduate School of Management or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Grade Mode:* Letter.

### **MGT 202A – Markets & the Firm (3 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 202B – Business, Government, & the International Economy (3 units)**

*Course Description:* Examines the influence of government and international factors on business. Topics include distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance.

*Prerequisite(s):* MGT 202A or MGV 202AV or MGP 202A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 203A – Data Analysis for Managers (3 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Prerequisite(s):* Graduate student in the Graduate School of Management MBA program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 203B – Forecasting & Managerial Research Methods (3 units)**

*Course Description:* Practical statistical methods for managerial decision making covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy.

*Prerequisite(s):* MGT 203A or MGB 203A or MGP 203A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 204 – Marketing Management (3 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 205 – Financial Theory & Policy (3 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 206 – Decision Making & Management Science (3 units)**

*Course Description:* Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach. Emphasizes how structured modeling techniques, probability forecasts, simulations, and computer optimization models are used in the overall process of making decisions in an uncertain environment.

*Prerequisite(s):* Graduate student in the Graduate School of Management MBA program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 207 – Management Information Systems (3 units)**

*Course Description:* Introduction to computer programming and data handling skills. Use of computer in organizations, emphasis on managerial aspects of computing. Standard and nonstandard uses of data files, centralization versus decentralization of computing, office automation, computer security.

*Prerequisite(s):* Graduate student or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 215 – Business Law (3 units)**

*Course Description:* Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

*Prerequisite(s):* Completion of administration core requirements or petition with consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 216 – Managing Professionals, Budgets, Controls & Ethics (3 units)**

*Course Description:* Performance measures, budgetary controls and ethical pressures which occur at middle management levels in service-type operations. Addresses such organizations as engineering, medical groups, law offices, management consultants.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 220 – Management of Social Networks (3 units)**

*Course Description:* Principles and applications of social network theory: coordinating divergent interests to create value for individuals and organizations. Emphasis on conceptual models, web-based diagnostic tools, and practical applications.

*Prerequisite(s):* MGT 201A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Grade Mode:* Letter.

**MGT 223 – Power & Influence in Management (3 units)**

*Course Description:* Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A; consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**MGT 224 – Managing People in High-Performance Organizations (3 units)**

*Course Description:* Strategic approach to the management of people within organization. Analyze employment systems' fit with firms' environments and strategies. Explore consequences of choices firms make in managing people; decisions as to selection, performance evaluation, compensation, and other management policies and practices.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Credit Limitation(s):* Not open to students who have taken MGB 224 or MGP 224.

*Grade Mode:* Letter.

**MGT 234 – Pricing (3 units)**

*Course Description:* Combines lectures, cases and homework to teach students tools and skills necessary to analyze pricing situations, make pricing decisions, and implement them, in a systematic manner.

*Prerequisite(s):* MGB 204 or MGP 204 or MGT 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGT 239 – Digital Marketing (3 units)**

*Course Description:* Equips students for a career in digital marketing and social media. Topics include online advertising, search engine optimization, interactive mktg, online privacy issues, e-commerce, social influence, social network theory, measurement of social influence and integrating social and traditional media.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**MGT 240 – Management Policy & Strategy (3 units)**

*Course Description:* Examines the scope of missions, objectives strategies, policies, structures, measurements and incentives which bear on the management of an organization. Real client organizations, in the private and public sectors, are assigned to student teams as the subjects of study.

*Prerequisite(s):* First-year core courses of M.B.A. program.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 240A – Intergrated Management Project (3 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to full-time MBA students.

*Grade Mode:* Letter.

**MGT 241 – New Product Development (3 units)**

*Course Description:* State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the Graduate School of Management.

*Grade Mode:* Letter.

**MGT 242 – Marketing Communications (3 units)**

*Course Description:* Issues in designing a marketing communications strategy. Topics include mass and direct communications, institutional aspects of advertising, consumer behavior, evaluating ad effectiveness, determining ad budget, creative strategy, and use and abuse of promotions.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 243 – Customer Relationship Management (3 units)**

*Course Description:* Customer Relationship Management (CRM) is a management approach under which marketing activities are organized and measured around customers (rather than around brands.) This approach is appealing because customers, not brands, are those who make buying decisions.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to MBA students only.

*Grade Mode:* Letter.

**MGT 244 – New & Small Business Ventures (3 units)**

*Course Description:* Student teams develop complete business plans for their own start-up ventures. Process includes: elevator pitch, business strategy, comprehensive bottoms-up financial projections, capital requirements, product differentiation, competitive, alliance, and go-to-market strategy development, investor presentation, and comprehensive written business plan.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 245 – Business Writing (3 units)**

*Course Description:* Techniques for sharpening writing skills are introduced, along with grammatical structure, word choice, and punctuation. Learn to develop styles that are pitch-perfect for given situations and to think strategically about each communication challenge in a management setting.

*Prerequisite(s):* Completion of first-year core courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to MBA students only.

*Grade Mode:* Letter.

**MGT 246 – Negotiation & Team Building (3 units)**

*Course Description:* Basic theory of negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tricks, uncovering hidden agendas, brainstorming to extend Pareto frontier.

*Prerequisite(s):* MGT 205; MGT 202.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**MGT 247 – Customer Service as a Marketing Tool (3 units)**

*Course Description:* Understanding the distinct features of services, how to create value through service, methods of building strong relationships with customers, methods of measuring and building customer satisfaction, and measuring the financial impact of service improvement.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 248 – Marketing Strategies (3 units)**

*Course Description:* Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 204 or MGB 204 or MGT 204).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 249 – Marketing Research (3 units)**

*Course Description:* Addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, research design, information collection, measuring instruments, data analysis, and marketing research applications.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 203A or MGB 203A or MGT 203A); (MGT 204 or MGB 204 or MGP 204).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 250 – Technology, Competition & Strategy (3 units)**

*Course Description:* Why is software typically so defective? Why do many firms in the IT industry give away their best products free? Helps analyze questions like these by modeling competition and strategy in the network, technology and information industries.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 203A or MGT 203A or MGB 203A).

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

## **MGT 251 – Management of Innovation (3 units)**

*Course Description:* Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 252 – Managing for Operational Excellence (3 units)**

*Course Description:* Explores the management of operations as applied to manufacturing as well as services provided both inside and outside the organization. Develop an understanding of how uncertainty affects planning and delivery by looking at fundamental models of operations.

*Prerequisite(s):* MGT 203A or MGB 203A or MGP 203A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to students in the Graduate School of Management.

*Grade Mode:* Letter.

## **MGT 253 – Corporate Social Responsibility (3 units)**

*Course Description:* Develop a thought process and approach to corporate social responsibility that students will be able to build on during their post-school leadership roles, whether as corporate executives, entrepreneurs, or NGO leaders.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 255 – Entrepreneurship & Venture Investment Clinic (3 units)**

*Course Description:* Provides the necessary analytical and design tools to create business ideas and refine business models based on emerging technologies. Students learn to work closely in small teams to synthesize technical, strategic, and marketing needs into designs for new ventures.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

## **MGT 258 – Mergers & Acquisitions (3 units)**

*Course Description:* Focuses on the market for corporate acquisitions and restructuring activity. Topics include: sources of value creation; takeovers; anti-takeover provisions; bidding strategies; use of leverage in buyouts; regulatory risk and hurdles; and, valuation approaches for highly leveraged transactions.

*Prerequisite(s):* MGT 205.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 259 – Banking & the Financial System (3 units)**

*Course Description:* Analyzes the role of financial markets and institutions in allocating capital. Focuses on: bank lending; debt securities; financial market innovations; regulation; functions of commercial banks and other financial intermediaries. Utilizes case studies.

*Prerequisite(s):* MGB 205 or MGP 205; consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 260 – Corporate Finance (3 units)**

*Course Description:* Focuses on planning, acquiring, and managing a company's financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure.

*Prerequisite(s):* (MGT 200A or MGB 200A or MGP 200A); (MGP 202A or MGV 202AV or MGT 202A); (MGT 205 or MGP 205 or MGB 205).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 261 – Investment Analysis (3 units)**

*Course Description:* Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.

*Prerequisite(s):* (MGT 203A or MGB 203A or MGP 203A); (MGP 205 or MGT 205 or MGB 205).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 262 – Money & Security Markets (3 units)**

*Course Description:* Examines how money and securities markets are organized; how public agencies, businesses, others obtain and invest funds in those markets. Relationship between interest rates, monetary policy, government's role in improving capital markets, approaches to assessing changes in regulation of specific markets.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 263 – Derivative Securities (3 units)**

*Course Description:* Behavior of options, futures, and other derivative securities markets and how public agencies, business and others use those markets. Trading strategies involving options, swaps, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods.

*Prerequisite(s):* (MGT 203A or MGB 203A or MGP 203A); (MGP 205 or MGT 205 or MGB 205).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Grade Mode:* Letter.

### **MGT 264 – Business Taxation (3 units)**

*Course Description:* Analysis of the impact of business taxation on investment, production, and finance decisions. Discussion of the relationship between business organization and tax liability. Not intended for tax specialists.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 265 – Technology Finance & Valuation (3 units)**

*Course Description:* Venture capital finance and the related practice of research and development finance. Application of finance tools and framework to the world of venture capital and financing of projects in high-growth industries.

*Prerequisite(s):* MGT 205 or MGP 205 or MGB 205.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program; not open to students who have taken MGV 265V.

*Grade Mode:* Letter.

### **MGT 266 – International Finance (3 units)**

*Course Description:* Studies fixed and floating exchange-rate systems. Topics include determinants of a nation's balance of international payments; macroeconomic interdependence of nations under various exchange-rate regimes and its implications for domestic stabilization policies; and the international coordination of monetary and stabilization policies.

*Prerequisite(s):* MGB 205 or MGT 205 or MGP 205; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 267 – Teams & Technology (3 units)**

*Course Description:* Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager; imparting interpersonal skills for implementing effective strategies; understanding how technological change affects team processes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to working professional MBA students.

*Grade Mode:* Letter.

### **MGT 268 – Articulation & Critical Thinking (3 units)**

*Course Description:* Commitment to this course, become competent public speakers, write well at a level expected in business, think efficiently and critically about business challenges and have a useful personal code of ethics to shape their actions and decisions. No student may repeat course for credit.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

### **MGT 269 – Machine Learning with Python (3 units)**

*Course Description:* Introduction to machine learning methods covering association rules, clustering, classification, and numeric prediction. Hands-on machine learning skills with Python. Big data technologies. Business applications.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program; exemptions may be granted for students in the Online MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGV 469V.

*Grade Mode:* Letter.

### **MGT 270 – Corporate Financial Reporting (3 units)**

*Course Description:* Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers.

*Prerequisite(s):* MGT 200A or MGP 200A or MGB 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 271 – Strategic Cost Management (3 units)**

*Course Description:* Theoretical frameworks and associated techniques for using organizational design and cost management to achieve a sustainable, profitable cost structure. Topics include: target costing, process design for low cost, total cost of ownership, cost of customers, implementing structural change, and incentives.

*Prerequisite(s):* MGT 202A or MGP 202A or MGV 202AV.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

### **MGT 272 – Evaluation of Financial Information (3 units)**

*Course Description:* Studies how investors, creditors, others use accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed.

*Prerequisite(s):* MGT 200A or MGP 200A or MGB 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 273 – Accounting & Reporting for Government Nonprofit Entities (3 units)**

*Course Description:* Concepts, methods, and uses of accounting and financial reporting by governmental and nonprofit entities. Introduction to budgeting and performance evaluation, and accounting for entities such as hospitals, universities, and welfare agencies.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGT 274 – Corporate Governance (3 units)**

*Course Description:* Discusses how corporations can better operate in the interests of shareholders and public. Directly relevant to managers, consultants in compensation and incentives, staff working on mergers and acquisitions, corporate regulators, shareholder rights activists, and board members.

*Prerequisite(s):* Full-time MBA students or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 276 – Real Estate, Finance & Development (3 units)**

*Course Description:* Focus on single family, attached, detached, multi-family, and light commercial development. Students will study factors which make up successful real estate developments. Considers financial aspects involved in land acquisition, land development, construction, and project lending.

*Prerequisite(s):* (MGP 205 or MGT 205 or MGB 205); (MGP 201A or MGB 201A or MGT 201A).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 281 – Systems Analysis & Design (3 units)**

*Course Description:* Design and specification of computer-based information systems. Applications systems development life cycle, use requirements and feasibility assessment, logical and physical design, program development and testing, conversion and implementation.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 282 – Supply Chain Management (3 units)**

*Course Description:* Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive.

*Prerequisite(s):* MGT 203A or MGP 203A or MGB 203A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

## **MGT 284 – Applied Linear Models for Management (3 units)**

*Course Description:* Covers regression, analysis of variance, and multivariate analysis. Topics will focus on applications to management and policy problems.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 285 – Time Series Analysis & Forecasting (3 units)**

*Course Description:* Considers application of time series methods to evaluation and forecasting problems. Covers univariate and multivariate ARIMA models and transfer function models. Applications will be in such areas as economics, finance, budgeting, program evaluation, and industrial process control.

*Prerequisite(s):* MGT 203B or MGP 203B or MGP 203B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 286 – Telecommunications & Computer Networks (3 units)**

*Course Description:* Communication system components; common carrier services; design and control of communications networks; network management and distributed environment; local area networks; data security in computer networks.

*Prerequisite(s):* MGT 280.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 287 – Business Database & Database Marketing (3 units)**

*Course Description:* Practical introduction to fundamental principles of database management systems and database marketing. Database design. SQL queries. Concepts of database marketing, data warehouse, data visualization and big data analytics.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 288 – Special Topics in Management of Information Systems (3 units)**

*Course Description:* Managerial aspects of information systems. Topics stressing applications in organizations chosen from: economics of computers and information systems, decision support systems, management of computer-based information systems, office automation.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGT 290 – Topics in General Management (3 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in MGT 201A and MGT 201B, or current business interest topics in fields of business writing, business communications, development, or workplace processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MGT 291 – Topics in Organizational Behavior (3 units)**

*Course Description:* Advanced topics in social psychology and sociology of organizations. Varied topics to cover more extensively issues discussed in MGT 201A and MGT 201B, or current business interest topics in fields of organization design, strategy, development, or workplace processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MGT 292 – Topics in Finance (3 units)**

*Course Description:* Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MGT 293 – Topics in Marketing (3 units)**

*Course Description:* Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hitech marketing, advertising, sales promotions, marketing through the Web.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MGT 294 – Topics in Accounting (3 units)**

*Course Description:* Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MGT 295 – Topics in Information Technology (3 units)**

*Course Description:* Applications of information technology to management and management of information technology. Adaptation to the dynamic nature of the field.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MGT 296 – Topics in Technology Management (3 units)**

*Course Description:* Cyclical nature of innovation and technological change, features of innovative firms and industries, national innovation systems, and impact of information technologies on innovation processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MGT 297 – Topics in International Management (3 units)**

*Course Description:* Broader environment in which U.S. firms and their foreign competitors operate. Integration of material from other topics courses (marketing, strategy, finance, accounting, information technology, technology management) into the international setting.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MGT 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **MGT 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **MGT 400A – Financial Accounting (4 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Credit Limitation(s):* Not available for credit for students who have taken MGT 200A, MGP 200A, MGB 200A, MGV 200AV or MGV 400AV.

*Grade Mode:* Letter.

### **MGT 401A – The Individual & Group Dynamics (4 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201A, MGP 201A, MGB 201A or MGV 201AV.

*Grade Mode:* Letter.

### **MGT 401B – Organizational Strategy & Structure (4 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201B, MGP 201B, MGB 201B or MGV 201BV.

*Grade Mode:* Letter.

### **MGT 402A – Markets & the Firm (4 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 202A, MGP 202A, MGB 202A or MGV 202AV.

*Grade Mode:* Letter.

### **MGT 403A – Data Analysis for Managers (4 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 203A, MGP 203A, MGB 203A or MGV 403AV.

*Grade Mode:* Letter.

**MGT 404 – Marketing Management (4 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 204, MGP 204, MGB 204 or MGV 204V.

*Grade Mode:* Letter.

**MGT 405 – Financial Theory & Policy (4 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 205, MGP 205, MGB 205 or MGV 205V.

*Grade Mode:* Letter.

**MGT 406A – Decision Analytics: Spreadsheet Based (2 units)**

*Course Description:* Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 206, MGP 206, MGB 206 or MGV 206V.

*Grade Mode:* Letter.

**MGT 406B – Decision Analytics: Scalable (2 units)**

*Course Description:* Builds on concepts learned in 406A to develop techniques for describing and implementing models that can scale in all dimensions.

*Prerequisite(s):* MGT 406A or MGP 406A or MGB 406A.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 206, MGP 206, MGB 206 or MGV 206V.

*Grade Mode:* Letter.

**MGT 407 – Storytelling for Leadership (1 unit)**

*Course Description:* Internalize the fundamental principles behind stories that educate, influence, motivate, inspire, persuade and connect.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGT 408 – The Business of the Media (1 unit)**

*Course Description:* Focuses on the media industries and how emerging digital technologies are disrupting the way media consumption, distribution and business models work. Will highlight the economics of several media, both news and entertainment.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGT 408V – The Business of the Media (1 unit)**

*Course Description:* Focuses on the media industries and how emerging digital technologies are disrupting the way media consumption, distribution and business models work. Will highlight the economics of several media, both news and entertainment.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGT 409 – Managing Multi-Asset Class Investment Portfolios (1 unit)**

*Course Description:* Examines top down management of multi-asset class portfolios. Topics include bonds, hedge funds, private equity, real estate, commodities, endowments, return generation, performance analysis, credit cycles, financial crises, manager selection, investment policy, and investment careers. Student teams present endowment portfolio recommendations.

*Prerequisite(s):* MGT 202A; MGT 203A; MGT 205.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGT 412 – International Marketing (1 unit)**

*Course Description:* Basic concepts of international marketing. Understanding and managing heterogeneous, dynamic, and interdependent environments across countries. How to develop and implement an international marketing strategy: where and how to compete, how to adapt your marketing mix.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGT 414 – Multi-Channel Marketing (1 unit)**

*Course Description:* Multi-channel marketing strategies empower managers to create value for different customer segments. Covers the necessary concepts to evaluate and select go-to market strategies in order to capitalize on the ubiquity of modern customers.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGT 415 – Climate Risks & Opportunities (1 unit)**

*Course Description:* Provide a working knowledge of the risks and opportunities arising from climate change and climate policy for businesses.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGT 415V – Business Law (3 units)**

*Course Description:* Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 215, MGP 215, or MGB 215.

*Grade Mode:* Letter.

**MGT 416 – Topics in Private Equity (1 unit)**

This version has ended; see updated course, below.

*Course Description:* Focuses on the finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies.

*Prerequisite(s):* MGT 205; MGB 205; MGP 205.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGT 416 – Topics in Private Equity and Mergers & Acquisitions (2 units)**

*Course Description:* Focuses on the finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies.

*Prerequisite(s):* MGT 205 (can be concurrent) or MGB 205 (can be concurrent) or MGP 205 (can be concurrent).

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**MGT 419 – Business Strategy Consulting Skills (1 unit)**

*Course Description:* Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.

*Learning Activities:* Lecture 5 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGT 419V – Business Strategy Consulting Skills (1 unit)**

*Course Description:* Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 419, MGP 419, or MGB 419.

*Grade Mode:* Letter.

**MGT 423 – Leader as Coach: An Introduction to Coaching Skills for Leaders (1 unit)**

*Course Description:* Introduces the fundamental coaching skills and coaching models that leaders can apply in everyday interactions with their team and colleagues in order to build trust, overcome challenges and help others discover their own full potential.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGT 423V – Power & Influence in Management (3 units)**

*Course Description:* Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.

*Prerequisite(s):* MGT 201A or MGP 201A or MGB 201A.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 223, MGP 223, MGB 223, or MGV 223V.

*Grade Mode:* Letter.

**MGT 426 – The Business of Healthcare (1 unit)**

*Course Description:* Intended to provide an overall understanding of the unique business aspects of the healthcare industry.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program (Business Administration-Working Professional, Business Administration-Bay Area, Business Administration-Full-Time).

*Grade Mode:* Letter.

**MGT 429 – Detection & Prevention of Asset Misappropriation Fraud in the Workplace (1 unit)**

*Course Description:* Discusses the fundamentals of fraud detection and prevention in the workplace. Learn the major schemes involving workplace fraud, how management can detect fraud and what policies and procedures can be implemented to prevent fraud.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGT 431 – Project Management (1 unit)**

*Course Description:* Students learn project management; including project scope, project planning, milestones and project closing. Important themes include leadership, team dynamics, storytelling/creating a narrative, communication, and conflict management.

*Learning Activities:* Lecture 10 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGT 432 – Project Management with Applications in Healthcare (1 unit)**

*Course Description:* Focuses on the heart of healthcare administration and how project management can be applied as a key lever to increase efficiency, decrease costs and improve the patient experience.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGT 432V – Project Management with Applications in Healthcare (1 unit)**

*Course Description:* Focuses on the heart of healthcare administration and how project management can be applied as a key lever to increase efficiency, decrease costs and improve the patient experience.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 432, MGP 432, or MGB 432.

*Grade Mode:* Letter.

**MGT 433 – Corporate Social Responsibility (1 unit)**

*Course Description:* Learn practical information that will help students understand the basics of designing, managing and evaluating an effective CSR program. Expose students to a basic set of CSR issues in the context of cross-purpose business challenges and then focus on the analysis and critical decisions that managers must make to move their business and their social agenda forward.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGT 435 – Data Wrangling (1 unit)**

*Course Description:* Develop practical skills to pre-process data. Tidied raw data can then be used for downstream data analysis, modeling, and visualization.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGT 436 – Introduction to Derivative Securities (1 unit)**

*Course Description:* Introduction to derivative securities and other forms of financial innovations.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGT 437 – Healthcare Analytics (1 unit)**

*Course Description:* Introduction to advanced analytics framework, key Artificial Intelligence & Machine Learning concepts, and modeling techniques towards solving high-value and high-impact healthcare business problems.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Grade Mode:* Letter.

**MGT 437V – Healthcare Analytics (1 unit)**

*Course Description:* Introduction to advanced analytics framework, key Artificial Intelligence & Machine Learning concepts, and modeling techniques towards solving high-value and high-impact healthcare business problems.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken MGT 437, MGP 437, or MGB 437.

*Grade Mode:* Letter.

**MGT 440 – Integrated Management Project (6 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for real-world clients. Students learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Project 3 hour(s).

*Enrollment Restriction(s):* Open to students in the MBA Program (SMBE, SMBB, SMBA).

*Grade Mode:* Letter.

**MGT 440A – Integrated Management Project (6 units)**

This version has ended; see updated course, below.

*Course Description:* Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Restricted to full-time (day) MBA students.

*Grade Mode:* Letter.

**MGT 440A – Integrated Management Project (6 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for international business clients. Learn practical consulting skills while clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Restricted to full-time (day) MBA students.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**MGT 440B – Integrated Management Project (3 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Project 3 hour(s).

*Enrollment Restriction(s):* Restricted to full-time (day) MBA students.

*Grade Mode:* Letter.

**MGT 440C – Integrated Management Project Team Lead (1 unit)**

*Course Description:* Integrated Management Project Team leader.

*Learning Activities:* Project 1 hour(s).

*Grade Mode:* Letter.

**MGT 440S – Integrated Management Simulation (4 units)**

*Course Description:* Apply theory and concepts from marketing, finance, organizational behavior, accounting, and strategy in order to manage a simulated corporation.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MGT 441V – New Product Development (3 units)**

*Course Description:* State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.

*Prerequisite(s):* MGT 204 or MGP 204 or MGB 204.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGT 443 – Customer Analytics (3 units)**

*Course Description:* Teaches how to use customer analytics to learn about and market to individual customers. Examines the different types of data analytics and how they fit into the customer relationship management world.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* No open for credit for students who have taken

MGT 443V, MGP 443V or MGB 443V.

*Grade Mode:* Letter.

**MGT 443V – Customer Analytics (3 units)**

*Course Description:* Teaches students how to use customer analytics to learn about and market to individual customers. Examines the different types of data analytics and how they fit into the customer relationship management world.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* No open for credit for students who have taken

MGT 443, MGP 443 or MGB 443.

*Grade Mode:* Letter.

**MGT 445Y – Product Management (4 units)**

*Course Description:* Overview of the requirements, issues, and tools involved in marketing of products and services via lectures, case studies, and a hands-on, quarter-long competitive simulation.

*Prerequisite(s):* MGT 404 or MGP 404 or MGB 404.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Lecture 2 hour(s).

*Credit Limitation(s):* Not open for students who have taken MGV 445V.

*Grade Mode:* Letter.

**MGT 448 – Practicum for Marketing Strategies (1 unit)**

*Course Description:* Provides opportunities to apply the concepts covered in the Marketing Strategies class through a group project involving the analysis of strategic marketing decisions based on business-related issues, simulation and modeling.

*Prerequisite(s):* MGT 248.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGT 448V – Marketing Strategies (3 units)**

*Course Description:* Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.

*Prerequisite(s):* (MGT 202A or MGP 202A or MGB 202A); (MGT 204 or MGP 204 or MGB 204).

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Repeat Credit:* Not open for credit to students who have taken MGT 248,

MGP 248, MGB 248, or MGV 248V.

*Grade Mode:* Letter.

**MGT 450 – Practicum for Technology Competition & Strategy (1 unit)**

*Course Description:* In-depth practicum project course. Apply theories, concepts, and models, learned in MGT 250 to a real-world business problem, through data collection, data analysis, simulation, modeling and post-model interpretation.

*Prerequisite(s):* MGT 250.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in MBA program.

*Grade Mode:* Letter.

**MGT 452 – Managing for Operational Excellence (4 units)**

*Course Description:* Explore the management of operations as applied to manufacturing, as well as services provided both inside & outside the organization. Develop an understanding of how uncertainty affects planning & delivery by looking at fundamental models of operations.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 252, MGP 252, MGB 252 or MGV 252V.

*Grade Mode:* Letter.

**MGT 454A – Causal Inference and Statistical Experiments (2 units)**

*Course Description:* Surveys causal inference methods with applications in business settings, especially marketing. Covers both primary data approaches such as A/B testing and secondary data approaches such as difference-in-differences.

*Prerequisite(s):* MGT 403A or MGP 403A or MGB 403A.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MGT 454B – Marketing Analytics (2 units)**

*Course Description:* Surveys a variety of marketing analytics applications, training students to identify (i) what questions data can answer, and, conversely, (ii) what data is needed to answer a question.

*Prerequisite(s):* MGT 454A or MGP 454A or MGB 454A.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MGT 460A – Corporate Finance: Fundamentals (2 units)**

*Course Description:* Study valuation techniques in applied settings, study a variety of investment decisions, and analyze how capital structure considerations play a role in firm's investment policies.

*Prerequisite(s):* MGT 205 or MGP 205 or MGB 205.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 260, MGP 260 or MGB 260.

*Grade Mode:* Letter.

**MGT 460B – Corporate Finance: Advanced Topics (2 units)**

*Course Description:* Advanced course in corporate finance that builds on 460A, with an aim to extend knowledge of the theory and practice of corporate finance.

*Prerequisite(s):* MGT 460A or MGB 460A; MGP 460A.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not open for students who have taken MGT 260, MGP 260 or MGB 260.

*Grade Mode:* Letter.

**MGT 467 – Practicum for Teams & Technology (1 unit)**

*Course Description:* Groups investigate the performance, creativity, conflict, information sharing, and leadership behaviors of a real world team. Provide consulting advice to the team, which not only gives analytic skills, but also builds presentation skills.

*Prerequisite(s):* MGT 267.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGT 467V – Teams & Technology (3 units)**

*Course Description:* Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager; imparting interpersonal skills for implementing effective strategies; understanding how technological change affects team processes.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 267, MGP 267, MGB 267, or MGV 267V.

*Grade Mode:* Letter.

**MGT 468 – Articulation & Critical Thinking (4 units)**

*Course Description:* Public speaking, business writing, efficient and critical thinking about business challenges, and defining a personal code of ethics to shape actions and decisions.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 268, MGP 268, MGB 268 or MGV 268V.

*Grade Mode:* Letter.

**MGT 469 – Practicum for Business Intelligence Technologies (1 unit)**

*Course Description:* Projects applying concepts learned in Business Intelligence Technologies to real business problems.

*Prerequisite(s):* MGT 269.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGT 490 – Topics in Business (1 unit)**

*Course Description:* Provides opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses.

*Prerequisite(s):* Consent of instructor. Sponsorship of a GSM Academic Senate faculty member; approval of graduate advisor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students in the MBA Program (SMBA, SMBB, SMBE).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGT 490A – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGT 490B – Topics in General Management-Extended (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such business writing, management, organizational behavior, business communications, development, finance and workplace processes.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGT 490BV – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Web Virtual Lecture 2 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Letter.

**MGT 490V – Topics in General Management (3 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in MGT 201A and MGT 201B, or current business interest topics in fields of business writing, business communications, development, or workplace processes.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGT 492V – Topics in Finance (2 units)**

*Course Description:* Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques.

*Learning Activities:* Web Virtual Lecture 2 hour(s).

*Repeat Credit:* May be repeated for credit when the topic differs; students can take this course repeatedly.

*Grade Mode:* Letter.

**MGT 493V – Topics in Marketing (3 units)**

*Course Description:* Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hi-tech marketing, advertising, sales promotions, marketing through the Web.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGT 498 – Directed Group Study Management Practicum (1-12 units)**

*Course Description:* Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses.

*Prerequisite(s):* Consent of instructor. Sponsorship of a GSM Academic Senate faculty member, and approval of graduate advisor.

*Learning Activities:* Project.

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MGT 499 – Directed Individual Study Management Practicum (1-12 units)**

*Course Description:* Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other Graduate School of Management courses.

*Prerequisite(s):* Consent of instructor. Sponsorship of a Graduate School of Management Academic Senate faculty member and approval of graduate advisor.

*Learning Activities:* Project.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Management; Online (MGV)**

Graduate School of Management

### **MGV 200AV – Financial Accounting (4 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only; do not enroll if Financial Accounting 200A or 400AV has been taken.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 200A, MGP200A, or MGB 200A.

*Grade Mode:* Letter.

### **MGV 200BV – Managerial Accounting (4 units)**

*Course Description:* Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 200B, MGP 200B, or MGB 200B.

*Grade Mode:* Letter.

### **MGV 201AV – The Individual & Group Dynamics (4 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201A, MGP 201A or MGB 201A.

*Grade Mode:* Letter.

### **MGV 201BV – Organizational Strategy & Structure (4 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201B, MGP 201B, or MGB 201B.

*Grade Mode:* Letter.

### **MGV 202AV – Markets & the Firm (4 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 202A, MGP 202A or MGB 202A.

*Grade Mode:* Letter.

### **MGV 203AV – Data Analysis for Managers (4 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only; do not enroll if Data Analysis for Managers 203A or 403AV has been taken.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 203A, MGP 203A, or MGB 203A.

*Grade Mode:* Letter.

### **MGV 203BV – Forecasting & Managerial Research Methods (4 units)**

*Course Description:* Influence of government and international factors on business. Distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance.

*Prerequisite(s):* MGV 203AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 203B, MGP 203B, or MGB 203B.

*Grade Mode:* Letter.

## **MGV 204V – Marketing Management (4 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 204, MGP 204, or MGB 204.

*Grade Mode:* Letter.

## **MGV 205V – Financial Theory & Policy (4 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 205, MGP 205, or MGB 205.

*Grade Mode:* Letter.

## **MGV 206V – Decision Analytics (4 units)**

*Course Description:* Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach. Emphasis on how structured modeling techniques, probability forecasts, simulations, and computer optimization models are used in the overall process of making decisions in an uncertain environment.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGB 206, MGP 206, or MGT 206.

*Grade Mode:* Letter.

## **MGV 207V – Management Information Systems (4 units)**

*Course Description:* Introduction to computer programming and data handling skills. Use of computer in organizations, emphasis on managerial aspects of computing. Standard and nonstandard uses of data files, centralization versus decentralization of computing, office automation, computer security.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 207, MGP 207, or MGB 207.

*Grade Mode:* Letter.

## **MGV 215V – Business Law (4 units)**

*Course Description:* Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 215, MGP 215, or MGB 215.

*Grade Mode:* Letter.

## **MGV 223V – Power & Influence (4 units)**

*Course Description:* Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.

*Prerequisite(s):* MGV 201AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 223, MGP 223, or MGB 223.

*Grade Mode:* Letter.

## **MGV 224V – Managing People in High-Performance Organizations (4 units)**

*Course Description:* Explore choices firms make in managing workers—decisions as to wages, benefits, working conditions, and other management policies and practices. Analyze employment systems' fit with firms' environments and strategies, and the consequences of choices managers make regarding policies and practices.

*Prerequisite(s):* MGV 201AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 224, MGP 224, or MGB 224.

*Grade Mode:* Letter.

## **MGV 226V – The Causes of Organizational Wrongdoing (4 units)**

*Course Description:* Explores the reasons why otherwise ethical, socially responsible, and law-abiding people become involved in wrongful courses of action in organizations.

*Prerequisite(s):* MGV 201AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Grade Mode:* Letter.

## **MGV 234V – Pricing (4 units)**

*Course Description:* Combines lectures, cases and homework to teach students tools and skills necessary to analyze pricing situations, make pricing decisions, and implement them, in a systematic manner.

*Prerequisite(s):* MGV 202AV; MGV 203BV; MGV 204V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 234, MGP 234, or MGB 234.

*Grade Mode:* Letter.

### **MGV 239V – Digital Marketing (4 units)**

*Course Description:* Equips students for a career in digital marketing and social media. Topics include online advertising, search engine optimization, interactive marketing, online privacy issues, e-commerce, social influence, social network theory, measurement of social influence and integrating social and traditional media.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 239, MGP 239 or MGB 239.

*Grade Mode:* Letter.

### **MGV 241V – New Product Development (4 units)**

*Course Description:* State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 241, MGP 241, or MGB 241.

*Grade Mode:* Letter.

### **MGV 243V – Customer Relationship Management (4 units)**

*Course Description:* Customer Relationship Management (CRM) is a management approach under which marketing activities are organized and measured around customers (rather than around brands.) This approach is appealing because customers, not brands, are those who make buying decisions.

*Prerequisite(s):* MGV 204V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 243, MGP 243, or MGB 243.

*Grade Mode:* Letter.

### **MGV 244V – New & Small Business Ventures (4 units)**

*Course Description:* Teams develop complete business plans for their own start-up ventures. Process includes: elevator pitch, business strategy, comprehensive bottoms-up financial projections, capital requirements, product differentiation, competitive, alliance, and go-to-market strategy development, investor presentation, and comprehensive written business plan.

*Prerequisite(s):* MGV 201AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 244, MGP 244, or MGB 244.

*Grade Mode:* Letter.

### **MGV 246V – Negotiations in Organizations (4 units)**

*Course Description:* Basic theory of negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tricks, uncovering hidden agendas, brainstorming to extend Pareto frontier.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 246, MGP 246, or MGB 246.

*Grade Mode:* Letter.

### **MGV 248V – Marketing Strategy (4 units)**

*Course Description:* Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.

*Prerequisite(s):* MGV 204V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 248, MGP 248, or MGB 248.

*Grade Mode:* Letter.

### **MGV 249V – Marketing Research (4 units)**

*Course Description:* Addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, research design, information collection, measuring instruments, data analysis, and marketing research applications.

*Prerequisite(s):* MGV 202AV; MGV 203AV; MGV 204V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 249, MGP 249, or MGB 249.

*Grade Mode:* Letter.

### **MGV 250V – Technology Competition & Strategy (4 units)**

*Course Description:* Covers business strategies for firms that make technology products. Looks at distinctive economic forces affecting supply, demand, and markets, asks: How do these forces impact market outcomes? And how should firms shape their competitive strategy?

*Prerequisite(s):* MGV 202AV; MGV 203AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 250, MGP 250 or MGB 250.

*Grade Mode:* Letter.

**MGV 251V – Management of Innovation (4 units)**

*Course Description:* Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics.

*Prerequisite(s):* MGV 201AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 251, MGP 251 or MGB 251.

*Grade Mode:* Letter.

**MGV 252V – Managing for Operational Excellence (4 units)**

*Course Description:* Explore the management of operations as applied to manufacturing, as well as services provided both inside & outside the organization. Develop an understanding of how uncertainty affects planning & delivery by looking at fundamental models of operations.

*Prerequisite(s):* MGV 203AV or MGV 403AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 252, MGP 252, or MGB 252.

*Grade Mode:* Letter.

**MGV 253V – Corporate Social Responsibility (4 units)**

*Course Description:* Develop a thought process and approach to corporate social responsibility that students will be able to build on during their post-school leadership roles, whether as corporate executives, entrepreneurs, or NGO leaders.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 253, MGP 253 or MGB 253.

*Grade Mode:* Letter.

**MGV 254V – Marketing Analytics (4 units)**

*Course Description:* Several econometric models commonly used in marketing practice. How data and models can be used to answer questions, generate forecasts, and make decisions.

*Prerequisite(s):* MGV 203AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Grade Mode:* Letter.

**MGV 255V – Entrepreneurship Clinic (4 units)**

*Course Description:* Provides the necessary analytical and design tools to create business ideas and refine business models based on emerging technologies. Students learn to work closely in small teams to synthesize technical, strategic, and marketing needs into designs for new ventures.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 255, MGP 255, or MGB 255.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGV 258V – Mergers & Acquisitions (4 units)**

*Course Description:* Focuses on the market for corporate acquisitions and restructuring activity. Topics include: sources of value creation; takeovers; anti-takeover provisions; bidding strategies; use of leverage in buyouts; regulatory risk and hurdles; and, valuation approaches for highly leveraged transactions.

*Prerequisite(s):* MGV 205V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 258, MGP 258, or MGB 258.

*Grade Mode:* Letter.

**MGV 259V – Banking & the Financial System (4 units)**

*Course Description:* Analyzes the role of financial markets and institutions in allocating capital. Focuses on: bank lending; debt securities; financial market innovations; regulation; functions of commercial banks and other financial intermediaries. Utilizes case studies.

*Prerequisite(s):* MGV 205V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 259, MGP 259, or MGB 259.

*Grade Mode:* Letter.

**MGV 260V – Corporate Finance (4 units)**

*Course Description:* Planning, acquiring, and managing a company's financial resources. Financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure.

*Prerequisite(s):* MGV 200AV or MGV 202AV or MGV 205V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 260, MGP 260 or MGB 260.

*Grade Mode:* Letter.

**MGV 261V – Investment Analysis (4 units)**

*Course Description:* Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.

*Prerequisite(s):* MGV 203AV; MGV 205V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 261, MGP 261, or MGB 261.

*Grade Mode:* Letter.

### **MGV 263V – Derivative Securities (4 units)**

*Course Description:* Behavior of options, futures, and other derivative securities markets and how public agencies, business and others use those markets. Trading strategies involving options, swaps, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods.

*Prerequisite(s):* MGV 203AV; MGV 205V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 263, MGP 263, or MGB 263.

*Grade Mode:* Letter.

### **MGV 264V – Business Taxation (4 units)**

*Course Description:* Analysis of the impact of business taxation on investment, production, and finance decisions. Relationship between business organization and tax liability. Not intended for tax specialists.

*Prerequisite(s):* MGV 200AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 264, MGP 264 or MGB 264.

*Grade Mode:* Letter.

### **MGV 265V – Technology Finance & Valuation (4 units)**

*Course Description:* Examines venture capital finance and the related practice of R&D finance. Goal is to apply finance tools and framework to the world of venture capital and financing of projects in high-growth industries.

*Prerequisite(s):* MGV 205V (can be concurrent).

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for students who have previously taken MGT 265, MGB 265, or MGP 265.

*Grade Mode:* Letter.

### **MGV 267V – Teams & Technology (4 units)**

*Course Description:* Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager, imparting interpersonal skills for implementing effective strategies, understanding how technological change affects team processes.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 267, MGP 267, or MGB 267.

*Grade Mode:* Letter.

### **MGV 268V – Articulation & Critical Thinking (4 units)**

*Course Description:* Public speaking, business writing, efficient and critical thinking about business challenges, and defining a personal code of ethics to shape actions and decisions.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 268, MGP 268, or MGB 268.

*Grade Mode:* Letter.

### **MGV 269V – Data Mining (4 units)**

*Course Description:* Descriptive and Predictive Data mining methods covering association rules, clustering, classification, text mining, etc. Big data Technologies. Business applications. Hands-on data mining skills. Business intelligence for managerial decision making.

*Prerequisite(s):* MGV 203BV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 269, MGB 269 or MGP 269.

*Grade Mode:* Letter.

### **MGV 270V – Corporate Financial Reporting (4 units)**

*Course Description:* Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers.

*Prerequisite(s):* MGV 200AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 270, MGP 270, or MGB 270.

*Grade Mode:* Letter.

### **MGV 272V – Evaluation of Financial Information (4 units)**

*Course Description:* Studies how investors, creditors, others use accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed.

*Prerequisite(s):* MGV 200AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 272, MGP 272, or MGB 272.

*Grade Mode:* Letter.

## **MGV 276V – Real Estate, Finance & Development (4 units)**

*Course Description:* Focus on single family, attached, detached, multi-family, and light commercial development. Study factors that make up successful real estate developments. Consider financial aspects involved in land acquisition, land development, construction, and project lending.

*Prerequisite(s):* MGV 205V; MGV 201AV.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 276, MGP 276 or MGB 276.

*Grade Mode:* Letter.

## **MGV 282V – Supply Chain Management (4 units)**

*Course Description:* Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive.

*Prerequisite(s):* MGV 204V.

*Learning Activities:* Web Electronic Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 282, MGP 282, or MGB 282.

*Grade Mode:* Letter.

## **MGV 285V – Time Series Analysis & Forecasting (4 units)**

*Course Description:* Consider application of time series methods to evaluation & forecasting problems. Covers univariate & multivariate ARIMA models and transfer function models. Applications in such areas as economics, finance, budgeting, program evaluation, and industrial process control.

*Learning Activities:* Web Electronic Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 285, MGP 285, or MGB 285.

*Grade Mode:* Letter.

## **MGV 287V – Business Database & Database Marketing (4 units)**

*Course Description:* Practical introduction to fundamental principles of database management systems and database marketing. Database design. SQL queries. Concepts of database marketing, data warehouse, data visualization and big data analytics.

*Prerequisite(s):* Graduate standing in the Graduate School of Management or consent of instructor required.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 287, MGP 287, or MGB 287.

*Grade Mode:* Letter.

## **MGV 290V – Topics in General Management (4 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in MGV 201AV and MGV 201BV, or current business interest topics in fields of business writing, business communications, development, or workplace processes.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA Program only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **MGV 297V – Topics in International Management (4 units)**

*Course Description:* International environment in which U.S. firms and their foreign competitors operate. May integrate topics in marketing, strategy, finance, accounting, information technology, or technology management in an international context.

*Prerequisite(s):* Graduate standing in the Graduate School of Management or consent of instructor required.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **MGV 400AV – Financial Accounting (4 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Prerequisite(s):* MGV 438V.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only.

*Grade Mode:* Letter.

## **MGV 401AV – The Individual & Group Dynamics (4 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201A, MGP 201A, MGB 201A, MGV 201AV, MGT 401A, MGP 401A, or MGB 401A.

*Grade Mode:* Letter.

## **MGV 401BV – Organizational Strategy & Structure (4 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201B, MGP 201B, MGB 201B, MGV 201BV, MGT 401B, MGP 401B or MGB 401B.

*Grade Mode:* Letter.

**MGV 402AV – Markets & The Firm (4 units)**

**Course Description:** Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

**Learning Activities:** Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken MGT 202A, MGP 202A, MGB 202A, MGV 202AV, MGT 402A, MGP402A or MGB 402A.

**Grade Mode:** Letter.

**MGV 403AV – Data Analysis for Managers (4 units)**

**Course Description:** Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

**Prerequisite(s):** MGV 438V.

**Learning Activities:** Web Virtual Lecture 4 hour(s).

**Enrollment Restriction(s):** Open to students enrolled in the Online MBA program only.

**Grade Mode:** Letter.

**MGV 404V – Marketing Management (4 units)**

**Course Description:** Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

**Learning Activities:** Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken MGT 204, MGP204, MGB 204, MGV 204V, MGT 404, MGP 404 or MGB 404.

**Grade Mode:** Letter.

**MGV 405V – Financial Theory & Policy (4 units)**

**Course Description:** Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

**Learning Activities:** Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit for students who have taken MGT 205, MGP 205, MGB 205, MGV 205V, MGT 405, MGP 405 or MGB 405.

**Grade Mode:** Letter.

**MGV 438V – Quantitative Tools for Business (4 units)**

**Course Description:** Quantitative analysis and business storytelling through practical quantitative frameworks, descriptive procedures and real life case studies.

**Learning Activities:** Web Electronic Discussion 4 hour(s).

**Enrollment Restriction(s):** Open to students enrolled in the Online MBA program.

**Grade Mode:** Letter.

**MGV 440V – Integrated Management Project (4 units)**

**Course Description:** Examines the scope of missions, objectives strategies, policies, structures, measurements and incentives which bear on the management of an organization. Simulated organizations in the private and public sectors, are assigned to student teams as the subjects of study.

**Prerequisite(s):** First-year core courses of online MBA program.

**Learning Activities:** Web Virtual Lecture 4 hour(s).

**Enrollment Restriction(s):** Open to students enrolled in the online MBA Program only.

**Credit Limitation(s):** Not open for credit to students who have taken MGT 240, MGP 240, MGB 240 or MGT 440, MGP 440, MGB 440.

**Grade Mode:** Letter.

**MGV 445V – Product Management (4 units)**

**Course Description:** Overview of the requirements, issues, and tools involved in marketing of products and services via lectures, case studies, and a hands-on, quarter-long competitive simulation.

**Prerequisite(s):** MGV 204V.

**Learning Activities:** Web Virtual Lecture 3 hour(s).

**Enrollment Restriction(s):** Open to students enrolled in the Online MBA program only.

**Grade Mode:** Letter.

**MGV 452V – Managing for Operational Excellence (4 units)**

**Course Description:** Explore the management of operations as applied to manufacturing, as well as services provided both inside & outside the organization. Develop an understanding of how uncertainty affects planning & delivery by looking at fundamental models of operations.

**Learning Activities:** Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken MGT 252, MGP 252, MGB 252, MGV 252V, MGT 452, MGP 452 or MGB 452.

**Grade Mode:** Letter.

**MGV 468V – Articulation & Critical Thinking (4 units)**

**Course Description:** Public speaking, business writing, efficient and critical thinking about business challenges, and defining a personal code of ethics to shape actions and decisions.

**Learning Activities:** Web Virtual Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken MGT 268, MGP 268, MGB 268, MGV 268V, MGT 468, MGP 468, or MGB 468.

**Grade Mode:** Letter.

**MGV 469V – Machine Learning with Python (4 units)**

**Course Description:** Introduction to Machine Learning methods covering association rules, clustering, classification, and numeric prediction. Hands-on Machine Learning skills with Python. Big data technologies. Business applications.

**Prerequisite(s):** MGV 203AV.

**Learning Activities:** Web Virtual Lecture 4 hour(s).

**Enrollment Restriction(s):** Open to students in the Online MBA program; exemptions may be granted upon request for students enrolled in the MBA program.

**Credit Limitation(s):** Not open for credit to students who have taken MGT 269, MGP 269 or MGB 269.

**Grade Mode:** Letter.

**MGV 475V – R & SQL for Business Analytics (4 units)**

*Course Description:* Introduces programming concepts and how they can be applied to derive insights from data and make management decisions.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Grade Mode:* Letter.

**MGV 490A – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such as business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA program only.

*Repeat Credit:* May be repeated for credit when topic differs; can be taken for credit more than once.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGV 490AV – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such as business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Web Virtual Lecture 2 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the Online MBA program only.

*Repeat Credit:* May be repeated when topic differs; can be taken for credit more than once.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGV 490BV – Topics in Management–Extended (4 units)**

*Course Description:* Extended topics in general management. Varied topics to cover more extensively; management, organizational behavior, finance, marketing, accounting and business analytics.

*Learning Activities:* Web Virtual Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the online MBA program only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

# Management; Working Professional (MGP)

Graduate School of Management

**MGP 200A – Financial Accounting (3 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 200B – Managerial Accounting (3 units)**

*Course Description:* Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations.

*Prerequisite(s):* MGT 200A or MGB 200A or MGP 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 201A – The Individual & Group Dynamics (3 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 201B – Organizational Strategy & Structure (3 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Prerequisite(s):* Completion of first year courses in Graduate School of Management or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Grade Mode:* Letter.

**MGP 202A – Markets & the Firm (3 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 202B – Business, Government, & the International Economy (3 units)**

*Course Description:* Examines the influence of government and international factors on business. Topics include distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance.

*Prerequisite(s):* MGP 202A or MGT 202A or MGV 202AV.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 203A – Data Analysis for Managers (3 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Prerequisite(s):* Graduate student in the Graduate School of Management MBA program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 203B – Forecasting & Managerial Research Methods (3 units)**

*Course Description:* Practical statistical methods for managerial decision making covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy.

*Prerequisite(s):* MGP 203A or MGT 203A or MGB 203A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 204 – Marketing Management (3 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 205 – Financial Theory & Policy (3 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 206 – Decision Making & Management Science (3 units)**

*Course Description:* Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach. Emphasizes how structured modeling techniques, probability forecasts, simulations, and computer optimization models are used in the overall process of making decisions in an uncertain environment.

*Prerequisite(s):* Graduate student in the Graduate School of Management MBA program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 207 – Management Information Systems (3 units)**

*Course Description:* Introduction to computer programming and data handling skills. Use of computer in organizations, emphasis on managerial aspects of computing. Standard and nonstandard uses of data files, centralization versus decentralization of computing, office automation, computer security.

*Prerequisite(s):* Graduate student or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 215 – Business Law (3 units)**

*Course Description:* Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

*Prerequisite(s):* Completion of administration core requirements or petition with consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 216 – Managing Professionals, Budgets, Controls & Ethics (3 units)**

*Course Description:* Performance measures, budgetary controls and ethical pressures which occur at middle management levels in service-type operations. Addresses such organizations as engineering, medical groups, law offices, management consultants.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 220 – Management of Social Networks (3 units)**

*Course Description:* Principles and applications of social network theory: coordinating divergent interests to create value for individuals and organizations. Emphasis on conceptual models, web-based diagnostic tools, and practical applications.

*Prerequisite(s):* MGP 201A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Grade Mode:* Letter.

**MGP 223 – Power & Influence in Management (3 units)**

*Course Description:* Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A; consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **MGP 224 – Managing People in High-Performance Organizations (3 units)**

*Course Description:* Strategic approach to the management of people within organization. Analyze employment systems' fit with firms' environments and strategies. Explore consequences of choices firms make in managing people; decisions as to selection, performance evaluation, compensation, and other management policies and practices.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Credit Limitation(s):* Not open to students who have taken MGB 224 or MGT 224.

*Grade Mode:* Letter.

## **MGP 234 – Pricing (3 units)**

*Course Description:* Combines lectures, cases and homework to teach students tools and skills necessary to analyze pricing situations, make pricing decisions, and implement them, in a systematic manner.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA Program.

*Grade Mode:* Letter.

## **MGP 239 – Digital Marketing (3 units)**

*Course Description:* Equips students for a career in digital marketing and social media. Topics include online advertising, search engine optimization, interactive mktg, online privacy issues, e-commerce, social influence, social network theory, measurement of social influence, integrating social and traditional media.

*Prerequisite(s):* MGP 204 or MGT 204 or MGB 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **MGP 240 – Management Policy & Strategy (3 units)**

*Course Description:* Examines the scope of missions, objectives strategies, policies, structures, measurements and incentives which bear on the management of an organization. Real client organizations, in the private and public sectors, are assigned to student teams as the subjects of study.

*Prerequisite(s):* First-year core courses of M.B.A. program.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 241 – New Product Development (3 units)**

*Course Description:* State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to students in the MBA Program for Working Professionals.

*Grade Mode:* Letter.

## **MGP 242 – Marketing Communications (3 units)**

*Course Description:* Issues in designing a marketing communications strategy. Topics include mass and direct communications, institutional aspects of advertising, consumer behavior, evaluating ad effectiveness, determining ad budget, creative strategy, and use and abuse of promotions.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 243 – Customer Relationship Management (3 units)**

*Course Description:* Customer Relationship Management (CRM) is a management approach under which marketing activities are organized and measured around customers (rather than around brands.) This approach is appealing because customers, not brands, are those who make buying decisions.

*Prerequisite(s):* MGT 204 or MGP 204 or MGB 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to MBA students only.

*Grade Mode:* Letter.

## **MGP 244 – New & Small Business Ventures (3 units)**

*Course Description:* Student teams develop complete business plans for their own start-up ventures. Process includes: elevator pitch, business strategy, comprehensive bottoms-up financial projections, capital requirements, product differentiation, competitive, alliance, and go-to-market strategy development, investor presentation, and comprehensive written business plan.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 245 – Business Writing (3 units)**

*Course Description:* Techniques for sharpening writing skills are introduced, along with grammatical structure, word choice, and punctuation. Learn to develop styles that are pitch-perfect for given situations and to think strategically about each communication challenge in a management setting.

*Prerequisite(s):* Completion of first-year core courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to MBA students only.

*Grade Mode:* Letter.

## **MGP 246 – Negotiation & Team Building (3 units)**

*Course Description:* Basic theory of negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tricks, uncovering hidden agendas, brainstorming to extend Pareto frontier.

*Prerequisite(s):* MGP 205; MGP 202.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **MGP 247 – Customer Service as a Marketing Tool (3 units)**

*Course Description:* Understanding the distinct features of services, how to create value through service, methods of building strong relationships with customers, methods of measuring and building customer satisfaction, and measuring the financial impact of service improvement.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 248 – Marketing Strategies (3 units)**

*Course Description:* Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 204 or MGB 204 or MGT 204).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 249 – Marketing Research (3 units)**

*Course Description:* Addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, research design, information collection, measuring instruments, data analysis, and marketing research applications.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 203A or MGB 203A or MGT 203A); (MGT 204 or MGB 204 or MGP 204).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 250 – Technology, Competition & Strategy (3 units)**

*Course Description:* Why is software typically so defective? Why do many firms in the IT industry give away their best products free? Helps analyze questions like these by modeling competition and strategy in the network, technology and information industries.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 203A or MGB 203A or MGT 203A).

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

## **MGP 251 – Management of Innovation (3 units)**

*Course Description:* Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 252 – Managing for Operational Excellence (3 units)**

*Course Description:* Explores the management of operations as applied to manufacturing as well as services provided both inside and outside the organization. Develop an understanding of how uncertainty affects planning and delivery by looking at fundamental models of operations.

*Prerequisite(s):* MGP 203A or MGB 203A or MGT 203A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to students in the Graduate School of Management.

*Grade Mode:* Letter.

## **MGP 253 – Corporate Social Responsibility (3 units)**

*Course Description:* Develop a thought process and approach to corporate social responsibility that students will be able to build on during their post-school leadership roles, whether as corporate executives, entrepreneurs, or NGO leaders.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 255 – Entrepreneurship & Venture Investment Clinic (3 units)**

*Course Description:* Provides the necessary analytical and design tools to create business ideas and refine business models based on emerging technologies. Students learn to work closely in small teams to synthesize technical, strategic, and marketing needs into designs for new ventures.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

## **MGP 258 – Mergers & Acquisitions (3 units)**

*Course Description:* Focuses on the market for corporate acquisitions and restructuring activity. Topics include: sources of value creation; takeovers; anti-takeover provisions; bidding strategies; use of leverage in buyouts; regulatory risk and hurdles; and, valuation approaches for highly leveraged transactions.

*Prerequisite(s):* MGP 205 or MGT 205 or MGB 205.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 259 – Banking & the Financial System (3 units)**

*Course Description:* Analyzes the role of financial markets and institutions in allocating capital. Focuses on: bank lending; debt securities; financial market innovations; regulation; functions of commercial banks and other financial intermediaries. Utilizes case studies.

*Prerequisite(s):* MGB 205 or MGT 205; consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGP 260 – Corporate Finance (3 units)**

*Course Description:* Focuses on planning, acquiring, and managing a company's financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure.

*Prerequisite(s):* (MGT 200A or MGB 200A or MGP 200A); (MGP 202A or MGV 202AV or MGT 202A); (MGT 205 or MGB 205 or MGP 205).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 261 – Investment Analysis (3 units)**

*Course Description:* Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.

*Prerequisite(s):* (MGT 203A or MGP 203A or MGB 203A); (MGB 205 or MGT 205 or MGP 205).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Pass/No Pass only.

**MGP 262 – Money & Security Markets (3 units)**

*Course Description:* Examines how money and securities markets are organized; how public agencies, businesses, others obtain and invest funds in those markets. Relationship between interest rates, monetary policy, government's role in improving capital markets, approaches to assessing changes in regulation of specific markets.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 263 – Derivative Securities (3 units)**

*Course Description:* Behavior of options, futures, and other derivative securities markets and how public agencies, business and others use those markets. Trading strategies involving options, swaps, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods.

*Prerequisite(s):* (MGT 205 or MGP 205 or MGB 205); (MGT 203A or MGP 203A or MGB 203A).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGP 264 – Business Taxation (3 units)**

*Course Description:* Analysis of the impact of business taxation on investment, production, and finance decisions. Discussion of the relationship between business organization and tax liability. Not intended for tax specialists.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 265 – Technology Finance & Valuation (3 units)**

*Course Description:* Venture capital finance and the related practice of research and development finance. Application of finance tools and framework to the world of venture capital and financing of projects in high-growth industries.

*Prerequisite(s):* MGB 205 or MGP 205 or MGT 205.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program; not open to students who have taken MGV 265V.

*Grade Mode:* Letter.

**MGP 266 – International Finance (3 units)**

*Course Description:* Studies fixed and floating exchange-rate systems. Topics include determinants of a nation's balance of international payments; macroeconomic interdependence of nations under various exchange-rate regimes and its implications for domestic stabilization policies; and the international coordination of monetary and stabilization policies.

*Prerequisite(s):* MGT 205 or MGB 205 or MGP 205; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 267 – Teams & Technology (3 units)**

*Course Description:* Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager; imparting interpersonal skills for implementing effective strategies; understanding how technological change affects team processes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to working professional MBA students.

*Grade Mode:* Letter.

**MGP 268 – Articulation & Critical Thinking (3 units)**

*Course Description:* With commitment to this course, students will become competent public speakers, write well at a level expected in business, think efficiently and critically about business challenges and have a useful personal code of ethics to shape their actions and decisions. No student may repeat course for credit.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**MGP 269 – Machine Learning with Python (3 units)**

*Course Description:* Introduction to machine learning methods covering association rules, clustering, classification, and numeric prediction. Hands-on machine learning skills with Python. Big data technologies. Business applications.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program; exemptions may be granted for students in the Online MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGV 469V.

*Grade Mode:* Letter.

**MGP 270 – Corporate Financial Reporting (3 units)**

*Course Description:* Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers.

*Prerequisite(s):* MGT 200A or MGP 200A or MGB 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 271 – Strategic Cost Management (3 units)**

*Course Description:* Theoretical frameworks and associated techniques for using organizational design and cost management to achieve a sustainable, profitable cost structure. Topics include: target costing, process design for low cost, total cost of ownership, cost of customers, implementing structural change, and incentives.

*Prerequisite(s):* MGT 202A or MGP 202A or MGV 202AV.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGP 272 – Evaluation of Financial Information (3 units)**

*Course Description:* Studies how investors, creditors, others use accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed.

*Prerequisite(s):* MGT 200A or MGB 200A or MGP 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 273 – Accounting & Reporting for Government Nonprofit Entities (3 units)**

*Course Description:* Concepts, methods, and uses of accounting and financial reporting by governmental and nonprofit entities. Introduction to budgeting and performance evaluation, and accounting for entities such as hospitals, universities, and welfare agencies.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 274 – Corporate Governance (3 units)**

*Course Description:* Discusses how corporations can better operate in the interests of shareholders and public. Directly relevant to managers, consultants in compensation and incentives, staff working on mergers and acquisitions, corporate regulators, shareholders rights activists, and board members.

*Prerequisite(s):* Full-time MBA students or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 276 – Real Estate, Finance & Development (3 units)**

*Course Description:* Focus on single family, attached, detached, multi-family, and light commercial development. Study factors that make up successful real estate developments. Consider financial aspects involved in land acquisition, land development, construction, and project lending.

*Prerequisite(s):* (MGT 205 or MGB 205 or MGP 205); (MGP 201A or MGB 201A or MGT 201A).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 281 – Systems Analysis & Design (3 units)**

*Course Description:* Design and specification of computer-based information systems. Applications systems development life cycle, use requirements and feasibility assessment, logical and physical design, program development and testing, conversion and implementation.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 282 – Supply Chain Management (3 units)**

*Course Description:* Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive.

*Prerequisite(s):* MGT 203A or MGB 203A or MGP 203A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGP 284 – Applied Linear Models for Management (3 units)**

*Course Description:* Covers regression, analysis of variance, and multivariate analysis. Topics will focus on applications to management and policy problems.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 285 – Time Series Analysis & Forecasting (3 units)**

*Course Description:* Considers application of time series methods to evaluation and forecasting problems. Covers univariate and multivariate ARIMA models and transfer function models. Applications will be in such areas as economics, finance, budgeting, program evaluation, and industrial process control.

*Prerequisite(s):* MGP 203B or MGT 203B or MGB 203B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 286 – Telecommunications & Computer Networks (3 units)**

*Course Description:* Communication system components; common carrier services; design and control of communications networks; network management and distributed environment; local area networks; data security in computer networks.

*Prerequisite(s):* MGP 280.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 287 – Business Database & Database Marketing (3 units)**

*Course Description:* Practical introduction to fundamental principles of database management systems and database marketing. Database design. SQL queries. Concepts of database marketing, data warehouse, data visualization and big data analytics.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 290 – Topics in General Management (3 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in MGT 201A and MGT 201B, or current business interest topics in fields of business writing, business communications, development, or workplace processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 291 – Topics in Organizational Behavior (3 units)**

*Course Description:* Advanced topics in social psychology and sociology of organizations. Varied topics to cover more extensively issues discussed in MGP 201A and MGP 201B, or current business interest topics in fields of organization design, strategy, development, or workplace processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 292 – Topics in Finance (3 units)**

*Course Description:* Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 293 – Topics in Marketing (3 units)**

*Course Description:* Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hitech marketing, advertising, sales promotions, marketing through the Web.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 294 – Topics in Accounting (3 units)**

*Course Description:* Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 295 – Topics in Information Technology (3 units)**

*Course Description:* Applications of information technology to management and management of information technology. Adaptation to the dynamic nature of the field.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 296 – Topics in Technology Management (3 units)**

*Course Description:* Cyclical nature of innovation and technological change, features of innovative firms and industries, national innovation systems, and impact of information technologies on innovation processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 297 – Topics in International Management (3 units)**

*Course Description:* Broader environment in which U.S. firms and their foreign competitors operate. Integration of material from other topics courses (marketing, strategy, finance, accounting, information technology, technology management) into the international setting.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGP 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGP 400A – Financial Accounting (4 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Credit Limitation(s):* Not available for credit for students who have taken MGT 200A, MGP 200A, MGB 200A, MGV 200AV or MGV 400AV.

*Grade Mode:* Letter.

**MGP 400AY – Financial Accounting (4 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Credit Limitation(s):* Not available for credit for students who have taken MGT 200A, MGP 200A, MGB 200A, MGV 200AV, MGV 400AV, MGT 400A, MGP 400A or MGB 400A.

*Grade Mode:* Letter.

**MGP 401A – The Individual & Group Dynamics (4 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201A, MGP 201A, MGB 201A or MGV 201AV.

*Grade Mode:* Letter.

**MGP 401AY – Individual & Group Dynamics (4 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Only open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201A, MGP 201A, MGB 201A, MGV 201AV, MGT 401A, MGP 401A or MGB 401A.

*Grade Mode:* Letter.

**MGP 401B – Organizational Strategy & Structure (4 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201B, MGP 201B, MGB 201B or MGV 201BV.

*Grade Mode:* Letter.

**MGP 401BY – Organizational Strategy & Structure (4 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201B, MGP 201B, MGB 201B, MGV 201BV, MGT 401B, MGP 401B or MGB 401B.

*Grade Mode:* Letter.

**MGP 402A – Markets & the Firm (4 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 202A, MGP 202A, MGB 202A or MGV 202AV.

*Grade Mode:* Letter.

**MGP 402AY – Markets & the Firm (4 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 202A, MGP 202A, MGB 202A, MGV 202AV, MGT 402A, MGP 402A or MGB 402A.

*Grade Mode:* Letter.

**MGP 403A – Data Analysis for Managers (4 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit for students who have taken MGT 203A, MGP 203A, MGB 203A or MGV 403AV.

*Grade Mode:* Letter.

**MGP 403AY – Data Analysis for Managers (4 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 203A, MGP 203A, MGB 203A, MGV 403AV, MGT 403A, MGP 403A or MGB 403A.

*Grade Mode:* Letter.

**MGP 404 – Marketing Management (4 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 204, MGP 204, MGB 204 or MGV 204V.

*Grade Mode:* Letter.

**MGP 404Y – Marketing Management (4 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 204, MGP 204, MGB 204, MGV 204V, MGT 404, MGP 404 or MGB 404.

*Grade Mode:* Letter.

**MGP 405 – Financial Theory & Policy (4 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit for students who have taken MGT 205, MGP 205, MGB 205 or MGV 205V.

*Grade Mode:* Letter.

**MGP 405Y – Financial Theory & Policy (4 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 205, MGP 205, MGB 205, MGV 205V, MGT 405, MGP 405 or MGB 405.

*Grade Mode:* Letter.

**MGP 406A – Decision Analytics: Spreadsheet Based (2 units)**

*Course Description:* Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 206, MGP 206, MGB 206 or MGV 206V.

*Grade Mode:* Letter.

**MGP 406B – Decision Analytics: Scalable (2 units)**

*Course Description:* Builds on concepts learned in 406A to develop techniques for describing and implementing models that can scale in all dimensions.

*Prerequisite(s):* MGT 406A or MGP 406A or MGB 406A.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 206, MGP 206, MGB 206 or MGV 206V.

*Grade Mode:* Letter.

**MGP 407 – Storytelling for Leadership (1 unit)**

*Course Description:* Internalize the fundamental principles behind stories that educate, influence, motivate, inspire, persuade and connect.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGP 408 – The Business of the Media (1 unit)**

*Course Description:* Focuses on the media industries and how emerging digital technologies are disrupting the way media consumption, distribution and business models work. Will highlight the economics of several media, both news and entertainment.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGP 408V – The Business of the Media (1 unit)**

*Course Description:* Focuses on the media industries and how emerging digital technologies are disrupting the way media consumption, distribution and business models work. Will highlight the economics of several media, both news and entertainment.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGP 409 – Managing Multi-Asset Class Investment Portfolios (1 unit)**

*Course Description:* Examines top down management of multi-asset class portfolios. Topics include bonds, hedge funds, private equity, real estate, commodities, endowments, return generation, performance analysis, credit cycles, financial crises, manager selection, investment policy, and investment careers. Student teams present endowment portfolio recommendations.

*Prerequisite(s):* MGP 202A; MGP 203A; MGP 205.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGP 412 – International Marketing (1 unit)**

*Course Description:* Basic concepts of international marketing. Understanding and managing heterogeneous, dynamic, and interdependent environments across countries. How to develop and implement an international marketing strategy: where and how to compete, how to adapt to your marketing mix.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGP 414 – Multi-Channel Marketing (1 unit)**

*Course Description:* Multi-channel marketing strategies empower managers to create value for different customer segments. Covers the necessary concepts to evaluate and select go-to market strategies in order to capitalize on the ubiquity of modern customers.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGP 415 – Climate Risks & Opportunities (1 unit)**

*Course Description:* Provide a working knowledge of the risks and opportunities arising from climate change and climate policy for businesses.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGP 415V – Business Law (3 units)**

*Course Description:* Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 215, MGP 215, or MGB 215.

*Grade Mode:* Letter.

**MGP 416 – Topics in Private Equity (1 unit)**

This version has ended; see updated course, below.

*Course Description:* Focuses on the finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies.

*Prerequisite(s):* MGP 205 or MGT 205 or MGB 205.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGP 416 – Topics in Private Equity and Mergers & Acquisitions (2 units)**

*Course Description:* Focuses on the finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies.

*Prerequisite(s):* MGP 205 (can be concurrent) or MGT 205 (can be concurrent) or MGB 205 (can be concurrent).

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**MGP 419 – Business Strategy Consulting Skills (1 unit)**

*Course Description:* Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.

*Learning Activities:* Lecture 5 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGP 419V – Business Strategy Consulting Skills (1 unit)**

*Course Description:* Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 419, MGP 419, or MGB 419.

*Grade Mode:* Letter.

**MGP 423 – Leader as Coach: An Introduction to Coaching Skills for Leaders (1 unit)**

*Course Description:* Introduces the fundamental coaching skills and coaching models that leaders can apply in everyday interactions with their team and colleagues in order to build trust, overcome challenges and help others discover their own full potential.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGP 423V – Power & Influence in Management (3 units)**

*Course Description:* Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.

*Prerequisite(s):* MGT 201A or MGP 201A or MGB 201A.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 223, MGP 223, MGB 223, or MGV 223V.

*Grade Mode:* Letter.

**MGP 426 – The Business of Healthcare (1 unit)**

*Course Description:* Intended to provide an overall understanding of the unique business aspects of the healthcare industry.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program (Business Administration-Working Professional, Business Administration-Bay Area, Business Administration-Full-Time).

*Grade Mode:* Letter.

**MGP 429 – Detection & Prevention of Asset Misappropriation Fraud in the Workplace (1 unit)**

*Course Description:* Discusses the fundamentals of fraud detection and prevention in the workplace. Learn the major schemes involving workplace fraud, how management can detect fraud and what policies and procedures can be implemented to prevent fraud.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGP 431 – Project Management (1 unit)**

*Course Description:* Students learn project management; including project scope, project planning, milestones and project closing. Important themes include leadership, team dynamics, storytelling/creating a narrative, communication, and conflict management.

*Learning Activities:* Lecture 10 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGP 432 – Project Management with Applications in Healthcare (1 unit)**

*Course Description:* Focuses on the heart of healthcare administration and how project management can be applied as a key lever to increase efficiency, decrease costs and improve the patient experience.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGP 432V – Project Management with Applications in Healthcare (1 unit)**

*Course Description:* Focuses on the heart of healthcare administration and how project management can be applied as a key lever to increase efficiency, decrease costs and improve the patient experience.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 432, MGP 432, or MGB 432.

*Grade Mode:* Letter.

**MGP 433 – Corporate Social Responsibility (1 unit)**

*Course Description:* Learn practical information that will help students understand the basics of designing, managing and evaluating an effective CSR program. Expose students to a basic set of CSR issues in the context of cross-purpose business challenges and then focus on the analysis and critical decisions that managers must make to move their business and their social agenda forward.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGP 435 – Data Wrangling (1 unit)**

*Course Description:* Develop practical skills to pre-process data. Tidied raw data can then be used for downstream data analysis, modeling, and visualization.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGP 436 – Introduction to Derivative Securities (1 unit)**

*Course Description:* Introduction to derivative securities and other forms of financial innovations.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGP 437 – Healthcare Analytics (1 unit)**

*Course Description:* Introduction to advanced analytics framework, key Artificial Intelligence & Machine Learning concepts, and modeling techniques towards solving high-value and high-impact healthcare business problems.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Grade Mode:* Letter.

**MGP 437V – Healthcare Analytics (1 unit)**

*Course Description:* Introduction to advanced analytics framework, key Artificial Intelligence & Machine Learning concepts, and modeling techniques towards solving high-value and high-impact healthcare business problems.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken MGT 437, MGP 437, or MGB 437.

*Grade Mode:* Letter.

**MGP 440 – Integrated Management Project (6 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for real-world clients. Students learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Project 3 hour(s).

*Enrollment Restriction(s):* Open to students in the MBA Program (SMBE, SMBB, SMBA).

*Grade Mode:* Letter.

**MGP 440A – Integrated Management Project (6 units)**

This version has ended; see updated course, below.

*Course Description:* Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Restricted to full-time MBA students.

*Grade Mode:* Letter.

**MGP 440A – Integrated Management Project (6 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for international business clients. Learn practical consulting skills while clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Restricted to full-time MBA students.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**MGP 440B – Integrated Management Project (3 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Project 3 hour(s).

*Enrollment Restriction(s):* Restricted to full-time MBA students.

*Grade Mode:* Letter.

**MGP 440C – Integrated Management Project Lead (1 unit)**

*Course Description:* Integrated Management Project Team leader.

*Learning Activities:* Project 1 hour(s).

*Grade Mode:* Letter.

**MGP 440S – Integrated Management Simulation (4 units)**

*Course Description:* Apply theory and concepts from marketing, finance, organizational behavior, accounting, and strategy in order to manage a simulated corporation.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MGP 441V – New Product Development (3 units)**

*Course Description:* State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.

*Prerequisite(s):* MGT 204 or MGP 204 or MGB 204.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGP 443 – Customer Analytics (3 units)**

*Course Description:* Teaches how to use customer analytics to learn about and market to individual customers. Examines the different types of data analytics and how they fit into the customer relationship management world.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* No open for credit for students who have taken

MGT 443V, MGP 443V or MGB 443V.

*Grade Mode:* Letter.

**MGP 443V – Customer Analytics (3 units)**

*Course Description:* Teaches students how to use customer analytics to learn about and market to individual customers. Examines the different types of data analytics and how they fit into the customer relationship management world.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* No open for credit for students who have taken

MGT 443, MGP 443 or MGB 443.

*Grade Mode:* Letter.

**MGP 445Y – Product Management (4 units)**

*Course Description:* Overview of the requirements, issues, and tools involved in marketing of products and services via lectures, case studies, and a hands-on, quarter-long competitive simulation.

*Prerequisite(s):* MGT 404 or MGP 404 or MGB 404.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Lecture 2 hour(s).

*Credit Limitation(s):* Not open for students who have taken MGV 445V.

*Grade Mode:* Letter.

**MGP 448 – Practicum for Marketing Strategies (1 unit)**

*Course Description:* Provides opportunities to apply the concepts covered in the Marketing Strategies class through a group project involving the analysis of strategic marketing decisions based on business-related issues, simulation and modeling.

*Prerequisite(s):* MGP 248.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGP 448V – Marketing Strategies (3 units)**

*Course Description:* Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.

*Prerequisite(s):* (MGT 202A or MGP 202A or MGB 202A); (MGT 204 or MGP 204 or MGB 204).

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Repeat Credit:* Not open for credit to students who have taken MGT 248,

MGP 248, MGB 248, or MGV 248V.

*Grade Mode:* Letter.

**MGP 450 – Practicum for Technology Competition & Strategy (1 unit)**

*Course Description:* In-depth practicum project course. Apply theories, concepts, and models, learned in MGP 250 to a real-world business problem, through data collection, data analysis, simulation, modeling and post-model interpretation.

*Prerequisite(s):* MGP 250.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in MBA program.

*Grade Mode:* Letter.

**MGP 452 – Managing for Operational Excellence (4 units)**

*Course Description:* Explore the management of operations as applied to manufacturing, as well as services provided both inside & outside the organization. Develop an understanding of how uncertainty affects planning & delivery by looking at fundamental models of operations.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken

MGT 252, MGP 252, MGB 252 or MGV 252V.

*Grade Mode:* Letter.

**MGP 452Y – Managing for Operational Excellence (4 units)**

*Course Description:* Explore the management of operations as applied to manufacturing, as well as services provided both inside & outside the organization. Develop an understanding of how uncertainty affects planning & delivery by looking at fundamental models of operations.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 252, MGP 252, MGB 252, MGV 252V, MGT 452, MGP 452 or MGB 452.

*Grade Mode:* Letter.

**MGP 454A – Causal Inference and Statistical Experiments (2 units)**

*Course Description:* Surveys causal inference methods with applications in business settings, especially marketing. Covers both primary data approaches such as A/B testing and secondary data approaches such as difference-in-differences.

*Prerequisite(s):* MGT 403A or MGP 403A or MGB 403A.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MGP 454B – Marketing Analytics (2 units)**

*Course Description:* Surveys a variety of marketing analytics applications, training students to identify (i) what questions data can answer, and, conversely, (ii) what data is needed to answer a question.

*Prerequisite(s):* MGT 454A or MGP 454A or MGB 454A.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MGP 460A – Corporate Finance: Fundamentals (2 units)**

*Course Description:* Study valuation techniques in applied settings, study a variety of investment decisions, and analyze how capital structure considerations play a role in firm's investment policies.

*Prerequisite(s):* MGT 205 or MGP 205 or MGB 205.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 260, MGP 260 or MGB 260.

*Grade Mode:* Letter.

**MGP 460B – Corporate Finance: Advanced Topics (2 units)**

*Course Description:* Advanced course in corporate finance that builds on 460A, with an aim to extend knowledge of the theory and practice of corporate finance.

*Prerequisite(s):* MGT 460A or MGP 460A or MGB 460A.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not open for students who have taken MGT, MGP or MGB 260.

*Grade Mode:* Letter.

**MGP 467 – Practicum for Teams & Technology (1 unit)**

*Course Description:* Groups investigate the performance, creativity, conflict, information sharing, and leadership behaviors of a real world team. Provide consulting advice to the team, which not only gives analytic skills, but also builds presentation skills.

*Prerequisite(s):* MGP 267.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGP 467V – Teams & Technology (3 units)**

*Course Description:* Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager; imparting interpersonal skills for implementing effective strategies; understanding how technological change affects team processes.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 267, MGP 267, MGB 267, or MGV 267V.

*Grade Mode:* Letter.

**MGP 468 – Articulation & Critical Thinking (4 units)**

*Course Description:* Public speaking, business writing, efficient and critical thinking about business challenges, and defining a personal code of ethics to shape actions and decisions.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 268, MGP 268, MGB 268 or MGV 268V.

*Grade Mode:* Letter.

**MGP 468Y – Articulation & Critical Thinking (4 units)**

*Course Description:* Public speaking, business writing, efficient and critical thinking about business challenges, and defining a personal code of ethics to shape actions and decisions.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 268, MGP 268, MGB 268, MGV 268V, MGT 468, MGP 468 or MGB 468.

*Grade Mode:* Letter.

**MGP 469 – Practicum for Business Intelligence Technologies (1 unit)**

*Course Description:* Projects applying concepts learned in Business Intelligence Technologies to real business problems.

*Prerequisite(s):* MGP 269.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGP 490 – Topics in Business (1 unit)**

*Course Description:* Provides opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses.

*Prerequisite(s):* Consent of instructor. Sponsorship of a GSM Academic Senate faculty member; approval of graduate advisor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students in the MBA Program (SMBA, SMBB, SMBE).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 490A – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such as business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGP 490B – Topics in General Management-Extended (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such business writing, management, organizational behavior, business communications, development, finance and workplace processes.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGP 490BV – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Web Virtual Lecture 2 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Letter.

**MGP 490V – Topics in General Management (3 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in MGT 201A and MGT 201B, or current business interest topics in fields of business writing, business communications, development, or workplace processes.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MGP 492V – Topics in Finance (2 units)**

*Course Description:* Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques.  
*Learning Activities:* Web Virtual Lecture 2 hour(s).  
*Repeat Credit:* May be repeated for credit when the topic differs; students can take this course repeatedly.  
*Grade Mode:* Letter.

### **MGP 493V – Topics in Marketing (3 units)**

*Course Description:* Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hi-tech marketing, advertising, sales promotions, marketing through the Web.  
*Learning Activities:* Web Virtual Lecture 3 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Letter.

### **MGP 498 – Directed Group Study Management Practicum (1-12 units)**

*Course Description:* Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses.  
*Prerequisite(s):* Consent of instructor. Sponsorship of a GSM Academic Senate faculty member; approval of graduate advisor.  
*Learning Activities:* Project.  
*Repeat Credit:* May be repeated 6 unit(s).  
*Grade Mode:* Satisfactory/Unsatisfactory only.

### **MGP 499 – Directed Individual Study Management Practicum (1-12 units)**

*Course Description:* Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other Graduate School of Management courses.  
*Prerequisite(s):* Consent of instructor. Sponsorship of a Graduate School of Management Academic Senate faculty member; approval of graduate advisor.  
*Learning Activities:* Project.  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Management; Working Professional Bay Area (MGB)**

Graduate School of Management

### **MGB 200A – Financial Accounting (3 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.  
*Prerequisite(s):* Graduate student in the Graduate School of Management.  
*Learning Activities:* Lecture 3 hour(s).  
*Grade Mode:* Letter.

### **MGB 200B – Managerial Accounting (3 units)**

*Course Description:* Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations.

*Prerequisite(s):* MGT 200A or MGB 200A or MGP 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGB 201A – The Individual & Group Dynamics (3 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGB 201B – Organizational Strategy & Structure (3 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Prerequisite(s):* Completion of first year courses in Graduate School of Management or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Grade Mode:* Letter.

### **MGB 202A – Markets & The Firm (3 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

### **MGB 202B – Business, Government, & the International Economy (3 units)**

*Course Description:* Examines the influence of government and international factors on business. Topics include distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance.

*Prerequisite(s):* MGV 202AV or MGT 202A or MGP 202A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 203A – Data Analysis for Managers (3 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Prerequisite(s):* Graduate student in the Graduate School of Management MBA program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 203B – Forecasting & Managerial Research Methods (3 units)**

*Course Description:* Practical statistical methods for managerial decision making covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy.

*Prerequisite(s):* MGT 203A or MGP 203A or MGB 203A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 204 – Marketing Management (3 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 205 – Financial Theory & Policy (3 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Prerequisite(s):* Graduate student in the Graduate School of Management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 206 – Decision Making & Management Science (3 units)**

*Course Description:* Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach. Emphasizes how structured modeling techniques, probability forecasts, simulations, and computer optimization models are used in the overall process of making decisions in an uncertain environment.

*Prerequisite(s):* Graduate student in the Graduate School of Management MBA program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 207 – Management Information Systems (3 units)**

*Course Description:* Introduction to computer programming and data handling skills. Use of computer in organizations, emphasis on managerial aspects of computing. Standard and nonstandard uses of data files, centralization versus decentralization of computing, office automation, computer security.

*Prerequisite(s):* Graduate Student or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 215 – Business Law (3 units)**

*Course Description:* Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

*Prerequisite(s):* Completion of administration core requirements or petition with consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 216 – Managing Professionals, Budgets, Controls & Ethics (3 units)**

*Course Description:* Performance measures, budgetary controls and ethical pressures which occur at middle management levels in service-type operations. Addresses such organizations as engineering, medical groups, law offices, management consultants.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 220 – Management of Social Networks (3 units)**

*Course Description:* Principles and applications of social network theory: coordinating divergent interests to create value for individuals and organizations. Emphasis on conceptual models, web-based diagnostic tools, and practical applications.

*Prerequisite(s):* MGB 201A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Grade Mode:* Letter.

**MGB 223 – Power & Influence in Management (3 units)**

*Course Description:* Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A; consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

## **MGB 224 – Managing People in High-Performance Organizations (3 units)**

*Course Description:* Strategic approach to the management of people within organization. Analyze employment systems' fit with firms' environments and strategies. Explore consequences of choices firms make in managing people; decisions as to selection, performance evaluation, compensation, and other management policies and practices.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Credit Limitation(s):* Not open to students who have taken MGT 224 or MGP 224.

*Grade Mode:* Letter.

## **MGB 234 – Pricing (3 units)**

*Course Description:* Combines lectures, cases and homework to teach students tools and skills necessary to analyze pricing situations, make pricing decisions, and implement them, in a systematic manner.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

## **MGB 239 – Digital Marketing (3 units)**

*Course Description:* Equips students for a career in digital marketing and social media. Topics include online advertising, search engine optimization, interactive mktg, online privacy issues, e-commerce, social influence, social network theory, measurement of social influence, integrating social and traditional media.

*Prerequisite(s):* MGB 204 or MGT 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **MGB 240 – Management Policy & Strategy (3 units)**

*Course Description:* Examines the scope of missions, objectives strategies, policies, structures, measurements and incentives which bear on the management of an organization. Real client organizations, in the private and public sectors, are assigned to student teams as the subjects of study.

*Prerequisite(s):* First-year core courses of M.B.A. program.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 241 – New Product Development (3 units)**

*Course Description:* State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the Graduate School of Management.

*Grade Mode:* Letter.

## **MGB 242 – Marketing Communications (3 units)**

*Course Description:* Issues in designing a marketing communications strategy. Topics include mass and direct communications, institutional aspects of advertising, consumer behavior, evaluating ad effectiveness, determining ad budget, creative strategy, and use and abuse of promotions.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 243 – Customer Relationship Management (3 units)**

*Course Description:* Customer Relationship Management (CRM) is a management approach under which marketing activities are organized and measured around customers (rather than around brands.) This approach is appealing because customers, not brands, are those who make buying decisions.

*Prerequisite(s):* MGT 204 or MGB 204 or MGP 204.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to MBA students only.

*Grade Mode:* Letter.

## **MGB 244 – New & Small Business Ventures (3 units)**

*Course Description:* Student teams develop complete business plans for their own start-up ventures. Process includes: elevator pitch, business strategy, comprehensive bottoms-up financial projections, capital requirements, product differentiation, competitive, alliance, and go-to-market strategy development, investor presentation, and comprehensive written business plan.

*Prerequisite(s):* MGT 204 or MGP 204 or MGB 204.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 245 – Business Writing (3 units)**

*Course Description:* Techniques for sharpening writing skills are introduced, along with grammatical structure, word choice, and punctuation. Learn to develop styles that are pitch-perfect for given situations and to think strategically about each communication challenge in a management setting.

*Prerequisite(s):* Completion of first-year core courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to MBA students only.

*Grade Mode:* Letter.

## **MGB 246 – Negotiation & Team Building (3 units)**

*Course Description:* Basic theory of negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tricks, uncovering hidden agendas, brainstorming to extend Pareto frontier.

*Prerequisite(s):* MGB 205; MGB 202.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **MGB 247 – Customer Service as a Marketing Tool (3 units)**

*Course Description:* Understanding the distinct features of services, how to create value through service, methods of building strong relationships with customers, methods of measuring and building customer satisfaction, and measuring the financial impact of service improvement.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 248 – Marketing Strategies (3 units)**

*Course Description:* Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 204 or MGT 204 or MGB 204).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 249 – Marketing Research (3 units)**

*Course Description:* Addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, research design, information collection, measuring instruments, data analysis, and marketing research applications.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 203A or MGB 203A or MGT 203A); (MGT 204 or MGB 204 or MGP 204).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 250 – Technology Competition & Strategy (3 units)**

*Course Description:* Why is software typically so defective? Why do many firms in the IT industry give away their best products free? Helps analyze questions like these by modeling competition and strategy in the network technology and information industries.

*Prerequisite(s):* (MGT 202A or MGV 202AV or MGP 202A); (MGP 203A or MGB 203A or MGT 203A).

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

## **MGB 251 – Management of Innovation (3 units)**

*Course Description:* Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics.

*Prerequisite(s):* MGT 201A or MGB 201A or MGP 201A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 252 – Managing for Operational Excellence (3 units)**

*Course Description:* Explores the management of operations as applied to manufacturing as well as services provided both inside and outside the organization. Develop an understanding of how uncertainty affects planning and delivery by looking at fundamental models of operations.

*Prerequisite(s):* MGB 203A or MGP 203A or MGT 203A.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to students in the Graduate School of Management.

*Grade Mode:* Letter.

## **MGB 253 – Corporate Social Responsibility (3 units)**

*Course Description:* Develop a thought process and approach to corporate social responsibility that students will be able to build on during their post-school leadership roles, whether as corporate executives, entrepreneurs, or NGO leaders.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 255 – Entrepreneurship & Venture Investment**

### **Clinic (3 units)**

*Course Description:* Provides the necessary analytical and design tools to create business ideas and refine business models based on emerging technologies. Students learn to work closely in small teams to synthesize technical, strategic, and marketing needs into designs for new ventures.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

## **MGB 258 – Mergers & Acquisitions (3 units)**

*Course Description:* Focuses on the market for corporate acquisitions and restructuring activity. Topics include: sources of value creation; takeovers; anti-takeover provisions; bidding strategies; use of leverage in buyouts; regulatory risk and hurdles; and, valuation approaches for highly leveraged transactions.

*Prerequisite(s):* MGB 205.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 259 – Banking & the Financial System (3 units)**

*Course Description:* Analyzes the role of financial markets and institutions in allocating capital. Focuses on: bank lending; debt securities; financial market innovations; regulation; functions of commercial banks and other financial intermediaries. Utilizes case studies.

*Prerequisite(s):* MGP 205 or MGT 205; consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MGB 260 – Corporate Finance (3 units)**

*Course Description:* Focuses on planning, acquiring, and managing a company's financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure.

*Prerequisite(s):* (MGT 200A or MGB 200A or MGP 200A); (MGP 202A or MGV 202AV or MGT 202A); (MGT 205 or MGB 205 or MGP 205).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 261 – Investment Analysis (3 units)**

*Course Description:* Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.

*Prerequisite(s):* (MGT 203A or MGB 203A or MGP 203A); (MGP 205 or MGT 205 or MGB 205).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 262 – Money & Security Markets (3 units)**

*Course Description:* Examines how money and securities markets are organized; how public agencies, businesses, others obtain and invest funds in those markets. Relationship between interest rates, monetary policy, government's role in improving capital markets, approaches to assessing changes in regulation of specific markets.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 263 – Derivative Securities (3 units)**

*Course Description:* Behavior of options, futures, and other derivative securities markets and how public agencies, business and others use those markets. Trading strategies involving options, swaps, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods.

*Prerequisite(s):* (MGT 203A or MGB 203A or MGP 203A); (MGP 205 or MGT 205 or MGB 205).

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Grade Mode:* Letter.

**MGB 264 – Business Taxation (3 units)**

*Course Description:* Analysis of the impact of business taxation on investment, production, and finance decisions. Discussion of the relationship between business organization and tax liability. Not intended for tax specialists.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 265 – Technology Finance & Valuation (3 units)**

*Course Description:* Venture capital finance and the related practice of research and development finance. Application of finance tools and framework to the world of venture capital and financing of projects in high-growth industries.

*Prerequisite(s):* MGT 205 or MGB 205 or MGP 205.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program; not open to students who have taken MGV 265V.

*Grade Mode:* Letter.

**MGB 266 – International Finance (3 units)**

*Course Description:* Studies fixed and floating exchange-rate systems. Topics include determinants of a nation's balance of international payments; macroeconomic interdependence of nations under various exchange-rate regimes and its implications for domestic stabilization policies; and the international coordination of monetary and stabilization policies.

*Prerequisite(s):* MGT 205 or MGB 205 or MGP 205; Or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 267 – Teams & Technology (3 units)**

*Course Description:* Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager; imparting interpersonal skills for implementing effective strategies; understanding how technological change affects team processes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to working professional MBA students.

*Grade Mode:* Letter.

**MGB 268 – Articulation & Critical Thinking (3 units)**

*Course Description:* With commitment to this course, students will become competent public speakers, write well at a level expected in business, think efficiently and critically about business challenges and have a useful personal code of ethics to shape their actions and decisions. No student may repeat course for credit.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

**MGB 269 – Machine Learning with Python (3 units)**

*Course Description:* Introduction to machine learning methods covering association rules, clustering, classification, and numeric prediction. Hands-on machine learning skills with Python. Big data technologies. Business applications.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program; exemptions may be granted for students in the Online MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGV 469V.

*Grade Mode:* Letter.

**MGB 270 – Corporate Financial Reporting (3 units)**

*Course Description:* Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers.

*Prerequisite(s):* MGT 200A or MGP 200A or MGB 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 271 – Strategic Cost Management (3 units)**

*Course Description:* Theoretical frameworks and associated techniques for using organizational design and cost management to achieve a sustainable, profitable cost structure. Topics include: target costing, process design for low cost, total cost of ownership, cost of customers, implementing structural change, and incentives.

*Prerequisite(s):* MGT 202A or MGP 202A or MGV 202AV.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGB 272 – Evaluation of Financial Information (3 units)**

*Course Description:* Studies how investors, creditors, others use accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed.

*Prerequisite(s):* MGT 200A or MGP 200A or MGB 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 273 – Accounting & Reporting for Government Nonprofit Entities (3 units)**

*Course Description:* Concepts, methods, and uses of accounting and financial reporting by governmental and nonprofit entities. Introduction to budgeting and performance evaluation, and accounting for entities such as hospitals, universities, and welfare agencies.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 274 – Corporate Governance (3 units)**

*Course Description:* Discusses how corporations can better operate in the interests of shareholders and public. Directly relevant to managers, consultants in compensation and incentives, staff working on mergers and acquisitions, corporate regulators, shareholder rights activists, and board members.

*Prerequisite(s):* Full-time MBA students or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 276 – Real Estate, Finance & Development (3 units)**

*Course Description:* Focus on single family, attached, detached, multi-family, and light commercial development. Study factors that make up successful real estate developments. Consider financial aspects involved in land acquisition, land development, construction, and project lending.

*Prerequisite(s):* (MGT 205 or MGP 205 or MGB 205); (MGT 201A or MGB 201A or MGP 201A).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 281 – Systems Analysis & Design (3 units)**

*Course Description:* Design and specification of computer-based information systems. Applications systems development life cycle, use requirements and feasibility assessment, logical and physical design, program development and testing, conversion and implementation.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 282 – Supply Chain Management (3 units)**

*Course Description:* Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive.

*Prerequisite(s):* MGT 203A or MGB 203A or MGP 203A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGB 284 – Applied Linear Models for Management (3 units)**

*Course Description:* Covers regression, analysis of variance, and multivariate analysis. Topics will focus on applications to management and policy problems.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 285 – Time Series Analysis & Forecasting (3 units)**

*Course Description:* Considers application of time series methods to evaluation and forecasting problems. Covers univariate and multivariate ARIMA models and transfer function models. Applications will be in such areas as economics, finance, budgeting, program evaluation, and industrial process control.

*Prerequisite(s):* MGB 203B or MGT 203B or MGP 203B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 286 – Telecommunications & Computer Networks (3 units)**

*Course Description:* Communication system components; common carrier services; design and control of communications networks; network management and distributed environment; local area networks; data security in computer networks.

*Prerequisite(s):* MGB 280.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 287 – Business Database & Database Marketing (3 units)**

*Course Description:* Practical introduction to fundamental principles of database management systems and database marketing. Database design. SQL queries. Concepts of database marketing, data warehouse, data visualization and big data analytics.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 290 – Topics in General Management (3 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in MGB 201A and MGB 201B, or current business interest topics in fields of business writing, business communications, development, or workplace processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 291 – Topics in Organizational Behavior (3 units)**

*Course Description:* Advanced topics in social psychology and sociology of organizations. Varied topics to cover more extensively issues discussed in MGB 201A and MGB 201B, or current business interest topics in fields of organization design, strategy, development, or workplace processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 292 – Topics in Finance (3 units)**

*Course Description:* Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 293 – Topics in Marketing (3 units)**

*Course Description:* Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hitech marketing, advertising, sales promotions, marketing through the Web.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 294 – Topics in Accounting (3 units)**

*Course Description:* Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 295 – Topics in Information Technology (3 units)**

*Course Description:* Applications of information technology to management and management of information technology. Adaptation to the dynamic nature of the field.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 296 – Topics in Technology Management (3 units)**

*Course Description:* Cyclical nature of innovation and technological change, features of innovative firms and industries, national innovation systems, and impact of information technologies on innovation processes.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 297 – Topics in International Management (3 units)**

*Course Description:* Broader environment in which U.S. firms and their foreign competitors operate. Integration of material from other topics courses (marketing, strategy, finance, accounting, information technology, technology management) into the international setting.

*Prerequisite(s):* Completion of all first-year graduate courses at the Graduate School of Management or the equivalent.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGB 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGB 400A – Financial Accounting (4 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Credit Limitation(s):* Not available for credit for students who have taken MGT 200A, MGP 200A, MGB 200A, MGV 200AV or MGV 400AV.

*Grade Mode:* Letter.

**MGB 400AY – Financial Accounting (4 units)**

*Course Description:* Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, consideration of the usefulness of financial statements in the analysis of a corporation's operations.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Credit Limitation(s):* Not available for credit for students who have taken MGT 200A, MGP 200A, MGB 200A, MGV 200AV, MGV 400AV, MGT 400A, MGP 400A or MGB 400A.

*Grade Mode:* Letter.

**MGB 401A – The Individual & Group Dynamics (4 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201A, MGP 201A, MGB 201A or MGV 201AV.

*Grade Mode:* Letter.

## **MGB 401AY – Individual & Group Dynamics (4 units)**

*Course Description:* Examines basic psychological and social psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Only open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201A, MGP 201A, MGB 201A, MGV 201AV, MGT 401A, MGP 401A or MGB 401A.

*Grade Mode:* Letter.

## **MGB 401B – Organizational Strategy & Structure (4 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201B, MGP 201B, MGB 201B or MGV 201BV.

*Grade Mode:* Letter.

## **MGB 401BY – Organizational Strategy & Structure (4 units)**

*Course Description:* Strategic management of organizations, including analysis of industries, firm resources and capabilities and corporate strategy. Strategy formulation, implementation and strategic decision-making. Firm and industry life cycles and change. Analysis of organizational design and structure including differentiation and integration.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 201B, MGP 201B, MGB 201B, MGV 201BV, MGT 401B, MGP 401B or MGB 401B.

*Grade Mode:* Letter.

## **MGB 402A – Markets & the Firm (4 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 202A, MGP 202A, MGB 202A or MGV 202AV.

*Grade Mode:* Letter.

## **MGB 402AY – Markets & the Firm (4 units)**

*Course Description:* Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to MBA students only.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 202A, MGP 202A, MGB 202A, MGV 202AV, MGT 402A, MGP 402A or MGB 402A.

*Grade Mode:* Letter.

## **MGB 403A – Data Analysis for Managers (4 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit for students who have taken MGT 203A, MGP 203A, MGB 203A or MGV 403AV.

*Grade Mode:* Letter.

## **MGB 403AY – Data Analysis for Managers (4 units)**

*Course Description:* Introduction to statistics and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 203A, MGP 203A, MGB 203A, MGV 403AV, MGT 403A, MGP 403A or MGB 403A.

*Grade Mode:* Letter.

## **MGB 404 – Marketing Management (4 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 204, MGP 204, MGB 204 or MGV 204V.

*Grade Mode:* Letter.

## **MGB 404Y – Marketing Management (4 units)**

*Course Description:* Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 204, MGP 204, MGB 204, MGV 204V, MGT 404, MGP 404 or MGB 404.

*Grade Mode:* Letter.

**MGB 405 – Financial Theory & Policy (4 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit for students who have taken MGT 205, MGP 205, MGB 205 or MGV 205V.

*Grade Mode:* Letter.

**MGB 405Y – Financial Theory & Policy (4 units)**

*Course Description:* Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management and hedging.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 205, MGP 205, MGB 205, MGV 205V, MGT 405, MGP 405 or MGB 405.

*Grade Mode:* Letter.

**MGB 406A – Decision Analytics: Spreadsheet Based (2 units)**

*Course Description:* Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 206, MGP 206, MGB 206 or MGV 206V.

*Grade Mode:* Letter.

**MGB 406B – Decision Analytics: Scalable (2 units)**

*Course Description:* Builds on concepts learned in 406A to develop techniques for describing and implementing models that can scale in all dimensions.

*Prerequisite(s):* MGT 406A or MGP 406A or MGB 406A.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 206, MGP 206, MGB 206 or MGV 206V.

*Grade Mode:* Letter.

**MGB 407 – Storytelling for Leadership (1 unit)**

*Course Description:* Internalize the fundamental principles behind stories that educate, influence, motivate, inspire, persuade and connect.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGB 408 – The Business of the Media (1 unit)**

*Course Description:* Focuses on the media industries and how emerging digital technologies are disrupting the way media consumption, distribution and business models work. Will highlight the economics of several media, both news and entertainment.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGB 408V – The Business of the Media (1 unit)**

*Course Description:* Focuses on the media industries and how emerging digital technologies are disrupting the way media consumption, distribution and business models work. Will highlight the economics of several media, both news and entertainment.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Grade Mode:* Letter.

**MGB 409 – Managing Multi-Asset Class Investment Portfolios (1 unit)**

*Course Description:* Examines top down management of multi-asset class portfolios. Topics include bonds, hedge funds, private equity, real estate, commodities, endowments, return generation, performance analysis, credit cycles, financial crises, manager selection, investment policy, and investment careers. Student teams present endowment portfolio recommendations.

*Prerequisite(s):* MGV 202AV; MGB 203A; MGB 205.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGB 412 – International Marketing (1 unit)**

*Course Description:* Basic concepts of international marketing. Understanding and managing heterogeneous, dynamic, and interdependent environments across countries. How to develop and implement an international marketing strategy: where and how to compete, how to adapt your marketing mix.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGB 414 – Multi-Channel Marketing (1 unit)**

*Course Description:* Multi-channel marketing strategies empower managers to create value for different customer segments. Covers the necessary concepts to evaluate and select go-to market strategies in order to capitalize on the ubiquity of modern customers.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGB 415 – Climate Risks & Opportunities (1 unit)**

*Course Description:* Provide a working knowledge of the risks and opportunities arising from climate change and climate policy for businesses.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MGB 415V – Business Law (3 units)**

*Course Description:* Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not available for credit for students who have taken MGT 215, MGP 215, MGB 215.

*Grade Mode:* Letter.

## **MGB 416 – Topics in Private Equity (1 unit)**

This version has ended; see updated course, below.

*Course Description:* Focuses on the finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies.

*Prerequisite(s):* MGB 205 or MGP 205 or MGT 205.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

## **MGB 416 – Topics in Private Equity and Mergers & Acquisitions (2 units)**

*Course Description:* Focuses on the finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies.

*Prerequisite(s):* MGB 205 (can be concurrent) or MGP 205 (can be concurrent) or MGT 205 (can be concurrent).

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

## **MGB 419 – Business Strategy Consulting Skills (1 unit)**

*Course Description:* Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.

*Learning Activities:* Lecture 5 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

## **MGB 419V – Business Strategy Consulting Skills (1 unit)**

*Course Description:* Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit for students who have taken MGT 419, MGP 419, or MGB 419.

*Grade Mode:* Letter.

## **MGB 423 – Leader as Coach: An Introduction to Coaching Skills for Leaders (1 unit)**

*Course Description:* Introduces the fundamental coaching skills and coaching models that leaders can apply in everyday interactions with their team and colleagues in order to build trust, overcome challenges and help others discover their own full potential.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

## **MGB 423V – Power & Influence in Management (3 units)**

*Course Description:* Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), social psychological processes (including commitment), the construction of meaning, and ethics.

*Prerequisite(s):* MGT 201A or MGP 201A or MGB 201A.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 223, MGP 223, MGB 223, or MGV 223V.

*Grade Mode:* Letter.

## **MGB 426 – The Business of Healthcare (1 unit)**

*Course Description:* Intended to provide an overall understanding of the unique business aspects of the healthcare industry.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program (Business Administration-Working Professional, Business Administration-Bay Area, Business Administration-Full-Time).

*Grade Mode:* Letter.

## **MGB 429 – Detection & Prevention of Asset Misappropriation Fraud in the Workplace (1 unit)**

*Course Description:* Discusses the fundamentals of fraud detection and prevention in the workplace. Learn the major schemes involving workplace fraud, how management can detect fraud and what policies and procedures can be implemented to prevent fraud.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MBA program.

*Grade Mode:* Letter.

## **MGB 431 – Project Management (1 unit)**

*Course Description:* Students learn project management; including project scope, project planning, milestones and project closing. Important themes include leadership, team dynamics, storytelling/creating a narrative, communication, and conflict management.

*Learning Activities:* Lecture 10 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Grade Mode:* Letter.

## **MGB 432 – Project Management with Applications in Healthcare (1 unit)**

*Course Description:* Focuses on the heart of healthcare administration and how project management can be applied as a key lever to increase efficiency, decrease costs and improve the patient experience.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

## **MGB 432V – Project Management with Applications in Healthcare (1 unit)**

*Course Description:* Focuses on the heart of healthcare administration and how project management can be applied as a key lever to increase efficiency, decrease costs and improve the patient experience.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 432, MGP 432, or MGB 432.

*Grade Mode:* Letter.

### **MGB 433 – Corporate Social Responsibility (1 unit)**

*Course Description:* Learn practical information that will help students understand the basics of designing, managing and evaluating an effective CSR program. Expose students to a basic set of CSR issues in the context of cross-purpose business challenges and then focus on the analysis and critical decisions that managers must make to move their business and their social agenda forward.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

### **MGB 435 – Data Wrangling (1 unit)**

*Course Description:* Develop practical skills to pre-process data. Tidied raw data can then be used for downstream data analysis, modeling, and visualization.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

### **MGB 436 – Introduction to Derivative Securities (1 unit)**

*Course Description:* Introduction to derivative securities and other forms of financial innovations.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

### **MGB 437 – Healthcare Analytics (1 unit)**

*Course Description:* Introduction to advanced analytics framework, key Artificial Intelligence & Machine Learning concepts, and modeling techniques towards solving high-value and high-impact healthcare business problems.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program only.

*Grade Mode:* Letter.

### **MGB 437V – Healthcare Analytics (1 unit)**

*Course Description:* Introduction to advanced analytics framework, key Artificial Intelligence & Machine Learning concepts, and modeling techniques towards solving high-value and high-impact healthcare business problems.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken MGT 437, MGP 437, or MGB 437.

*Grade Mode:* Letter.

### **MGB 440 – Integrated Management Project (6 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for real-world clients. Students learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Project 3 hour(s).

*Enrollment Restriction(s):* Open to students in the MBA Program (SMBE, SMMB, SMBA).

*Grade Mode:* Letter.

### **MGB 440A – Integrated Management Project (6 units)**

This version has ended; see updated course, below.

*Course Description:* Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Restricted to full-time MBA students.

*Grade Mode:* Letter.

### **MGB 440A – Integrated Management Project (6 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for international business clients. Learn practical consulting skills while clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Restricted to full-time MBA students.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

### **MGB 440B – Integrated Management Project (3 units)**

*Course Description:* Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student's experience, insights, and work product.

*Prerequisite(s):* First-year core courses of MBA program.

*Learning Activities:* Project 3 hour(s).

*Enrollment Restriction(s):* Restricted to full-time MBA students.

*Grade Mode:* Letter.

### **MGB 440C – Integrated Management Project Lead (1 unit)**

*Course Description:* Integrated Management Project Team leader.

*Learning Activities:* Project 1 hour(s).

*Grade Mode:* Letter.

### **MGB 440S – Integrated Management Simulation (4 units)**

*Course Description:* Apply theory and concepts from marketing, finance, organizational behavior, accounting, and strategy in order to manage a simulated corporation.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

### **MGB 441V – New Product Development (3 units)**

*Course Description:* State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems.

*Prerequisite(s):* MGT 204 or MGP 204 or MGB 204.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Grade Mode:* Letter.

**MGB 443 – Customer Analytics (3 units)**

*Course Description:* Teaches how to use customer analytics to learn about and market to individual customers. Examines the different types of data analytics and how they fit into the customer relationship management world.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* No open for credit for students who have taken

MGT 443V, MGP 443V or MGB 443V.

*Grade Mode:* Letter.

**MGB 443V – Customer Analytics (3 units)**

*Course Description:* Teaches students how to use customer analytics to learn about and market to individual customers. Examines the different types of data analytics and how they fit into the customer relationship management world.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* No open for credit for students who have taken

MGT 443, MGP 443 or MGB 443.

*Grade Mode:* Letter.

**MGB 445Y – Product Management (4 units)**

*Course Description:* Overview of the requirements, issues, and tools involved in marketing of products and services via lectures, case studies, and a hands-on, quarter-long competitive simulation.

*Prerequisite(s):* MGT 404 or MGP 404 or MGB 404.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Lecture 2 hour(s).

*Credit Limitation(s):* Not open for students who have taken MGV 445V.

*Grade Mode:* Letter.

**MGB 448 – Practicum for Marketing Strategies (1 unit)**

*Course Description:* Provides opportunities to apply the concepts covered in the Marketing Strategies class through a group project involving the analysis of strategic marketing decisions based on business-related issues, simulation and modeling.

*Prerequisite(s):* MGB 248.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGB 448V – Marketing Strategies (3 units)**

*Course Description:* Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.

*Prerequisite(s):* (MGT 202A or MGP 202A or MGB 202A); (MGT 204 or MGP 204 or MGB 204).

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Repeat Credit:* Not open for credit to students who have taken MGT 248,

MGP 248, MGB 248, or MGV 248V.

*Grade Mode:* Letter.

**MGB 450 – Practicum for Technology Competition & Strategy (1 unit)**

*Course Description:* In-depth practicum project course. Apply theories, concepts, and models, learned in MGB 250 to a real-world business problem, through data collection, data analysis, simulation, modeling and post-model interpretation.

*Prerequisite(s):* MGB 250.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in MBA program.

*Grade Mode:* Letter.

**MGB 452 – Managing for Operational Excellence (4 units)**

*Course Description:* Explore the management of operations as applied to manufacturing, as well as services provided both inside & outside the organization. Develop an understanding of how uncertainty affects planning & delivery by looking at fundamental models of operations.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 252, MGP 252, MGB 252 or MGV 252V.

*Grade Mode:* Letter.

**MGB 452Y – Managing for Operational Excellence (4 units)**

*Course Description:* Explore the management of operations as applied to manufacturing, as well as services provided both inside & outside the organization. Develop an understanding of how uncertainty affects planning & delivery by looking at fundamental models of operations.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 252, MGP 252, MGB 252, MGV 252V, MGT 452, MGP 452 or MGB 452.

*Grade Mode:* Letter.

**MGB 454A – Causal Inference and Statistical Experiments (2 units)**

*Course Description:* Surveys causal inference methods with applications in business settings, especially marketing. Covers both primary data approaches such as A/B testing and secondary data approaches such as difference-in-differences.

*Prerequisite(s):* MGT 403A or MGP 403A or MGB 403A.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MGB 454B – Marketing Analytics (2 units)**

*Course Description:* Surveys a variety of marketing analytics applications, training students to identify (i) what questions data can answer, and, conversely, (ii) what data is needed to answer a question.

*Prerequisite(s):* MGT 454A or MGP 454A or MGB 454A.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MGB 460A – Corporate Finance: Fundamentals (2 units)**

*Course Description:* Course will study valuation techniques in applied settings, study a variety of investment decisions, and analyze how capital structure considerations play a role in firm's investment policies.

*Prerequisite(s):* MGT 205 or MGP 205 or MGB 205.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 260, MGP 260 or MGB 260.

*Grade Mode:* Letter.

**MGB 460B – Corporate Finance: Advanced Topics (2 units)**

*Course Description:* Advanced course in corporate finance that builds on 460A, with an aim to extend knowledge of the theory and practice of corporate finance.

*Prerequisite(s):* MGT 460A or MGP 460A or MGB 460A.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not open for students who have taken MGT 260, MGP260 or MGB 260.

*Grade Mode:* Letter.

**MGB 467 – Practicum for Teams & Technology (1 unit)**

*Course Description:* Groups investigate the performance, creativity, conflict, information sharing, and leadership behaviors of a real world team. Provide consulting advice to the team, which not only gives analytic skills, but also builds presentation skills.

*Prerequisite(s):* MGB 267.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGB 467V – Teams & Technology (3 units)**

*Course Description:* Theory and practice of managing teams with primary goals of: providing conceptual guidelines for analyzing and diagnosing group dynamics and determining strategic options as a manager; imparting interpersonal skills for implementing effective strategies; understanding how technological change affects team processes.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 267, MGP 267, MGB 267, or MGV 267V.

*Grade Mode:* Letter.

**MGB 468 – Articulation & Critical Thinking (4 units)**

*Course Description:* Public speaking, business writing, efficient and critical thinking about business challenges, and defining a personal code of ethics to shape actions and decisions.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MGT 268, MGP 268, MGB 268 or MGV 268V.

*Grade Mode:* Letter.

**MGB 468Y – Articulation & Critical Thinking (4 units)**

*Course Description:* Public speaking, business writing, efficient and critical thinking about business challenges, and defining a personal code of ethics to shape actions and decisions.

*Learning Activities:* Lecture 3 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the MBA program.

*Credit Limitation(s):* Not open for credit to students who have taken MGT 268, MGP 268, MGB 268, MGV 268V, MGT 468, MGP 468 or MGB 468.

*Grade Mode:* Letter.

**MGB 469 – Practicum for Business Intelligence Technologies (1 unit)**

*Course Description:* Projects applying concepts learned in Business Intelligence Technologies to real business problems.

*Prerequisite(s):* MGB 269.

*Learning Activities:* Project 1 hour(s).

*Enrollment Restriction(s):* Restricted to students in the MBA program.

*Grade Mode:* Letter.

**MGB 490 – Topics in Business (1 unit)**

*Course Description:* Provides opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses.

*Prerequisite(s):* Consent of instructor. Sponsorship of a GSM Academic Senate faculty member; approval of graduate advisor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students in the MBA Program (SMBA, SMBB, SMBE).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 490A – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such as business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGB 490B – Topics in General Management-Extended (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such business writing, management, organizational behavior, business communications, development, finance and workplace processes.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 490BV – Topics in Management (2 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in the MBA core such business writing, management, organizational behavior, business communications, development, and workplace processes.

*Learning Activities:* Web Virtual Lecture 2 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Letter.

**MGB 490V – Topics in General Management (3 units)**

*Course Description:* Advanced topics in general management. Varied topics to cover more extensively issues discussed in MGT 201A and MGT 201B, or current business interest topics in fields of business writing, business communications, development, or workplace processes.

*Learning Activities:* Web Virtual Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MGB 492V – Topics in Finance (2 units)**

*Course Description:* Contemporary and emerging issues in finance. Application of modern techniques of finance to business problems. Use of appropriate electronic database and research techniques.  
*Learning Activities:* Web Virtual Lecture 2 hour(s).  
*Repeat Credit:* May be repeated for credit when the topic differs; students can take this course repeatedly.  
*Grade Mode:* Letter.

**MGB 493V – Topics in Marketing (3 units)**

*Course Description:* Advanced topics in marketing, which may include marketing research, new product development, brand management, pricing, distribution management, service marketing, hi-tech marketing, advertising, sales promotions, marketing through the Web.  
*Learning Activities:* Web Virtual Lecture 3 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Letter.

**MGB 498 – Directed Group Study Management Practicum (1-12 units)**

*Course Description:* Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses.  
*Prerequisite(s):* Consent of instructor. Sponsorship of a GSM Academic Senate faculty member, and approval of graduate advisor.  
*Learning Activities:* Project.  
*Repeat Credit:* May be repeated 6 unit(s).  
*Grade Mode:* Satisfactory/Unsatisfactory only.

**MGB 499 – Directed Individual Study Management Practicum (1-12 units)**

*Course Description:* Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other Graduate School of Management courses.  
*Prerequisite(s):* Consent of instructor. Sponsorship of a Graduate School of Management Academic Senate faculty member and approval of graduate advisor.  
*Learning Activities:* Project.  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Satisfactory/Unsatisfactory only.

**Masters Preventive Veterinary Medicine (MPM)**

School of Veterinary Medicine

**MPM 200 – Introduction to Information Management for Epidemiologists (1 unit)**

*Course Description:* Introduction to practical application of epidemiological methods to solve problems involving population health data. Emphasis on using worksheet/database software tools for organizing, analyzing, reporting, and interpreting data. Ten, three-hour sessions.  
*Learning Activities:* Laboratory 1 hour(s).  
*Enrollment Restriction(s):* Restricted to students in the Master of Preventive Veterinary Medicine program.  
*Grade Mode:* Letter.

**MPM 201 – Emerging Issues at the Interface of Animal, Human, & Ecosystem Health (2.5 units)**

*Course Description:* Introduce one health topics emphasizing relationships between environmental, animal and human health. Topics include ecosystem change and impacts on animals and humans, cross-species disease transmission and approaches for addressing critical data gaps to inform ecosystem health and disease prevention.  
*Learning Activities:* Lecture 1 hour(s), Discussion 1.50 hour(s).  
*Enrollment Restriction(s):* Limited to 35 students.

*Grade Mode:* Letter.

**MPM 202 – Medical Statistics I (4 units)**

*Course Description:* Basic statistics in clinical, laboratory and population medicine: descriptive statistics; probability; binomial, Poisson, normal, t-, F-, and Chi-square distributions; sampling distributions; parameter estimation; hypothesis testing; elementary nonparametric methods, simple linear regression and correlation; life table construction and analysis.  
*Prerequisite(s):* MPVM or MPH standing or consent of instructor.  
*Learning Activities:* Lecture 15 hour(s), Laboratory 10 hour(s).  
*Enrollment Restriction(s):* Restricted to 80 students.  
*Grade Mode:* Letter.

**MPM 203 – Medical Statistics II (4 units)**

*Course Description:* Continuation of MPM 202. Analysis of variance in biomedical sciences; nonparametric methods; multiple regression; unconditional logistic regression; biomedical applications of statistical methods. Microcomputer applications in population medicine to reinforce principles that are taught in lecture. Required for students in the Preventive Veterinary Program Graduate Group (PVM) and the Masters of Public Health Program (MPH).

*Prerequisite(s):* MPM 202; or consent of instructor, or equivalent.  
*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).  
*Grade Mode:* Letter.

**MPM 204 – Medical Statistics III (4 units)**

*Course Description:* Continuation of MPM 203. Selecting the best regression equation, conditional logistic regression, Poisson regression, survival analysis, analysis of time dependent variation and trends. Microcomputer applications in population medicine to reinforce principles that are taught in lecture.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).  
*Grade Mode:* Letter.

**MPM 205 – Principles of Epidemiology (4 units)**

*Course Description:* Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance.

*Prerequisite(s):* MPM 202; or consent of instructor; an introductory statistics course.

*Learning Activities:* Lecture 4 hour(s).  
*Cross Listing:* EPI 205.  
*Grade Mode:* Letter.

**MPM 206 – Epidemiologic Study Design (4 units)**

*Course Description:* Builds on concepts presented in MPM 205. Concepts of epidemiologic study design (clinical trials, observational cohort studies, case control studies) introduced in MPM 205A are covered in more depth, using a problem-based format. Discussion of published epidemiologic studies.

*Prerequisite(s):* MPM 205; or consent of instructor.

*Learning Activities:* Lecture 30 hour(s), Discussion 9 hour(s), Laboratory 2 hour(s).

*Cross Listing:* EPI 206.

*Grade Mode:* Letter.

**MPM 207 – Applied Epidemiologic Problem Solving (1 unit)**

*Course Description:* Integration of epidemiologic and statistical methodology in a problem-solving approach to contemporary animal population health issues. Data validation and manipulation.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

**MPM 208 – Research Planning & Reporting I (2 units)**

*Course Description:* Identify and implement research questions through hypothesis construction, articulation of aims, acquiring permits, working as a team, and all other techniques needed to develop a successful research program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* MPVM standing or consent of instructor.

*Credit Limitation(s):* Not open for credit to students who have previously taken MPM 408B.

*Grade Mode:* Letter.

**MPM 209 – Research Planning & Reporting II (1 unit)**

*Course Description:* Concepts and skills in effective scientific writing for publication in a peer-reviewed journal in animal health or biomedicine. Includes developing an argument, organizing and writing a manuscript, improving readability, and responding to peer review.

*Prerequisite(s):* MPM 208.

*Learning Activities:* Lecture/Discussion.

*Grade Mode:* Letter.

**MPM 210 – Advanced Health Leadership (1.5 units)**

*Course Description:* Develop skills for effective scientific leadership, including: project management and collaboration, conflict resolution, communication with the public, dynamic distribution of health information, and evidence-based policy influence.

*Learning Activities:* Lecture, Discussion.

*Enrollment Restriction(s):* Limited to 35 students.

*Grade Mode:* Letter.

**MPM 212 – Concepts & Methods in Infectious Disease Surveillance & Control (3 units)**

*Course Description:* Basic and advanced level of conceptual and methodological foundations in infectious disease epidemiology necessary for veterinarians to develop and evaluate programs for detection, prevention, and control of infectious diseases in animal populations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**Materials Science Engineering (EMS)****College of Engineering****EMS 002 – Materials Marvels: The Science of Superheroes (3 units)**

*Course Description:* Introduction to science and technology of materials as key engineering ingredients. Explores the relationship between art and materials, and how superheroes are both products and resources of ideas for new materials' technologies.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**EMS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates with lower division standing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**EMS 147 – Principles of Polymer Materials Science (3 units)**

*Course Description:* Basic principles of polymer science presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing.

*Prerequisite(s):* CHE 002A; CHE 002B; ((CHE 008A, CHE 008B) or (ENG 045 or ENG 045Y)); introductory physics.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* FPS 100.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**EMS 160 – Thermodynamics of Materials (4 units)**

*Course Description:* Review of thermodynamic principles of interest to materials scientists and engineers. Application of thermodynamics to material processing, phase stability, corrosion.

*Prerequisite(s):* (ENG 045 C- or better or ENG 045Y C- or better); PHY 009B C- or better; MAT 022B C- or better; CHE 002C recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**EMS 162 – Structure & Characterization of Engineering Materials (4 units)**

*Course Description:* Description of the structure of engineering materials on the atomic scale by exploring the fundamentals of crystallography. Importance of this structure to materials' properties. Description of experimental determination using x-ray diffraction techniques.

*Prerequisite(s):* (ENG 045 C- or better or ENG 045Y C- or better); MAT 022A C- or better; PHY 009B C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **EMS 162L – Structure & Characterization of Materials Laboratory (3 units)**

*Course Description:* Experimental investigations of structure of solid materials are combined with techniques for characterization of materials. Laboratory exercises emphasize methods used to study structure of solids at the atomic and microstructural levels. Methods focus on optical, x-ray and electron techniques.

*Prerequisite(s):* EMS 162 (can be concurrent); concurrent enrollment in EMS 162 recommended.

*Learning Activities:* Laboratory 3 hour(s), Discussion 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **EMS 164 – Kinetics of Materials (4 units)**

*Course Description:* Basic kinetic laws and the principles governing phase transformations. Applications in diffusion, oxidation, nucleation, growth and spinodal transformations.

*Prerequisite(s):* (ENG 045 C- or better or ENG 045Y C- or better); EMS 160; (ECH 060 or ENG 006).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **EMS 170 – Sustainable Energy Technologies: Batteries, Fuel Cells, & Photovoltaic Cells (4 units)**

*Course Description:* Basic principles of future energy devices such as lithium batteries, fuel cells, and photovoltaic cells. Examines the current status of these energy technologies and analyze challenges that still must be overcome.

*Prerequisite(s):* ENG 045 or ENG 045Y.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students in Engineering or related fields.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EMS 170L – Sustainable Energy Technologies Laboratory (3 units)**

*Course Description:* Fundamentals of manufacturing and characterization of energy devices, such as lithium batteries, fuel cells and photovoltaic cells. Discussion on limiting factors in the performance of the devices.

*Prerequisite(s):* (ENG 045 or ENG 045Y); EMS 170 (can be concurrent); EMS 172 (recommended).

*Learning Activities:* Laboratory 3 hour(s), Extensive Writing, Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EMS 172 – Smart Materials (4 units)**

*Course Description:* Electronic, optical, and magnetic properties of materials as related to structure and processing of solid state materials. Physical principles for understanding the properties of metals, semiconductors, ceramics, and amorphous solids and the applications of these materials in engineering.

*Prerequisite(s):* CHE 110A or PHY 009D; ENG 006 or ECH 060 or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **EMS 172L – Smart Materials Laboratory (3 units)**

*Course Description:* Experimental investigation of electronic, optical and magnetic properties of engineering materials, emphasizing the fundamental relationship between microstructure and properties as well as the influence of rate processes on the evolution of the microstructure and properties.

*Prerequisite(s):* EMS 172 (can be concurrent); concurrent enrollment in EMS 172 recommended.

*Learning Activities:* Laboratory 3 hour(s), Discussion 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **EMS 174 – Mechanical Behavior of Materials (4 units)**

*Course Description:* Microscopic and macroscopic aspects of the mechanical behavior of engineering materials, with emphasis on recent development in materials characterization by nondestructive testing. Fundamental aspects of plasticity in engineering materials, strengthening mechanisms and mechanical failure modes of materials systems.

*Prerequisite(s):* (ENG 045 C- or better or ENG 045Y C- or better); EMS 162 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **EMS 174L – Mechanical Behavior Laboratory (3 units)**

*Course Description:* Experimental investigation of mechanical behavior of engineering materials. Laboratory exercises emphasize the fundamental relationship between microstructure and mechanical properties, and the evolution of the microstructure as a consequence of rate process.

*Prerequisite(s):* EMS 174 (can be concurrent); concurrent enrollment recommended.

*Learning Activities:* Laboratory 3 hour(s), Discussion 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **EMS 180 – Materials in Engineering Design (4 units)**

*Course Description:* Quantitative treatment of materials selection for engineering applications. Discussion of design & material selection strategy; process & process selection strategy; process economics; life-cycle thinking & eco-design. Use of materials selection software.

*Prerequisite(s):* ENG 045 C- or better or ENG 045Y C- or better.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to students with upper division standing.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Visual Literacy (VL).

## **EMS 181 – Manufacturing of 3D & Composite Materials (4 units)**

*Course Description:* Fundamental physical and chemical principles underlying various processing techniques, used in manufacturing processes for bulk (3D) and composite structural and functional materials. Effects of processing variables on structure-property relationships.

*Prerequisite(s):* (ENG 045 C- or better or ENG 045Y C- or better); (ENG 105 or ECH 152B or EEC 140A or EEC 140AV or EMS 164).

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EMS 182 – Failure Analysis (4 units)**

*Course Description:* Analysis of the way materials fail. Effects of temperature, mechanical deformation and corrosion on the properties of materials. forensics and methodologies for investigating failures of materials including optical microscopy, x-ray analysis and scanning electron microscopy. Investigation of practical problems.

*Prerequisite(s):* ENG 045 C- or better or ENG 045Y C- or better; EMS 174 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **EMS 183 – Processing of 2D & Nanomaterials (4 units)**

*Course Description:* Fundamentals of processing methods for two-dimensional materials, including thin films and graphene-like materials; as well as nanomaterials, including nanoparticles, nanowires, and quantum dots.

*Prerequisite(s):* (ENG 045 C- or better or ENG 045Y C- or better); (ENG 105 or ECH 152B or EEC 140A or EEC 140AV or EMS 164).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EMS 188A – Materials Design Project (4 units)**

*Course Description:* Major materials design experience involving analysis of real materials synthesis/processing/fabrication and technological applications including critical assessments of economic, manufacturing, and ethical constraints. Various principles of materials science are integrated into a culminating team design project.

*Prerequisite(s):* EMS 160; EMS 162; EMS 164; EMS 172; EMS 174.

*Learning Activities:* Laboratory 4 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EMS 188AH – Honors Materials Design (1 unit)**

*Course Description:* Examination of special topics covered in the materials design course through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.

*Prerequisite(s):* Enrollment in the Materials Science Engineering Honors Program.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open only to students in the Materials Science & Engineering Honors Program.

*Grade Mode:* Letter.

## **EMS 188B – Materials Design Project (4 units)**

*Course Description:* Major materials design experience involving analysis of real materials synthesis/processing/fabrication and technological applications including critical assessments of economic, manufacturing, and ethical constraints. Various principles of materials science are integrated into a culminating team design project.

*Prerequisite(s):* EMS 188A.

*Learning Activities:* Laboratory 4 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **EMS 188BH – Honors Materials Design (1 unit)**

*Course Description:* Examination of special topics covered in the materials design course through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.

*Prerequisite(s):* Enrollment in the Materials Science Engineering Honors Program.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open only to students in the Materials Science & Engineering Honors Program.

*Grade Mode:* Letter.

## **EMS 190C – Research Group Conference (1 unit)**

*Course Description:* Individual and/or group conference on problems, progress and techniques in materials research.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **EMS 192 – Internship in Materials Science & Engineering (1-5 units)**

*Course Description:* Supervised work experience in the Materials Science & Engineering field.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-15 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Pass/No Pass only.

## **EMS 197T – Tutoring in Materials Science & Engineering (1-5 units)**

*Course Description:* Tutoring of students in courses taught by instructors in the Department of Materials Science & Engineering. Tutor responsibilities may include attending class, assisting an instructor or TA in laboratory sections or group discussions, or providing non-graded feedback on assignments. Weekly meeting with the instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 1-5 hour(s).

*Grade Mode:* P/NP only.

## **EMS 198 – Directed Group Study (1-5 units)**

*Course Description:* Group study of selected topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

## **EMS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **EMS 200 – Preparing for Graduate Student Success (1 unit)**

*Course Description:* Introduction to the soft-skills and campus resources needed to succeed in graduate school. Emphasis on the student-mentor relationship and the process of selecting a research mentor.

*Learning Activities:* Seminar 1.50 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Materials Science & Engineering.

*Cross Listing:* ECH 200.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EMS 230 – Fundamentals of Electron Microscopy (3 units)**

*Course Description:* Principles and techniques of scanning and transmission of electron microscopy used in the study of materials will be described. Emphasis upon practical applications.

*Prerequisite(s):* EMS 162.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EMS 230L – Laboratory for Electron Microscopy (2 units)**

*Course Description:* Practical application of techniques of electron scanning and transmission microscopy including x-ray microanalysis.

*Prerequisite(s):* EMS 230 (can be concurrent); EMS 230 required concurrently.

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

## **EMS 244 – Interaction of Materials & their Environment (3 units)**

*Course Description:* Thermodynamic and kinetic foundations of the corrosion and oxidation processes. Practical aspects of corrosion control and prevention. Stress-corrosion and gas-embrittlement phenomena.

Special topics in corrosion; microbiological and atmospheric corrosion.

*Prerequisite(s):* (ENG 045 or ENG 045Y); ENG 105A recommended; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EMS 245 – Micro- & Nano-Technology in Life Sciences (4 units)**

*Course Description:* Survey of biodevice design from engineering and biological perspectives; micro-/nano-fabrication techniques; surface science and mass transport; essential biological processes and models; proposal development skills on merging aforementioned themes.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* EEC 245, ECH 245, MAE 245.

*Grade Mode:* Letter.

## **EMS 246 – Photovoltaics & Solar Cells (3 units)**

*Course Description:* Physics and application of photovoltaics and solar cells, including design, fabrication technology, and grid incorporation. Mono and microcrystalline silicon devices; thin-film technologies, heterojunction and organic-semiconductor technologies. Collectors, electrical inverters and infrastructure issues. Challenges and concerns.

*Prerequisite(s):* EEC 140B; or consent of instructor, or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* EEC 248.

*Grade Mode:* Letter.

## **EMS 248 – Fracture of Engineering Materials (3 units)**

*Course Description:* Description of the failure of materials by crack propagation. Topics include the stress fields about elastic cracks, the Griffith-Irwin analysis, descriptions of plastic zones, fracture toughness testing, microstructural aspects of fracture and failure at elevated temperatures.

*Prerequisite(s):* EMS 174.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EMS 249 – Mechanisms of Fatigue (3 units)**

*Course Description:* Microstructural description of the mechanisms of fatigue in metals. Topics include a phenomenological treatment of cyclic deformation, dislocation processes in cyclic deformation, fatigue crack nucleation, Stage I growth, threshold effects and high temperature cyclic deformation.

*Prerequisite(s):* EMS 174; or consent of instructor. EMS 248 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **EMS 250A – Special Topics in Polymer & Fiber Science (3 units)**

*Course Description:* Selected topics of current interest in polymer and fiber sciences. Topics vary each time course is offered.

*Prerequisite(s):* EMS 147; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* FPS 250A.

*Grade Mode:* Letter.

## **EMS 250B – Special Topics in Polymer & Fiber Science (3 units)**

*Course Description:* Selected topics of current interest in polymer and fiber sciences. Topics vary each time course is offered.

*Prerequisite(s):* EMS 147; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* FPS 250B.

*Grade Mode:* Letter.

## **EMS 250E – Special Topics in Polymer & Fiber Science (3 units)**

*Course Description:* Selected topics of current interest in polymer and fiber sciences. Topics vary each time course is offered.

*Prerequisite(s):* EMS 147; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* FPS 250E.

*Grade Mode:* Letter.

## **EMS 260 – Advanced Thermodynamics of Solids (4 units)**

*Course Description:* Thermodynamic principles, formalism and their application to solid materials. Statistical mechanics and the relations between microscopic and macroscopic properties. Prediction of phase diagrams and phase stability, particularly for solids.

*Prerequisite(s):* EMS 160.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EMS 262 – Advanced Topics in Structure of Materials (4 units)**

*Course Description:* Electronic structure and crystal structure of engineering materials on the atomic scale with a detailed discussion of crystallography. Types of bonding, distinction between band structures of metals, semiconductors, and insulators. Symmetry elements, point and space groups, and common crystal structures.

*Prerequisite(s):* EMS 162; EMS 174 recommended; graduate standing in Engineering or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EMS 264 – Transport Phenomena in Materials Processes (4 units)**

*Course Description:* Thermodynamic driving forces and atomic-scale mechanisms underlying diffusive mass transport and interface motion in materials. Nucleation, growth and coarsening dynamics of phase transformations.

*Prerequisite(s):* Graduate standing in Engineering.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who previously completed former course EMS 240.

*Grade Mode:* Letter.

## **EMS 268 – Advanced Materials Characterization (4 units)**

*Course Description:* Fundamental working principles for characterization methods used in structural and compositional analysis of engineering materials. Topics include x-ray, electron, ion, and neutron interactions with materials and techniques include diffraction, spectroscopy, and imaging methods.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in Chemistry, Physics, and Engineering.

*Grade Mode:* Letter.

## **EMS 272 – Advanced Functional Properties of Materials (4 units)**

*Course Description:* Fundamental physical properties of solid materials important to solid state devices, specifically electronic, magnetic, and optical properties. Topics include band structures, metals, superconductors, semiconductors, dielectrics, optical properties, and magnetic properties and implementation of these properties into devices.

*Prerequisite(s):* Graduate standing in Physics, Chemistry, and Engineering.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **EMS 274 – Advanced Mechanical Properties of Materials (4 units)**

*Course Description:* Comprehensive study of mechanical properties of materials, with special attention to dislocations and deformation and fracture control mechanisms. Mechanical properties of conventional engineering materials as well as advanced materials such as nanocrystalline solids and thin films are considered.

*Prerequisite(s):* EMS 174.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EMS 280A – Graduate Capstone Project (4 units)**

*Course Description:* Advanced materials design experience involving analysis of engineering applications of materials, including synthesis, processing, and fabrication. Additional consideration of critical assessments of economics, manufacturing, and ethical constraints. Fundamental principles of materials science are integrated into a culminating capstone project.

*Prerequisite(s):* Graduate standing in an engineering discipline.

*Learning Activities:* Laboratory 4 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **EMS 280B – Graduate Capstone Project (4 units)**

*Course Description:* Advanced materials design experience involving analysis of engineering applications of materials, including synthesis, processing and fabrication. Additional consideration of critical assessments of economics, manufacturing, and ethical constraints. Fundamental principles of materials science are integrated into a culminating capstone project.

*Prerequisite(s):* EMS 280A.

*Learning Activities:* Discussion 1 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

## **EMS 282 – Glass: Science & Technology (3 units)**

*Course Description:* Modern paradigms in glass science and their applications to technologies. Relation of macroscopic properties of glasses and glass-forming liquids to atomic-level structures, including principles of formation, relaxation, transport phenomena, nucleation, crystallization and phase separation in glasses.

*Prerequisite(s):* Graduate standing in Chemistry, Physics or Engineering, or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Extensive Writing 1 hour(s).

*Grade Mode:* Letter.

## **EMS 285 – Advanced Computational Materials Science (3 units)**

*Course Description:* Capabilities and limitations of modern approaches in computational materials science. Implementation and use of these approaches. Molecular dynamics, cellular automata, and phase field techniques.

*Prerequisite(s):* Prior numerical programming experience and familiarity with control flow statements is recommended.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

## **EMS 288 – Living Matter: Physical Biology of the Cell (3 units)**

*Course Description:* Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to any student possessing general background in any disciplines of physical or biological sciences and engineering.

*Cross Listing:* BIM 288, BPH 288.

*Grade Mode:* Letter.

## **EMS 289A – Special Topics in Materials Science (1-5 units)**

*Course Description:* Special topics in the discipline of Materials Science & Engineering. Topics will vary by instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EMS 290 – Materials Science & Engineering Seminar (1 unit)**

*Course Description:* Selected topics of current interest in Materials Science & Engineering. Subjects covered vary from year to year and are announced at the beginning of each quarter.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EMS 290C – Graduate Research Conference (1 unit)**

*Course Description:* Individual and/or group conference on problems, progress, and techniques in Materials Science & Engineering research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EMS 292 – Materials Science & Engineering Internship (1-12 units)**

*Course Description:* Work or lab experience in industry or off-campus lab focusing on Materials Science & Engineering applications at the graduate level.

*Prerequisite(s):* Consent of instructor. Graduate level standing.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EMS 294 – Materials Science Seminar (1 unit)**

*Course Description:* Current literature and developments in materials science with presentations by individual students.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EMS 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **EMS 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **EMS 390 – The Teaching of Materials Science (1 unit)**

*Course Description:* Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.

*Prerequisite(s):* Meet qualifications for teaching assistant and/or associate-in in Materials Science Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Maternal & Child Nutrition (MCN)**

**College of Agricultural & Environmental Sciences**

### **MCN 260 – Nutrition During Pregnancy (6 units)**

*Course Description:* Overview of the anatomical, physiological and biochemical changes that occur during pregnancy and early development. Discussion and evaluation of nutritional/lifestyle factors associated with pregnancy outcomes and nutrition programs/interventions for pregnant women.

*Prerequisite(s):* Acceptance into Master of Advanced Studies in Maternal Child Nutrition or Graduate Group in Nutritional Biology; other students by consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students.

*Grade Mode:* Letter.

### **MCN 261 – Lactation & Infant Nutrition (6 units)**

*Course Description:* Overview of the physiological and biochemical processes underlying human lactation and nutritional needs of both mother and infant. Development of skills in assessment, nutrition counseling, education and support of new mothers and their families.

*Prerequisite(s):* MCN 260; graduate standing.

*Learning Activities:* Lecture 5 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to students enrolled in the MAS program; other graduate students by consent of instructor.

*Grade Mode:* Letter.

### **MCN 262 – Child & Adolescent Nutrition (6 units)**

*Course Description:* Relationships among nutrition, growth, and development during childhood and adolescence. Nutritional assessment for normal and high risk groups; psychological, social, and economic factors contributing to nutritional status. Nutritional needs and interventions for special groups, including obese children/adolescents, athletes, and eating disordered.

*Prerequisite(s):* MCN 261; graduate standing.

*Learning Activities:* Lecture 5 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to students enrolled in the MAS program; other graduate students by consent of instructor.

*Grade Mode:* Letter.

## **MCN 263 – Applied Research Methods in Maternal & Child Nutrition (4 units)**

*Course Description:* Application of epidemiological principles to the study of maternal and child nutrition. Topics include quantitative & qualitative study procedures, including study design, data collection, and related analytical techniques.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MAS program; other graduate students by consent of instructor.

*Grade Mode:* Letter.

## **MCN 264A – Current Topics in Maternal & Child Nutrition: Principles of Adult Education (2 units)**

*Course Description:* Current scientific literature related to Maternal & Child Nutrition in adult education settings. Topics include methods and theories of adult education and critical thinking skills related to research evaluation.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MAS program; other graduate students by consent of instructor.

*Grade Mode:* Letter.

## **MCN 264B – Current Topics in Maternal & Child Nutrition: Epidemiology & Evidence-Based Practice (2 units)**

*Course Description:* Current scientific literature related to Maternal & Child Nutrition. Topics include epidemiology, evidence-based practice, breastfeeding promotion, and nutritional assessment of populations.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MAS program; other graduate students by consent of instructor.

*Grade Mode:* Letter.

## **MCN 264C – Current Topics in Maternal & Child Nutrition: Public Policy Development & Implementation (2 units)**

*Course Description:* Current scientific literature related to Maternal & Child Nutrition. Topics include nutrition surveillance and monitoring, as well as public policy development and implementation.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the MAS program; other graduate students by consent of instructor.

*Grade Mode:* Letter.

# **Mathematics (MAT)**

## **College of Letters & Science**

### **MAT 000B – Elementary Algebra (no credit) (0 units)**

*Course Description:* Basic concepts of algebra, including polynomials, factoring, equations, graphs, and inequalities. Offered only if sufficient number of students enroll.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Not open to concurrent student enrollment.

*Grade Mode:* Pass/No Pass only.

## **MAT 000C – Trigonometry (no credit) (0 units)**

*Course Description:* Basic concepts of trigonometry, including trigonometric functions, identities, inverse functions, and applications. Offered only if sufficient number of students enroll.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Not open to concurrent student enrollment.

*Grade Mode:* Pass/No Pass only.

## **MAT 000D – Intermediate Algebra (no credit) (0 units)**

*Course Description:* Basic concepts of algebra, prepares student for college work in mathematics, such as MAT 016A or MAT 021A. Functions, equations, graphs, logarithms, and systems of equations. Offered only if sufficient number of students enroll.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Not open to concurrent student enrollment.

*Grade Mode:* Pass/No Pass only.

## **MAT 012 – Precalculus (3 units)**

*Course Description:* Topics selected for their use in calculus, including functions and their graphs, slope, zeroes of polynomials, exponential, logarithmic and trigonometric functions, sketching surfaces and solids.

*Prerequisite(s):* Two years of high school algebra, plane geometry, plane trigonometry; and obtaining required score on the Precalculus Diagnostic Examination.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed any of MAT 016A, MAT 016B, MAT 016C, MAT 017A, MAT 017B, MAT 017C, MAT 021A, MAT 021B, or MAT 021C with a C- or better.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 016A – Short Calculus (3 units)**

*Course Description:* Limits; differentiation of algebraic functions; analytic geometry; applications, in particular to maxima and minima problems.

*Prerequisite(s):* Two years of high school algebra, plane geometry, plane trigonometry, and satisfying the Mathematics Placement Requirement.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 017B, MAT 017C, MAT 021A, MAT 021B, or MAT 021C; only 2 units of credit to students who have completed MAT 017A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 016B – Short Calculus (3 units)**

*Course Description:* Integration; calculus for trigonometric, exponential, and logarithmic functions; applications.

*Prerequisite(s):* MAT 016AC- or better or MAT 017A C- or better or MAT 021A C- or better or MAT 021AH C- or better.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 017C, MAT 021B, or MAT 021C; only 2 units of credit to students who have completed MAT 017B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 016C – Short Calculus (3 units)**

*Course Description:* Differential equations; partial derivatives; double integrals; applications; series.

*Prerequisite(s):* MAT 016B C- or better or MAT 017B C- or better or MAT 021B C- or better or MAT 021BH C- or better.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 021C; only 2 units of credit to students who have completed MAT 017C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 017A – Calculus for Biology & Medicine (4 units)**

*Course Description:* Introduction to differential calculus via applications in biology and medicine. Limits, derivatives of polynomials, trigonometric, and exponential functions, graphing, applications of the derivative to biology and medicine.

*Prerequisite(s):* Two years of high school algebra, plane geometry, plane trigonometry, and analytical geometry, and satisfying the Mathematics Placement Requirement.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 016B, MAT 016C, MAT 021A, MAT 021B, or MAT 021C; only 2 units of credit to students who have completed MAT 016A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 017B – Calculus for Biology & Medicine (4 units)**

*Course Description:* Introduction to integral calculus and elementary differential equations via applications to biology and medicine.

Fundamental theorem of calculus, techniques of integration including integral tables and numerical methods, improper integrals, elementary first order differential equations, applications in biology and medicine.

*Prerequisite(s):* MAT 016A C- or better or MAT 017A C- or better or MAT 021A C- or better or MAT 021AH C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 016C, MAT 021B, or MAT 021C; only 2 units of credit for students who have completed MAT 016B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 017C – Calculus for Biology & Medicine (4 units)**

*Course Description:* Matrix algebra, functions of several variables, partial derivatives, systems of differential equations, and applications to biology and medicine.

*Prerequisite(s):* MAT 017B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 021C; only 2 units of credit to students who have completed MAT 016C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **MAT 019A – Calculus for Data-Driven Applications (4 units)**

*Course Description:* Calculus and other mathematical methods necessary in data driven analysis in the sciences, technology and the humanities.

*Prerequisite(s):* Two years of high school algebra, plane geometry, plane trigonometry, and satisfying the Mathematics Placement Requirement.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s)

*Credit Limitation(s):* Not open for credit to students who have completed MAT 016A, MAT 016B, MAT 016C, MAT 017B, MAT 017C, MAT 021A, MAT 021B, or MAT 021C; only 2 units of credit to students who have completed MAT 017A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 019B – Calculus for Data-Driven Applications (4 units)**

*Course Description:* Calculus and other mathematical methods necessary in data driven analysis in the sciences, technology, and the humanities.

*Prerequisite(s):* MAT 017A C- or better or MAT 021A C- or better or MAT 021AH C- or better or MAT 019A C- or better.

*Learning Activities:* Lecture 3 hour(s); Laboratory 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 016B, 016C, MAT 017C, MAT 021B, or MAT 021C; only 2 units of credit to students who have completed MAT 017B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 019C – Calculus for Data-Driven Applications (4 units)**

*Course Description:* Calculus and other mathematical methods necessary in data-driven analysis in the sciences, technology and the humanities.

Multivariable calculus, differential equations, partial derivatives.

*Prerequisite(s):* MAT 019B C- or better or MAT 017B C- or better or MAT 021B C- or better or MAT 021BH C- or better.

*Learning Activities:* Lecture 3 hour(s); Laboratory 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 016C or MAT 021C; only 2 units of credit to students who have completed MAT 017C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MAT 021A – Calculus (4 units)**

*Course Description:* Functions, limits, continuity. Slope and derivative.

Differentiation of algebraic and transcendental functions. Applications to motion, natural growth, graphing, extrema of a function. Differentials. L'Hopital's rule.

*Prerequisite(s):* Two years of high school algebra, plane geometry, plane trigonometry, and analytical geometry, and satisfying the Mathematics Placement Requirement.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 016B, MAT 016C, MAT 017B, or MAT 017C; only 2 units of credit to students who have completed MAT 016A or MAT 017A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**MAT 021AH – Honors Calculus (4 units)**

*Course Description:* More intensive treatment of material covered in MAT 021A.

*Prerequisite(s):* A Precalculus Diagnostic Examination score significantly higher than the minimum for MAT 021A is required.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 021AL – Emerging Scholars Program Calculus Workshop (2 units)**

*Course Description:* Functions, limits, continuity. Slope and derivative. Same course content as MAT 021A. Enrollment for students in the Emerging Scholars Program by instructor's invitation only.

*Prerequisite(s):* MAT 021A required concurrently.

*Learning Activities:* Workshop 6 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MAT 021B – Calculus (4 units)**

*Course Description:* Continuation of MAT 021A. Definition of definite integral, fundamental theorem of calculus, techniques of integration. Application to area, volume, arc length, average of a function, improper integral, surface of revolution. May be taught abroad.

*Prerequisite(s):* (MAT 021A C- or better or MAT 021AH C- or better) or MAT 017A B or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit to students who have completed MAT 016B, MAT 016C, MAT 017B, or MAT 017C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 021BH – Honors Calculus (4 units)**

*Course Description:* More intensive treatment of material covered in MAT 021B. Students completing MAT 021BH can continue with MAT 021CH or the regular MAT 021C.

*Prerequisite(s):* MAT 021A B or better or MAT 021AH B or better.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 021BL – Emerging Scholars Program Calculus Workshop (2 units)**

*Course Description:* Continuation of MAT 021A. Same course content as MAT 021B. Enrollment for students in the Emerging Scholars Program by instructor's invitation only.

*Prerequisite(s):* MAT 021B required concurrently.

*Learning Activities:* Workshop 6 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MAT 021C – Calculus (4 units)**

*Course Description:* Continuation of MAT 021B. Sequences, series, tests for convergence, Taylor expansions. Vector algebra, vector calculus, scalar and vector fields. Partial derivatives, total differentials. Applications to maximum and minimum problems in two or more variables. Applications to physical systems.

*Prerequisite(s):* MAT 016C C- or better or MAT 017C C- or better or MAT 021B C- or better or MAT 021BH C- or better or MAT 017B B or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 021CH – Honors Calculus (4 units)**

*Course Description:* More intensive treatment of material covered in MAT 021C.

*Prerequisite(s):* MAT 021B B or better or MAT 021BH B or better.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 021CL – Emerging Scholars Program Calculus Workshop (2 units)**

*Course Description:* Continuation of MAT 021B. Same course content as MAT 021C. Enrollment for students in the Emerging Scholars Program by instructor's invitation only.

*Prerequisite(s):* MAT 021C required concurrently.

*Learning Activities:* Workshop 6 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MAT 021D – Vector Analysis (4 units)**

*Course Description:* Continuation of MAT 021C. Definite integrals over plane and solid regions in various coordinate systems. Line and surface integrals. Green's theorem, Stoke's theorem, divergence theorem.

*Prerequisite(s):* (MAT 021C C- or better or MAT 021CH C- or better) or MAT 017C B or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 021M – Accelerated Calculus (5 units)**

*Course Description:* Accelerated treatment of material from MAT 021A and MAT 021B, with detailed presentation of theory, definitions, and proofs, and treatment of computational aspects of calculus at a condensed but sophisticated level.

*Prerequisite(s):* Grade of B or higher in both semesters of high school calculus or a score of 4 or higher on the Advanced Placement Calculus AB exam, and obtaining the required score on the Precalculus Diagnostic Examination and its trigonometric component.

*Learning Activities:* Lecture/Discussion 4 hour(s), Discussion/Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 021A or MAT 021B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## MAT 022A – Linear Algebra (3 units)

*Course Description:* Matrices and linear transformations, determinants, eigenvalues, eigenvectors, diagonalization, factorization.

*Prerequisite(s):* (MAT 016C C or better or MAT 017C C or better or MAT 021C C or better or MAT 021CH C or better); (ENG 006 or EME 005 or ECH 060 or MAT 022AL (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 067.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 022AL – Linear Algebra Computer Laboratory (1 unit)

*Course Description:* Introduction to MATLAB and its use in linear algebra.

*Prerequisite(s):* MAT 016C or MAT 017C or MAT 021C or MAT 021CH.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 022B – Differential Equations (3 units)

This version has ended; see updated course, below.

*Course Description:* Solutions of elementary differential equations.

*Prerequisite(s):* (MAT 022A C- or better or MAT 067 C- or better).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 022B – Differential Equations (3 units)

*Course Description:* Solutions of elementary differential equations.

*Prerequisite(s):* (MAT 022A C- or better or MAT 027A C- or better or BIS 027A C- or better or MAT 067 C- or better).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

This course version is effective from, and including: Winter Quarter 2024.

## MAT 027A – Linear Algebra with Applications to Biology (4 units)

*Course Description:* Introduction to linear algebra with biological, medical, and bioengineering applications. Matrix algebra, vector spaces, orthogonality, determinants, eigenvalues, eigenvectors, principal component analysis, singular value decomposition, and linear transformations. Computer labs cover mathematical and computational techniques for modeling biological systems.

*Prerequisite(s):* MAT 017C C- or better or MAT 021C C- or better or MAT 021CH C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Only 1 unit of credit for students who have completed MAT 022A.

*Cross Listing:* BIS 027A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## MAT 027B – Differential Equations with Applications to Biology (4 units)

*Course Description:* Solutions of differential equations with biological, medical, and bioengineering applications. First and second order linear equations, phase plane analysis, nonlinear dynamics, Laplace transforms, and the diffusion equation. Computer labs cover mathematical and numerical techniques for modeling biological systems.

*Prerequisite(s):* (MAT 027A C- or better or BIS 027A C- or better) or (MAT 022A C- or better, (MAT 022AL C- or better or ENG 006 C- or better or ECS 032A C- or better or ECS 036A C- or better or ECH 060 C- or better or EME 005 C- or better)).

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Only 1 unit of credit for students who have completed MAT 022B.

*Cross Listing:* BIS 027B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## MAT 036 – Fundamentals of Mathematics (3 units)

*Course Description:* Introduction to fundamental mathematical ideas selected from the principal areas of modern mathematics. Properties of the primes, the fundamental theorems of arithmetic, properties of the rationals and irrationals, binary and other number systems.

*Prerequisite(s):* Satisfaction of the Mathematics Placement Requirement.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken MAT 108.

*Grade Mode:* Letter.

## MAT 067 – Modern Linear Algebra (4 units)

*Course Description:* Rigorous treatment of linear algebra; topics include vector spaces, bases and dimensions, orthogonal projections, eigenvalues and eigenvectors, similarity transformations, singular value decomposition and positive definiteness.

*Prerequisite(s):* MAT 021C C- or better or MAT 021CH C- or better.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Only 1 unit of credit to students who have completed MAT 022A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## MAT 071A – Explorations in Elementary Mathematics (3 units)

*Course Description:* Weekly explorations of mathematical ideas related to the elementary school curriculum will be carried out by cooperative learning groups. Lectures will provide background and synthesize the results of group exploration.

*Prerequisite(s):* Two years of high school mathematics.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## MAT 071B – Explorations in Elementary Mathematics (3 units)

*Course Description:* Weekly explorations of mathematical ideas related to the elementary school curriculum will be carried out by cooperative learning groups. Lectures will provide background and synthesize the results of group exploration.

*Prerequisite(s):* Two years of high school mathematics.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**MAT 089 – Elementary Problem Solving (1 unit)**

*Course Description:* Solve and present solutions to challenging and interesting problems in elementary mathematics.

*Prerequisite(s):* High school mathematics through precalculus.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Pass/No Pass only.

**MAT 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**MAT 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**MAT 107 – Probability & Stochastic Processes with Applications to Biology (4 units)**

*Course Description:* Introduction to probability theory and stochastic processes with biological, medical, and bioengineering applications. Combinatorics, discrete and continuous random variables, Bayes' formula, conditional probability, Markov chains, Poisson processes, and Brownian motion. Computer labs cover mathematical and computational modeling techniques.

*Prerequisite(s):* (MAT 027A C- or better or BIS 027A C- or better) or (MAT 022A C- or better, (MAT 022AL C- or better or ENG 006 C- or better or ECS 032A C- or better or ECS 036A C- or better or ECH 060 C- or better or EME 005 C- or better)).

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have completed MAT 135A or STA 131A.

*Cross Listing:* BIS 107.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 108 – Introduction to Abstract Mathematics (4 units)**

*Course Description:* Rigorous treatment of mathematical concepts with emphasis on developing the ability to understand abstract mathematical ideas, to read and write mathematical concepts, and to prove theorems. Designed to serve as preparation for the more rigorous upper division courses.

*Prerequisite(s):* MAT 021B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 111 – History of Mathematics (4 units)**

*Course Description:* History of mathematics from ancient times through the development of calculus. Mathematics from Arab, Hindu, Chinese and other cultures. Selected topics from the history of modern mathematics.

*Prerequisite(s):* MAT 127A or MAT 067 or MAT 108 or MAT 114 or MAT 115A or MAT 141 or MAT 145; 8 units of upper division Mathematics.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 114 – Convex Geometry (4 units)**

*Course Description:* Topics selected from the theory of convex bodies, convex functions, geometric inequalities, combinatorial geometry, and integral geometry. Designed to serve as preparation for the more rigorous upper division courses.

*Prerequisite(s):* MAT 021C; (MAT 022A or BIS 027A or MAT 067).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 115A – Number Theory (4 units)**

*Course Description:* Divisibility and related topics, diophantine equations, selected topics from the theory of prime numbers. Designed to serve as preparation for the more rigorous upper division courses.

*Prerequisite(s):* MAT 021B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 115B – Number Theory (4 units)**

*Course Description:* Euler function, Moebius function, congruences, primitive roots, quadratic reciprocity law.

*Prerequisite(s):* MAT 115A; (MAT 022A or MAT 027A or MAT 067 or BIS 027A).

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**MAT 116 – Differential Geometry (4 units)**

*Course Description:* Vector analysis, curves, and surfaces in three dimensions.

*Prerequisite(s):* MAT 021D; (MAT 022A or MAT 027A or MAT 067 or BIS 027A); (MAT 022B or MAT 027B or BIS 027B).

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MAT 118A – Partial Differential Equations: Elementary Methods (4 units)**

*Course Description:* Derivation of partial differential equations; separation of variables; equilibrium solutions and Laplace's equation; Fourier series; method of characteristics for the one dimensional wave equation. Solution of nonhomogeneous equations.

*Prerequisite(s):* MAT 021D; (MAT 022A or MAT 027A or MAT 067 or BIS 027A); (MAT 022B or MAT 027B or BIS 027B).

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Enrollment Restriction(s):* Pass One open to Applied Mathematics, Mathematics, Mathematics & Scientific Computation, Mathematical Analytics & Operations Research.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MAT 118B – Partial Differential Equations: Eigenfunction Expansions (4 units)**

*Course Description:* Sturm-Liouville Theory; selfadjoint operators; mixed boundary conditions; partial differential equations in two and three dimensions; Eigenvalue problems in circular domains; nonhomogeneous problems and the method of eigenfunction expansions; Poisson's Equations.

*Prerequisite(s):* MAT 118A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MAT 118C – Partial Differential Equations: Green's Functions & Transforms (4 units)**

*Course Description:* Green's functions for one-dimensional problems and Poisson's equation; Fourier transforms; Green's Functions for time dependent problems; Laplace transform and solution of partial differential equations.

*Prerequisite(s):* MAT 118B.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MAT 119A – Ordinary Differential Equations (4 units)**

*Course Description:* Scalar and planar autonomous systems; nonlinear systems and linearization; existence and uniqueness of solutions; matrix solution of linear systems; phase plane analysis; stability analysis; bifurcation theory; Liapunov's method; limit cycles; Poincare Bendixon theory.

*Prerequisite(s):* MAT 021D; (MAT 022A or MAT 027A or MAT 067 or BIS 027A); (MAT 022B or MAT 027B or BIS 027B).

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MAT 119B – Ordinary Differential Equations (4 units)**

*Course Description:* Lorentz equations; Poincare maps; center manifolds and normal forms; scalar and planar maps; phase space analysis for iterated maps; period-doubling bifurcation; Lyapunov exponent; chaos and symbolic dynamics; strange attractors; fractals.

*Prerequisite(s):* MAT 119A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MAT 124 – Mathematical Biology (4 units)**

*Course Description:* Methods of mathematical modeling of biological systems including difference equations, ordinary differential equations, stochastic and dynamic programming models. Computer simulation methods applied to biological systems. Applications to population growth, cell biology, physiology, evolutionary ecology and protein clustering. MATLAB programming required.

*Prerequisite(s):* (MAT 022A or MAT 027A or MAT 067 or BIS 027A); (MAT 022B or MAT 027B or BIS 027B).

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MAT 127A – Real Analysis (4 units)**

*Course Description:* Real numbers, sequences, series, and continuous functions.

*Prerequisite(s):* (MAT 021C or MAT 021CH); (MAT 067 or (MAT 022A or MAT 027A or BIS 027A), MAT 108).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAT 127B – Real Analysis (4 units)**

*Course Description:* Derivatives, integrals, sequences of functions, and power series.

*Prerequisite(s):* MAT 127A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAT 127C – Real Analysis (4 units)**

*Course Description:* Metric spaces and multi-variable calculus.

*Prerequisite(s):* MAT 127B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAT 128A – Numerical Analysis (4 units)**

*Course Description:* Error analysis, approximation, interpolation, numerical differentiation and integration. Programming in language such as Pascal, Fortran, or BASIC required.

*Prerequisite(s):* MAT 021C; (ECS 032A or ENG 006 or EME 005 or ECS 030).

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MAT 128B – Numerical Analysis in Solution of Equations (4 units)**

*Course Description:* Solution of nonlinear equations and nonlinear systems. Minimization of functions of several variables. Simultaneous linear equations. Eigenvalue problems. Linear programming.

Programming in language such as Pascal, Fortran, or BASIC required.

*Prerequisite(s):* (MAT 022A or MAT 027A or MAT 067 or BIS 027A); (ECS 032A or ENG 006 or EME 005 or ECS 030).

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 128C – Numerical Analysis in Differential Equations (4 units)

**Course Description:** Difference equations, operators, numerical solutions of ordinary and partial differential equations. Programming in language such as Pascal, Fortran, or BASIC required.

**Prerequisite(s):** (ECS 032A or ENG 006 or EME 005 or ECS 030); (MAT 022A or MAT 027A or MAT 067 or BIS 027A); (MAT 022B or MAT 027B or BIS 027B).

**Learning Activities:** Lecture 3 hour(s), Project.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 129 – Fourier Analysis (4 units)

**Course Description:** Fourier series and integrals, orthogonal sets of functions. Topics selected from trigonometric approximation, orthogonal polynomials, applications to signal and image processing, numerical analysis, and differential equations.

**Prerequisite(s):** MAT 021D; MAT 127A; (MAT 022A or MAT 027A or MAT 067 or BIS 027A); (MAT 022B or MAT 027B or BIS 027B);

**Learning Activities:** Lecture 3 hour(s), Extensive Problem Solving.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 133 – Mathematical Finance (4 units)

**Course Description:** Analysis and evaluation of deterministic and random cash flow streams, yield and pricing of basic financial instruments, interest rate theory, mean-variance portfolio theory, capital asset pricing models, utility functions and general principles. MATLAB programming required.

**Prerequisite(s):** (MAT 067 or MAT 022A or MAT 027A or BIS 027A); MAT 108; MAT 135A

**Learning Activities:** Lecture 3 hour(s), Extensive Problem Solving.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## MAT 135A – Probability (4 units)

**Course Description:** Probability space; discrete probability, combinatorial analysis; independence, conditional probability; random variables, discrete and continuous distributions, probability mass function, joint and marginal density functions; expectation, moments, variance, Chebyshev inequality; sums of random variables, random walk, large number law, central limit theorem.

**Prerequisite(s):** MAT 021C; (MAT 108 or MAT 067).

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed former MAT 131.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## MAT 135B – Stochastic Processes (4 units)

**Course Description:** Generating functions, branching processes, characteristic function; Markov chains; convergence of random variables, law of iterated logarithm; random processes, Brownian motion, stationary processes, renewal processes, queueing theory, martingales.

**Prerequisite(s):** MAT 135A; (MAT 022A or MAT 027A or MAT 067 or BIS 027A).

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## MAT 141 – Euclidean Geometry (4 units)

**Course Description:** Axiomatic and analytic examination of Euclidean geometry from an advanced point of view. In particular, a discussion of its relation to other geometries. Designed to serve as preparation for the more rigorous upper division courses.

**Prerequisite(s):** MAT 021B; (MAT 022A or MAT 027A or MAT 067 or BIS 027A).

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## MAT 145 – Combinatorics (4 units)

**Course Description:** Combinatorial methods using basic graph theory, counting methods, generating functions, and recurrence relations. Designed to serve as preparation for the more rigorous upper division courses.

**Prerequisite(s):** MAT 021C.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 146 – Algebraic Combinatorics (4 units)

**Course Description:** Enumeration, Polya theory, generating functions, current topics in algebraic combinatorics.

**Prerequisite(s):** ((MAT 022A or MAT 027A or BIS 027A, MAT 108) or MAT 067)); MAT 145.

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed former MAT 149A.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## MAT 147 – Topology (4 units)

**Course Description:** Basic notions of point-set and combinatorial topology.

**Prerequisite(s):** MAT 127A.

**Learning Activities:** Lecture 3 hour(s), Extensive Problem Solving.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## MAT 148 – Discrete Mathematics (4 units)

**Course Description:** Coding theory, error correcting codes, finite fields and the algebraic concepts needed in their development.

**Prerequisite(s):** MAT 067 or (MAT 022A or MAT 027A or BIS 027A, MAT 108).

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed former MAT 149B.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL).

## MAT 150A – Modern Algebra (4 units)

**Course Description:** Basic concepts of groups, symmetries of the plane. Emphasis on the techniques used in the proof of the ideas (Lemmas, Theorems, etc.) developing these concepts. Precise thinking, proof writing, and the ability to deal with abstraction.

**Prerequisite(s):** MAT 067 or (MAT 022A or MAT 027A or BIS 027A, MAT 108).

**Learning Activities:** Lecture/Discussion 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**MAT 150B – Modern Algebra (4 units)**

*Course Description:* Bilinear forms, rings, factorization, modules.

*Prerequisite(s):* MAT 150A.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 150C – Modern Algebra (4 units)**

*Course Description:* Group representations, fields, Galois theory.

*Prerequisite(s):* MAT 150B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 165 – Mathematics & Computers (4 units)**

*Course Description:* Introduction to computational mathematics, symbolic computation, and computer generated/verified proofs in algebra, analysis and geometry. Investigation of rigorous new mathematics developed in conjunction with modern computational questions and the role that computers play in mathematical conjecture and experimentation.

*Prerequisite(s):* (MAT 127A or MAT 108 or MAT 114 or MAT 115A or MAT 145); (MAT 022A or MAT 027A or MAT 067 or BIS 027A).

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 167 – Applied Linear Algebra (4 units)**

*Course Description:* Applications of linear algebra; LU and QR matrix factorizations, eigenvalue and singular value matrix decompositions.

*Prerequisite(s):* MAT 022A or MAT 027A or BIS 027A or MAT 067.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 168 – Optimization (4 units)**

*Course Description:* Linear programming, simplex method. Basic properties of unconstrained nonlinear problems, descent methods, conjugate direction method. Constrained minimization. Programming language required.

*Prerequisite(s):* MAT 021C; ((MAT 022A or MAT 027A or BIS 027A, MAT 108) or MAT 067).

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MAT 170 – Mathematics for Data Analytics & Decision Making (4 units)**

*Course Description:* Relational model; relational algebra, relational calculus, normal forms, functional and multivalued dependencies, separability. Cost benefit analysis of physical database design and reorganization. Performance via analytical modeling, simulation, and queueing theory. Block accesses; buffering; operating system contention; CPU intensive operations.

*Prerequisite(s):* MAT 167 or MAT 128B or ECS 130.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Pass One open to Applied Mathematics, Mathematics, Mathematics & Scientific Computation, Mathematical Analytics & Operations Research and Statistics Majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 180 – Special Topics (3 units)**

*Course Description:* Special topics from various fields of modern, pure, and applied mathematics. Some recent topics include Knot Theory, General Relativity, and Fuzzy Sets.

*Prerequisite(s):* (MAT 067 or (MAT 022A or MAT 027A or BIS 027A, MAT 108)), MAT 127A.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 185A – Complex Analysis (4 units)**

*Course Description:* Complex number system, analyticity and the Cauchy-Riemann equations, elementary functions, complex integration, power and Laurent series expansions, residue theory.

*Prerequisite(s):* (MAT 067 or (MAT 022A or MAT 027A or BIS 027A, MAT 108)), MAT 127B.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 185B – Complex Analysis (4 units)**

*Course Description:* Analytical functions, elementary functions and their mapping properties, applications of Cauchy's integral theorem, conformal mapping and applications to heat flow and fluid mechanics.

*Prerequisite(s):* MAT 185A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MAT 189 – Advanced Problem Solving (3 units)**

*Course Description:* Solution and presentation of advanced problem solving techniques. Solve and present interesting and challenging problems of all areas of mathematics.

*Prerequisite(s):* ((MAT 022A, MAT 027A or BIS 027A, MAT 108) or MAT 067)); MAT 127A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Writing Experience (WE).

**MAT 192 – Internship in Applied Mathematics (1-3 units)**

*Course Description:* Supervised work experience in applied mathematics. Final report.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

**MAT 194 – Undergraduate Thesis (3 units)**

*Course Description:* Independent research under supervision of a faculty member. Student will submit written report in thesis form.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study.

*Repeat Credit:* May be repeated with consent of Vice Chairperson.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **MAT 197TC – Tutoring Mathematics in the Community (1-5 units)**

This version has ended; see updated course, below.

*Course Description:* Special projects in mathematical education developing techniques for mathematics instruction and tutoring on an individual or small group basis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-2 hour(s), Laboratory 2-6 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Pass/No Pass only.

## **MAT 197TC – Tutoring Mathematics in the Community (1-5 units)**

*Course Description:* Special projects in mathematical education developing techniques for mathematics instruction and tutoring on an individual or small group basis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-2 hour(s), Laboratory 2-6 hour(s).

*Grade Mode:* Pass/No Pass only.

This course version is effective from, and including: Winter Quarter 2024.

## **MAT 198 – Directed Group Study (1-5 units)**

*Course Description:* May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **MAT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **MAT 200 – Problem-Solving in Analysis (3 units)**

*Course Description:* Problem-solving in graduate analysis: continuous functions, metric spaces, Banach & Hilbert spaces, bounded linear operators, the spectral theorem, distributions, Fourier series & transforms, Lp spaces, Sobolev spaces.

*Prerequisite(s):* MAT 201A (can be concurrent); MAT 201B (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Extensive Problem Solving.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MAT 201A – Analysis (4 units)**

*Course Description:* Metric and normed spaces. Continuous functions. Topological, Hilbert, and Banach spaces. Fourier series. Spectrum of bounded and compact linear operators. Linear differential operators and Green's functions. Distributions. Fourier transform. Measure theory. Lp and Sobolev spaces. Differential calculus and variational methods.

*Prerequisite(s):* Graduate standing in Mathematics or Applied Mathematics, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAT 201B – Analysis (4 units)**

*Course Description:* Metric and normed spaces. Continuous functions. Topological, Hilbert, and Banach spaces. Fourier series. Spectrum of bounded and compact linear operators. Linear differential operators and Green's functions. Distributions. Fourier transform. Measure theory. Lp and Sobolev spaces. Differential calculus and variational methods.

*Prerequisite(s):* Graduate standing in Mathematics or Applied Mathematics, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAT 201C – Analysis (4 units)**

*Course Description:* Metric and normed spaces. Continuous functions. Topological, Hilbert, and Banach spaces. Fourier series. Spectrum of bounded and compact linear operators. Linear differential operators and Green's functions. Distributions. Fourier transform. Measure theory. Lp and Sobolev spaces. Differential calculus and variational methods.

*Prerequisite(s):* Graduate standing in Mathematics or Applied Mathematics, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAT 202 – Functional Analysis (4 units)**

*Course Description:* Hahn-Banach, Open mapping, Closed graph, Banach-Steinhaus, and Krein-Milman. Subspaces and quotient spaces. Projections. Weak and weak-star topologies. Compact and adjoint operators in Banach spaces. Fredholm theory. Functions of operators. Spectral theory of self-adjoint operators.

*Prerequisite(s):* MAT 201A; MAT 201B.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **MAT 205 – Complex Analysis (4 units)**

*Course Description:* Analytic continuation, Riemann surfaces, conformal mappings, Riemann mapping theorem, entire functions, special functions, elliptic functions.

*Prerequisite(s):* MAT 185A; or equivalent to MAT 185A, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAT 205A – Complex Analysis (4 units)**

*Course Description:* Cauchy's theorem, Cauchy's integral formulas, meromorphic functions, complex logarithm, entire functions, Weierstrass infinite product formula, the gamma and zeta functions, and prime number theorem.

*Prerequisite(s):* MAT 185A; or equivalent to MAT 185A, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Credit Limitation(s):* No credit given to students who have completed MAT 205.

*Grade Mode:* Letter.

**MAT 205B – Complex Analysis (4 units)**

*Course Description:* Conformal mappings, the Schwarz lemma, analytic automorphisms, the Riemann mapping theorem, elliptic functions, Eisenstein series, the Jacobi theta functions, asymptotics, Bessel functions, the Airy function, topics on special functions and Riemann surfaces.

*Prerequisite(s):* MAT 205A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

**MAT 206 – Measure Theory (4 units)**

*Course Description:* Introduction to measure theory. The study of lengths, surface areas, and volumes in general spaces, as related to integration theory.

*Prerequisite(s):* MAT 125B.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

**MAT 207A – Methods of Applied Mathematics (4 units)**

*Course Description:* Ordinary differential equations and dynamical systems. Variational principles. Eigenfunctions, integral equations and Green's functions. Complex analysis and contour integration. Laplace's equation. Diffusion equations. Wave phenomena. Dimensional analysis and scaling. Asymptotic expansions and perturbation theory. Stochastic processes and Brownian motion.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 207B – Methods of Applied Mathematics (4 units)**

*Course Description:* Ordinary differential equations and dynamical systems. Variational principles. Eigenfunctions, integral equations and Green's functions. Complex analysis and contour integration. Laplace's equation. Diffusion equations. Wave phenomena. Dimensional analysis and scaling. Asymptotic expansions and perturbation theory. Stochastic processes and Brownian motion.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 207C – Methods of Applied Mathematics (4 units)**

*Course Description:* Ordinary differential equations and dynamical systems. Variational principles. Eigenfunctions, integral equations and Green's functions. Complex analysis and contour integration. Laplace's equation. Diffusion equations. Wave phenomena. Dimensional analysis and scaling. Asymptotic expansions and perturbation theory. Stochastic processes and Brownian motion.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 215A – Topology (4 units)**

*Course Description:* Fundamental group and covering space theory. Homology and cohomology. Manifolds and duality. CW complexes. Fixed point theorems.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 215B – Topology (4 units)**

*Course Description:* Fundamental group and covering space theory. Homology and cohomology. Manifolds and duality. CW complexes. Fixed point theorems.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 215C – Topology (4 units)**

*Course Description:* Fundamental group and covering space theory. Homology and cohomology. Manifolds and duality. CW complexes. Fixed point theorems.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 216 – Geometric Topology (4 units)**

*Course Description:* Topology of two- and three-dimensional manifolds. Surfaces and their diffeomorphisms. Dehn twists. Heegaard surfaces. Theory of 3-dimensional manifolds. Knots and knot theory. Hyperbolic manifolds and geometric structures.

*Prerequisite(s):* MAT 215A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**MAT 218A – Partial Differential Equations (4 units)**

*Course Description:* Year-long sequence on PDEs which covers linear transport, Laplace, heat, and wave equations, maximum principles, method of characteristics, Sobolev and Hölder space theory, weak derivatives, semilinear, quasilinear, and fully nonlinear elliptic/parabolic equations, nonlinear hyperbolic equations, and compensated compactness.

*Prerequisite(s):* MAT 201A; MAT 201B; MAT 201C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 218B – Partial Differential Equations (4 units)**

*Course Description:* Year-long sequence on PDEs which covers linear transport, Laplace, heat, and wave equations, maximum principles, method of characteristics, Sobolev and Hölder space theory, weak derivatives, semilinear, quasilinear, and fully nonlinear elliptic/parabolic equations, nonlinear hyperbolic equations, and compensated compactness.

*Prerequisite(s):* MAT 218A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 218C – Partial Differential Equations (4 units)**

*Course Description:* Year-long sequence on PDEs which covers linear transport, Laplace, heat, and wave equations, maximum principles, method of characteristics, Sobolev and Hölder space theory, weak derivatives, semilinear, quasilinear, and fully nonlinear elliptic/parabolic equations, nonlinear hyperbolic equations, and compensated compactness.

*Prerequisite(s):* MAT 218B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 221A – Mathematical Fluid Dynamics (4 units)**

*Course Description:* Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Irrotational flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible fluids. Shock waves.

*Prerequisite(s):* MAT 118B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 221B – Mathematical Fluid Dynamics (4 units)**

*Course Description:* Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Irrotational flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible fluids. Shock waves.

*Prerequisite(s):* MAT 118B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 226A – Numerical Methods: Fundamentals (4 units)**

*Course Description:* Fundamental principles and methods in numerical analysis, including the concepts of stability of algorithms and conditioning of numerical problems, numerical methods for interpolation and integration, eigenvalue problems, singular value decomposition and its applications.

*Prerequisite(s):* MAT 128A; MAT 128B; or equivalent, or consent of instructor; familiarity with some programming language.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 226B – Numerical Methods: Large-Scale Matrix Computations (4 units)**

*Course Description:* Numerical methods for large-scale matrix computations, including direct and iterative methods for the solution of linear systems, the computation of eigenvalues and singular values, the solution of least-squares problems, matrix compression, methods for the solution of linear programs.

*Prerequisite(s):* MAT 167; or equivalent, or consent of instructor; familiarity with some programming language.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 226C – Numerical Methods: Ordinary Differential Equations (4 units)**

*Course Description:* Numerical methods for the solution of ordinary differential equations, including methods for initial-value problems and two-point boundary-value problems, theory of and methods for differential algebraic equations, dimension reduction of large-scale dynamical systems.

*Prerequisite(s):* MAT 022B; or equivalent, or consent of instructor; familiarity with some programming language.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 227 – Mathematical Biology (4 units)**

*Course Description:* Nonlinear ordinary and partial differential equations and stochastic processes of cell and molecular biology. Scaling, qualitative, and numerical analysis of mathematical models. Applications to nerve impulse, chemotaxis, muscle contraction, and morphogenesis.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 228A – Numerical Solution of Differential Equations (4 units)**

*Course Description:* Numerical solutions of initial-value, eigenvalue and boundary-value problems for ordinary differential equations. Numerical solution of parabolic and hyperbolic partial differential equations.

*Prerequisite(s):* MAT 128C.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Discussion.

*Grade Mode:* Letter.

**MAT 228B – Numerical Solution of Differential Equations (4 units)**

*Course Description:* Numerical solutions of initial-value, eigenvalue and boundary-value problems for ordinary differential equations. Numerical solution of parabolic and hyperbolic partial differential equations.

*Prerequisite(s):* MAT 128C.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Discussion.

*Grade Mode:* Letter.

**MAT 228C – Numerical Solution of Differential Equations (4 units)**

*Course Description:* Numerical solutions of initial-value, eigenvalue and boundary-value problems for ordinary differential equations. Numerical solution of parabolic and hyperbolic partial differential equations.

*Prerequisite(s):* MAT 128C.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Discussion.

*Grade Mode:* Letter.

**MAT 235A – Probability Theory (4 units)**

*Course Description:* Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from: martingales, Markov chains, ergodic theory.

*Prerequisite(s):* MAT 125B; (MAT 135A or STA 131A); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* STA 235A.

*Grade Mode:* Letter.

**MAT 235B – Probability Theory (4 units)**

*Course Description:* Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from: martingales, Markov chains, ergodic theory.

*Prerequisite(s):* MAT 235A or STA 235A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* STA 235B.

*Grade Mode:* Letter.

**MAT 235C – Probability Theory (4 units)**

*Course Description:* Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from: martingales, Markov chains, ergodic theory.

*Prerequisite(s):* MAT 235B or STA 235B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* STA 235C.

*Grade Mode:* Letter.

**MAT 236A – Stochastic Dynamics & Applications (4 units)**

*Course Description:* Stochastic processes, Brownian motion, Stochastic integration, martingales, stochastic differential equations. Diffusions, connections with partial differential equations, mathematical finance.

*Prerequisite(s):* MAT 201C or (MAT 235B or STA 235B); MAT 235A, MAT 235B, MAT 235C/STA 235A, STA 235B, STA 235C recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 236B – Stochastic Dynamics & Applications (4 units)**

*Course Description:* Stochastic processes, Brownian motion, Stochastic integration, martingales, stochastic differential equations. Diffusions, connections with partial differential equations, mathematical finance.

*Prerequisite(s):* MAT 201C or (MAT 235B or STA 235B); MAT 235A, MAT 235B, MAT 235C/STA 235A, STA 235B, STA 235C recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 239 – Differential Topology (4 units)**

*Course Description:* Differentiable manifolds, vector fields, transverse intersections, Sard's Theorem, orientations, intersection theory, the index of a vector field, differential forms, integration on manifolds, Stokes' Theorem, deRham cohomology, Morse functions, the Morse lemma, and the index of critical points.

*Prerequisite(s):* MAT 201A; or consent of instructor; Vector calculus, point-set topology; MAT 250A MAT 250B highly recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 240A – Differential Geometry (4 units)**

*Course Description:* Riemannian metrics, connections, geodesics, Gauss lemma, convex neighborhoods, curvature tensor, Ricci and scalar curvature, connections and curvature on vector bundles.

*Prerequisite(s):* MAT 201A; MAT 239; MAT 250A MAT 250B highly recommended; intended primarily for second-year graduate students.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 240B – Differential Geometry (4 units)**

*Course Description:* Jacobi fields, conjugate points, completeness, Hopf-Rinow theorem, Cartan-Hadamard theorem, energy, variation theorems and their applications, Rauch comparison theorem and its applications.

*Prerequisite(s):* MAT 240A; Intended primarily for second-year graduate students.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 245 – Enumerative Combinatorics (4 units)**

*Course Description:* Introduction to modern combinatorics and its applications. Emphasis on enumerative aspects of combinatorial theory.

*Prerequisite(s):* MAT 145; MAT 150; or the equivalent, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

**MAT 246 – Algebraic Combinatorics (4 units)**

*Course Description:* Algebraic and geometric aspects of combinatorics. The use of structures such as groups, polytopes, rings, and simplicial complexes to solve combinatorial problems.

*Prerequisite(s):* MAT 245; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

**MAT 248A – Algebraic Geometry (4 units)**

*Course Description:* Affine varieties and radical ideals. Projective varieties. Abstract varieties. Morphisms and rational maps. Smoothness. Algebraic curves and the Riemann-Roch theorem. Special topics.

*Prerequisite(s):* MAT 250A; MAT 250B; MAT 250C.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

**MAT 248B – Algebraic Geometry (4 units)**

*Course Description:* Complex varieties and the analytic topology. Sheaves and schemes. Fiber products. Separatedness and properness. Applications of scheme theory.

*Prerequisite(s):* MAT 248A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

**MAT 249 – Problem-Solving in Algebra (3 units)**

*Course Description:* Problem-solving in graduate algebra: groups, rings, modules, matrices, tensor products, representations, Galois theory, ring extensions, commutative algebra and homological algebra.

*Prerequisite(s):* MAT 250A (can be concurrent); MAT 250B (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Extensive Problem Solving.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MAT 250A – Algebra (4 units)**

*Course Description:* Group and rings. Sylow theorems, abelian groups, Jordan-Hölder theorem. Rings, unique factorization. Algebras, and modules. Fields and vector spaces over fields. Field extensions.

Commutative rings. Representation theory and its applications.

*Prerequisite(s):* Graduate standing in mathematics or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 250B – Algebra (4 units)**

*Course Description:* Group and rings. Sylow theorems, abelian groups, Jordan-Hölder theorem. Rings, unique factorization. Algebras, and modules. Fields and vector spaces over fields. Field extensions.

Commutative rings. Representation theory and its applications.

*Prerequisite(s):* Graduate standing in mathematics or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 250C – Algebra (4 units)**

*Course Description:* Group and rings. Sylow theorems, abelian groups, Jordan-Hölder theorem. Rings, unique factorization. Algebras, and modules. Fields and vector spaces over fields. Field extensions. Commutative rings. Representation theory and its applications.

*Prerequisite(s):* Graduate standing in mathematics or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 258A – Numerical Optimization (4 units)**

*Course Description:* Numerical methods for infinite dimensional optimization problems. Newton and Quasi-Newton methods, linear and sequential quadratic programming, barrier methods; large-scale optimization; theory of approximations; infinite and semi-infinite programming; applications to optimal control, stochastic optimization and distributed systems.

*Prerequisite(s):* MAT 025; MAT 167.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 258B – Discrete & Mixed-Integer Optimization (4 units)**

*Course Description:* Combinatorial, integer, and mixed-integer linear optimization problems. Ideal and strong formulations, cutting planes, branch and cut, decomposition methods.

*Prerequisite(s):* MAT 025; MAT 167; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 261 – Lie Groups & Lie Algebras (4 units)**

*Course Description:* Lie groups, examples and topological properties. Lie algebras and representation theory, and semisimple Lie algebras.

*Prerequisite(s):* MAT 147 and MAT 150A strongly encouraged; or equivalent; MAT 250A and MAT 215A and MAT 239 (can be concurrent) recommended.

*Learning Activities:* Lecture 3 hour(s); Extensive Problem Solving.

*Enrollment Restriction(s):* Open to graduate students only; or consent of instructor.

*Grade Mode:* Letter.

**MAT 265 – Mathematical Quantum Mechanics (4 units)**

*Course Description:* Mathematical foundations of quantum mechanics: the Hilbert space and Operator Algebra formulations; the Schrödinger and Heisenberg equations, symmetry in quantum mechanics, basics of spectral theory and perturbation theory. Applications to atoms and molecules. The Dirac equation.

*Prerequisite(s):* MAT 201; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAT 266 – Mathematical Statistical Mechanics & Quantum Field Theory (4 units)**

*Course Description:* Mathematical principles of statistical mechanics and quantum field theory. Topics include classical and quantum lattice systems, variational principles, spontaneous symmetry breaking and phase transitions, second quantization and Fock space, and fundamentals of quantum field theory.

*Prerequisite(s):* MAT 265; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**MAT 270 – Mathematics of Data Science (4 units)**

*Course Description:* Mathematical methods and algorithms that are fundamental to a variety of data science applications. Theoretical foundations and inner workings of popular algorithms used in data science, machine learning, and artificial intelligence. Implementation and application of these algorithms to real-world data sets.

*Prerequisite(s):* MAT 127A; MAT 167; MAT 135A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Enrollment Restriction(s):* Open to Graduate Students; undergraduate students obtain consent of instructor.

*Grade Mode:* Letter.

**MAT 271 – Applied & Computational Harmonic Analysis (4 units)**

*Course Description:* Introduction to mathematical basic building blocks (wavelets, local Fourier basis, and their relatives) useful for diverse fields (signal and image processing, numerical analysis, and statistics). Emphasis on the connection between the continuum and the discrete worlds.

*Prerequisite(s):* (MAT 125B or MAT 201C); (MAT 128B or MAT 167); MAT 129; or the equivalent, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

**MAT 280 – Topics in Pure & Applied Mathematics (3 units)**

*Course Description:* Special topics in various fields of pure and applied mathematics. Topics selected based on the mutual interests of students and faculty.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**MAT 290 – Seminar (1-6 units)**

*Course Description:* Advanced study in various fields of mathematics, including analysis, applied mathematics, discrete mathematics, geometry, mathematical biology, mathematical physics, optimization, partial differential equations, probability, and topology.

*Learning Activities:* Seminar 1-6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MAT 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**MAT 299 – Individual Study (1-12 units)***Course Description:* Individual study.*Learning Activities:* Variable.*Grade Mode:* Satisfactory/Unsatisfactory only.**MAT 299D – Dissertation Research (1-12 units)***Course Description:* Dissertation research.*Learning Activities:* Variable.*Repeat Credit:* May be repeated.*Grade Mode:* Satisfactory/Unsatisfactory only.**MAT 301A – Mathematics Teaching Practicum (3 units)***Course Description:* Specialist training in mathematics teaching. Teaching, training, and cross observing classes taught using large group Socratic techniques, small group guided inquiry experiences, and/or other approaches to teaching at various grade levels. Required for advanced degrees in mathematics education.*Prerequisite(s):* MAT 302A (can be concurrent); MAT 303A (can be concurrent); MAT 302A MAT 303A required concurrently or consent of instructor.*Learning Activities:* Fieldwork 5 hour(s), Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 301B – Mathematics Teaching Practicum (3 units)***Course Description:* Specialist training in mathematics teaching. Teaching, training, and cross observing classes taught using large group Socratic techniques, small group guided inquiry experiences, and/or other approaches to teaching at various grade levels. Required for advanced degrees in mathematics education.*Prerequisite(s):* MAT 302B (can be concurrent); MAT 303B (can be concurrent); MAT 302B MAT 303B required concurrently or consent of instructor.*Learning Activities:* Fieldwork 5 hour(s), Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 301C – Mathematics Teaching Practicum (3 units)***Course Description:* Specialist training in mathematics teaching. Teaching, training, and cross observing classes taught using large group Socratic techniques, small group guided inquiry experiences, and/or other approaches to teaching at various grade levels. Required for advanced degrees in mathematics education.*Prerequisite(s):* MAT 302C (can be concurrent); MAT 303B (can be concurrent); MAT 302C MAT 303C required concurrently or consent of instructor.*Learning Activities:* Fieldwork 5 hour(s), Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 302A – Curriculum Development in Mathematics (1 unit)***Course Description:* Mathematics curriculum development for all grade levels. Required for advanced degrees in mathematics education.*Prerequisite(s):* MAT 303A required concurrently or consent of instructor.*Learning Activities:* Lecture/Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 302B – Curriculum Development in Mathematics (1 unit)***Course Description:* Mathematics curriculum development for all grade levels. Required for advanced degrees in mathematics education.*Prerequisite(s):* MAT 303B required concurrently or consent of instructor.*Learning Activities:* Lecture/Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 302C – Curriculum Development in Mathematics (1 unit)***Course Description:* Mathematics curriculum development for all grade levels. Required for advanced degrees in mathematics education.*Prerequisite(s):* MAT 303C required concurrently or consent of instructor.*Learning Activities:* Lecture/Discussion 1 hour(s).*Repeat Credit:* May be repeated.*Grade Mode:* Letter.**MAT 303A – Mathematics Pedagogy (1 unit)***Course Description:* An investigation of the interplay of mathematical pedagogy and mathematical content, including a historical survey of past and present methods in view of some of the influences that shaped their development.*Prerequisite(s):* MAT 302A or MAT 210AL required concurrently or consent of instructor.*Learning Activities:* Lecture/Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 303B – Mathematics Pedagogy (1 unit)***Course Description:* An investigation of the interplay of mathematical pedagogy and mathematical content, including a historical survey of past and present methods in view of some of the influences that shaped their development.*Prerequisite(s):* MAT 302A or MAT 210AL required concurrently or consent of instructor.*Learning Activities:* Lecture/Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 303C – Mathematics Pedagogy (1 unit)***Course Description:* An investigation of the interplay of mathematical pedagogy and mathematical content, including a historical survey of past and present methods in view of some of the influences that shaped their development.*Prerequisite(s):* MAT 302C or MAT 210CL required concurrently or consent of instructor.*Learning Activities:* Lecture/Discussion 1 hour(s).*Repeat Credit:* May be repeated 1 time(s).*Grade Mode:* Letter.**MAT 390 – Teaching Assistantship Training (3 units)***Course Description:* Experience in methods of assisting and teaching of mathematics at the university level. Includes discussion of lecturing techniques, running discussion sessions, holding office hours, preparing and grading of examinations, student-teacher interaction, and related topics. Required of departmental teaching assistants.*Prerequisite(s):* Graduate standing in the Department of Mathematics.*Learning Activities:* Lecture 3 hour(s).*Grade Mode:* Satisfactory/Unsatisfactory only.

**MAT 399 – Individual Study (2-4 units)**

*Course Description:* Individual study of some aspect of mathematics education or a focused work on a curriculum design project under supervision of a faculty member in mathematics.

*Learning Activities:* Independent Study 2-3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Mechanical & Aeronautical Engineering (MAE)

College of Engineering

**MAE 207 – Engineering Experimentation & Uncertainty Analysis (4 units)**

*Course Description:* Design and analysis of engineering experiments with emphasis on measurement standards, data analysis, regressions and general and detailed uncertainty analysis, including statistical treatment of experimental data intervals, propagation of bias and precision errors, correlated bias approximations, and using jitter programs.

*Prerequisite(s):* EME 108; EME 109.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Graduate students.

*Grade Mode:* Letter.

**MAE 210A – Advanced Fluid Mechanics & Heat Transfer (4 units)**

*Course Description:* Development of differential equations governing continuity, momentum and energy transfer. Solutions in laminar flow for exact cases, low and high Reynolds numbers and lubrication theory. Dynamics of inviscid flow.

*Prerequisite(s):* ENG 103; ENG 105; EME 165.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAE 210B – Advanced Fluid Mechanics & Heat Transfer (4 units)**

*Course Description:* Study of stability and transition to turbulence. Introduction to the physics of turbulence. Modeling of turbulence for numerical determination of momentum and heat transfer.

*Prerequisite(s):* MAE 210A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAE 211 – Fluid Flow & Heat Transfer (4 units)**

*Course Description:* Design aspects of selected topics such as: heat conduction, fins; heat transport in ducts, boundary layers and separated flows; heat exchangers.

*Prerequisite(s):* ENG 103; ENG 105; EME 165; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAE 212 – Biomedical Heat & Mass Transport Processes (4 units)**

*Course Description:* Application of principles of heat and mass transfer to biomedical systems related to heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs.

*Prerequisite(s):* EME 165; EBS 125; ECH 153; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* BIM 212.

*Grade Mode:* Letter.

**MAE 216 – Advanced Thermodynamics (4 units)**

*Course Description:* Study of topics important to energy conversion systems, propulsion and other systems using high temperature gases. Classical thermodynamics and quantum statistical mechanics of nonreacting and chemically reacting gases, gas mixtures, and other substances.

*Prerequisite(s):* ENG 105.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAE 217 – Combustion (4 units)**

*Course Description:* Review of chemical thermodynamics and chemical kinetics. Discussion of reacting flows, their governing equations and transport phenomena; detonations; laminar flame structure and turbulent combustion.

*Prerequisite(s):* ENG 103; ENG 105; EME 106.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

**MAE 218 – Advanced Energy Systems (4 units)**

*Course Description:* Review of options available for advanced power generation. Detailed study of basic power balances, component efficiencies, and overall powerplant performance for one advanced concept such as a fusion, magnetohydrodynamic, or solar electric powerplant.

*Prerequisite(s):* ENG 103; ENG 105; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAE 219 – Introduction to Scientific Computing in Solid & Fluid Dynamics (4 units)**

*Course Description:* Scientific calculations with finite element and finite difference methods for multi-dimensional problems in solid and fluid dynamics are performed with examples in C, C++, FORTRAN, and MATLAB script files. Derivation of the basic equations of motion in finite volume form with applications to elasticity, waves.

*Prerequisite(s):* ENG 103; ENG 104.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**MAE 220 – Mechanical Vibrations (4 units)**

*Course Description:* Multiple degrees of freedom; damping measures; Rayleigh's method; vibration absorbers; eigenvalues and modeshapes; modal coordinates; forced vibrations; random processes and vibrations; autocorrelation; spectral density; first passage and fatigue failure; nonlinear systems; phase plane.

*Prerequisite(s):* ENG 122.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MAE 222 – Advanced Dynamics (4 units)**

*Course Description:* Dynamics of particles, rigid bodies and distributed systems with engineering applications; generalized coordinates; Hamilton's principle; Lagrange's equations; Hamilton-Jacobi theory; modal dynamics orthogonality; wave dynamics; dispersion.

*Prerequisite(s):* ENG 102.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MAE 223 – Multibody Dynamics (4 units)**

*Course Description:* Coupled rigid-body kinematics/dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomicity; generalized speeds; partial velocities; mass; inertia tensor/theorems; angular momentum; generalized forces; comparing Newton/Euler, Lagrange's, Kane's methods; computer-aided equation derivation; orientation; Euler; Rodrigues parameters.

*Prerequisite(s):* ENG 102.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* BIM 223.

*Grade Mode:* Letter.

**MAE 225 – Spatial Kinematics & Robotics (4 units)**

*Course Description:* Spatial kinematics, screw theory, spatial mechanisms analysis and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, real-time architecture and software implementation.

*Prerequisite(s):* MAE 222; C Language.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* BIM 225.

*Grade Mode:* Letter.

**MAE 226 – Acoustics & Noise Control (4 units)**

*Course Description:* Description of sound using normal modes and waves; interaction between vibrating solids and sound fields; sound absorption in enclosed spaces; sound transmission through barriers; applications in design, acoustic enclosures and sound walls, room acoustics, design of quiet machinery.

*Prerequisite(s):* ENG 122.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MAE 228 – Introduction to BioMEMS (4 units)**

*Course Description:* Ideal for beginning graduate or advanced undergraduate students interested in microelectromechanical systems (MEMS) topics related to biological applications. Covers topics from various disciplines related to BioMEMS: mechanical, electrical, biomedical, chemical engineering, and materials science.

*Prerequisite(s):* B.S. engineering discipline or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAE 229 – Design & Analysis of Micro-Electromechanical Systems (4 units)**

*Course Description:* Mechanical design of micro-electromechanical systems (MEMS). Device modeling: lumped parameter models; energy methods; nonlinearities; electrical and mechanical noise sources. Actuation and measurement methods: capacitive, piezoresistive, thermal, piezoelectric, and optical techniques. Review of basic electronics: bridge circuits, amplitude modulation; lock-in detection.

*Prerequisite(s):* (ENG 045 or ENG 045Y); ENG 100; ENG 104; and consent of instructor. ENG 122 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MAE 232 – Skeletal Tissue Mechanics (3 units)**

*Course Description:* Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disease. Tissues covered include bone, cartilage and synovial fluid, ligament and tendon.

*Prerequisite(s):* ENG 104B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Cross Listing:* BIM 232.

*Grade Mode:* Letter.

**MAE 234 – Design & Dynamics of Road Vehicles (4 units)**

*Course Description:* Analysis and numerical simulation of road vehicles with on design applications.

*Prerequisite(s):* EME 134.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**MAE 237 – Analysis & Design of Composite Structures (4 units)**

*Course Description:* Modeling and analysis methodology for composite structures including response and failure. Laminated plate bending theory. Introduction to failure processes. Includes discussion of aerospace structural analysis.

*Prerequisite(s):* ENG 104; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MAE 239 – Advanced Finite Elements & Optimization (4 units)**

*Course Description:* Introduction to advanced finite elements and design optimization methods, with application to modeling of complex mechanical, aerospace and biomedical systems. Application of states of the art in finite elements in optimum design of components under realistic loading conditions and constraints.

*Prerequisite(s):* ENG 180 or EAD 115 or MAT 128C.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* BIM 239.

*Grade Mode:* Letter.

## **MAE 240 – Computational Methods in Nonlinear Mechanics (4 units)**

*Course Description:* Deformation of solids and the motion of fluids treated with state-of-the-art computational methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronautical, and biological systems.

*Prerequisite(s):* EAD 115 or MAT 128B or ENG 180.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* BIM 240.

*Grade Mode:* Letter.

## **MAE 245 – Micro- & Nano-Technology in Life Sciences (4 units)**

*Course Description:* Survey of biodevice design from engineering and biological perspectives; micro-/nano-fabrication techniques; surface science and mass transport; essential biological processes and models; proposal development skills on merging aforementioned themes.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* ECH 245, EMS 245, EEC 245.

*Grade Mode:* Letter.

## **MAE 248 – Advanced Turbomachinery (4 units)**

*Course Description:* Preliminary aerodynamic design of axial and radial flow compressors and turbines. Design of diffusers. Selection of turbomachine and configurations and approximations to optimum dimensions and flow angles. Introduction to through flow analysis. Rotating stall and surge, and aeromechanical considerations.

*Prerequisite(s):* ENG 103; ENG 105.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAE 250A – Advanced Methods in Mechanical Design (4 units)**

*Course Description:* Applications of advanced techniques of solid mechanics to mechanical design problems. Coverage of advanced topics in stress analysis and static failure theories with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools for life cycle evaluation.

*Prerequisite(s):* EME 150A; EME 150B; or the equivalents or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **MAE 250B – Advanced Methods in Mechanical Design (4 units)**

*Course Description:* Applications of advanced techniques of solid mechanics to mechanical design problems. Advanced topics in variational methods of mechanics with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools.

*Prerequisite(s):* MAE 250A.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **MAE 250C – Mechanical Performance of Materials (4 units)**

*Course Description:* Occurrence, mechanisms, and prediction of fatigue and fracture phenomenon. Use of stress and strain to predict crack initiation. Use of fracture mechanics to predict failure and crack propagation. Effects of stress concentration, manufacturing, load sequence, irregular loading, and multi-axial loading.

*Prerequisite(s):* Undergraduate course in stress analysis and mechanical behavior of materials.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **MAE 252 – Information Processing for Autonomous Robotics (4 units)**

*Course Description:* Computational principles for sensing, reasoning, and navigation for autonomous robots.

*Prerequisite(s):* EME 154; EME 171; ENG 006; EME 005; or equivalent programming experience to ENG 006 EME 005; MAE 154, MAE 171, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAE 253 – Network Theory & Applications (4 units)**

*Course Description:* Develops the mathematical theory underlying growth, structure and function of networks with applications to physical, social, biological and engineered systems. Topics include network growth, resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures.

*Prerequisite(s):* MAT 022A; MAT 022B; (STA 013 or STA 013Y or STA 120); Experience with computer software, or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* ECS 253.

*Grade Mode:* Letter.

## **MAE 254 – Engineering Software Design (4 units)**

*Course Description:* Principle and design of engineering software.

Advanced topics in engineering software design, applications of object-oriented programming, very high-level languages, real-time multi-thread computing and sensor fusion, Web-based network computing, graphics, and GUI in engineering.

*Prerequisite(s):* EME 005; ENG 180.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **MAE 255 – Computer Aided Design & Manufacturing (4 units)**

*Course Description:* Representation and processing of geometrical information in design and manufacturing. Numeric and symbolic computations. Coordinate systems and transformations. Bezier and B-spline curves and surfaces. Interpolation and approximation methods. Intersections, offsets, and blends. Path planning for machining, inspection, and robotics applications.

*Prerequisite(s):* Proficiency in a high level programming language such as Fortran, Pascal or C.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **MAE 256 – Sustainable Manufacturing & Design (4 units)**

*Course Description:* Definitions, methods, and dimensions of sustainability in manufacturing and product design. Emphasis on resource efficiency and life cycle engineering in the context of the production environment.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students; undergraduate students allowed only with consent of instructor.

*Grade Mode:* Letter.

## **MAE 258 – Hybrid Electric Vehicle System Theory & Design (4 units)**

*Course Description:* Advanced vehicle design for fuel economy, performance, and low emissions, considering regulations, societal demands and manufacturability. Analysis and verification of computer design and control of vehicle systems in real vehicle tests. Advanced engine concepts.

*Prerequisite(s):* EME 150B; graduate standing in Mechanical and Aeronautical Engineering.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **MAE 259 – Modern Manufacturing Technologies (4 units)**

*Course Description:* Review of manufacturing processes, simulation methods, quality control, and machine tool design. Design for manufacturing and assembly and operation management are also introduced.

*Prerequisite(s):* EME 050 or equivalent is recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **MAE 262 – Advanced Aerodynamics (4 units)**

*Course Description:* Study of invicid and viscous flows about aerodynamic shapes at subsonic, transonic and supersonic conditions. Application of aerodynamic theory to design for reduced drag and increased lift.

*Prerequisite(s):* EAE 126.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAE 263 – Introduction to Computational Aerodynamics & Fluid Dynamics (4 units)**

*Course Description:* Introduction to numerical methods for solution of fluid flow problems. Discretization techniques and solution algorithms. Finite difference solutions to classical model equations pertinent to wave phenomena, diffusion phenomena, or equilibrium. Application to the incompressible and compressible Navier-Stokes equations.

*Prerequisite(s):* ENG 103; ENG 105; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students.

*Grade Mode:* Letter.

## **MAE 265 – Aeroacoustics (4 units)**

*Course Description:* Introduction to acoustics, Fourier transform and sound pressure level, Green's function, Lighthill's acoustic analogy and jet noise, tailored Green's function and acoustic scattering, Ffowcs Williams and Hawkings equation and rotorcraft noise, turbulence for aeroacoustics and leading-edge noise, trailing-edge noise and wind turbine noise, duct acoustics and aircraft engine noise.

*Prerequisite(s):* ENG 103.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

## **MAE 269 – Fuel Cell Systems (4 units)**

*Course Description:* Basics of electrochemistry and fuel cell engines in mobile and stationary applications. Aspects of fuel cell energy converters and their subsystems including practice with existing fuel cell and hydrogen systems on campus.

*Prerequisite(s):* EME 106; EME 109; EME 165; or equivalent courses, or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Graduate or junior/senior undergraduate as a technical elective.

*Grade Mode:* Letter.

## **MAE 271 – Advanced Modeling & Simulation of Mechatronic Systems (4 units)**

*Course Description:* Multiport models of mechanical, electrical, hydraulic, and thermal devices; bond graphs, block diagrams and state space equations; modeling of multiple energy domain systems; three-dimensional mechanics; digital simulation laboratory.

*Prerequisite(s):* EME 172; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **MAE 272 – Theory & Design of Control Systems (4 units)**

*Course Description:* Mathematical representations of linear dynamical systems. Feedback principles; benefits and cost of feedback. Analysis and design of control systems based on classical and modern approaches, with emphasis on applications to mechanical and aeronautical systems.

*Prerequisite(s):* EME 172; or the equivalent.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **MAE 273A – Single Input Single Output (SISO) Optimal Robust Control (4 units)**

*Course Description:* Analysis and design of SISO (Single Input Single Output) feedback control systems utilizing Youla Parameterization technique. Optimal control concepts (controllability, observability, Linear Quadratic Regulator) and an introduction to Kalman filtering and robust optimal control theory for designing H<sub>2</sub>/LQG and H<sub>inf</sub> controllers.

*Prerequisite(s):* EME 172; MAE 272; or consent of instructor. EEC 250 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students.

*Grade Mode:* Letter.

## **MAE 273B – Multiple Input Multiple Output (MIMO) Optimal Robust Control (4 units)**

*Course Description:* Analysis and design of MIMO (Multiple Input Multiple Output) feedback control systems utilizing Youla Parameterization technique. Uncertainty modeling and MIMO feedback control system design using loop shaping with H<sub>inf</sub>/H<sub>2</sub> system norm optimization techniques.

*Prerequisite(s):* MAE 272; MAE 273A; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students.

*Grade Mode:* Letter.

## **MAE 275 – Guidance & Control of Unmanned Aerial Systems (4 units)**

*Course Description:* Introduction to Unmanned Aerial Systems (UAS). Challenges in guiding and controlling limited-payload small and miniature aircraft systems. Coordinate frames, kinematics and dynamics, linear design models, autopilot design, sensor models, state estimation, design model for guidance, straight-line and orbit following, and path planning.

*Prerequisite(s):* ENG 102; EME 172; or consent of instructor. Familiarity with simulation tools, such as Matlab/Simulink, expected.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students.

*Grade Mode:* Letter.

## **MAE 276 – Data Acquisition & Analysis (4 units)**

*Course Description:* Application of computers for data acquisition and control. Topics include computer architecture, characteristics of transducers, hardware for laboratory applications of computers, fundamentals of interfaces between computers and experimental equipment, programming techniques for data acquisition and control, basic data analysis.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MAE 290C – Graduate Research Conference (1 unit)**

*Course Description:* Individual and/or group conference on problems, progress, and techniques in mechanical and aeronautical engineering research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MAE 297 – SEMINAR (1 unit)**

*Course Description:* Current topics in engineering including developments in mechanical and aeronautical engineering with presentations by students, faculty, and visitors.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MAE 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **MAE 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MAE 390 – Teaching of Aeronautical Science & Engineering (1 unit)**

*Course Description:* Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports.

*Prerequisite(s):* Meet qualifications for teaching assistant and/or associate-in in Aeronautical Science and Engineering.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MAE 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Mechanical Engineering (EME)**

## **College of Engineering**

### **EME 001 – Mechanical Engineering (1 unit)**

*Course Description:* Description of the field of mechanical engineering with examples taken from industrial applications, discussions of the practice with respect to engineering principles, ethics, and responsibilities.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Pass/No Pass only.

### **EME 005 – Computer Programming for Engineering Applications (4 units)**

*Course Description:* Structured programming in C for solving problems in engineering. Introduction to MATLAB and comparison study of C/C++ with MATLAB.

*Prerequisite(s):* MAT 016A (can be concurrent) or MAT 021A (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

### **EME 050 – Manufacturing Processes (4 units)**

*Course Description:* Modern manufacturing methods, safety, manufacturing instructions, computer-aided manufacturing and their role in the engineering design and development process.

*Prerequisite(s):* ENG 004 C- or better; PHY 009A C- or better.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering and Mechanical Engineering/Materials Science Engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 092 – Internship in Mechanical Engineering (1-5 units)**

*Course Description:* Supervised work-study experience in engineering.

*Prerequisite(s):* Lower division standing; approval of project prior to period of internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **EME 097TC – Mentoring & Tutoring Engineering in the Community (1-4 units)**

*Course Description:* Mentoring, coaching, tutoring and/or supervision of students in K-12 schools in Engineering-related topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **EME 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor. Lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **EME 106 – Thermo-Fluid Dynamics (4 units)**

*Course Description:* Inviscid incompressible flow, compressible flow, ideal gas mixtures, psychrometrics, reacting mixtures and combustion.

*Prerequisite(s):* ENG 103 C- or better; ENG 105 C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, and Mechanical Engineering/Materials Science Engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 108 – Measurement Systems (4 units)**

*Course Description:* Experiments to illustrate principles of mechanical systems. Signal analysis; Demonstration of basic sensors for mechanical systems; Experimental project design; Experiments involving voltage measurement; strain gauges, dynamic systems of 1st order.

*Prerequisite(s):* ENG 100 C- or better; ENG 102 C- or better; ENG 104 recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical/Materials Science & Engineering.

*Credit Limitation(s):* Only 3 units of credit for students who have previously taken BIM 111; 2 units of credit for students who have previously taken EBS 165; 1 unit of credit allowed for students who have completed EME 107B (former version of EME 108).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **EME 109 – Experimental Methods for Thermal Fluids (4 units)**

*Course Description:* Experiments illustrating principles of thermal-fluid systems and related measurement devices. Statistical design of experiments and uncertainty analysis of data; thermodynamic cycles, combustion, compressible and incompressible flows.

*Prerequisite(s):* EME 106 C- or better.

*Learning Activities:* Lecture 2 hour(s), Laboratory 1.50 hour(s), Discussion 1 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical/Materials Science Engineering Majors.

*Credit Limitation(s):* Only 3 units of credit for students who have previously taken ECH 155A; 2 units of credit for students who have previously taken ECH 155B; 3 units of credit for students who have previously taken ECI 141L; 1 unit of credit for students who have already completed EME 107A (former version of EME 109).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 115 – Introduction to Numerical Analysis & Methods (4 units)**

*Course Description:* Number representation, Taylor expansions, error and stability analysis, roots of nonlinear equations, sets of linear equations, numerical integration, ordinary differential equations.

*Prerequisite(s):* (ENG 006 C- or better or EME 005 C- or better or ECS 030 C- or better or ECS 032A C- or better or ECS 036A C- or better or ECH 060 C- or better or ECM 006 C- or better); ((MAT 021A C- or better, MAT 021B C- or better, MAT 021C C- or better, MAT 021D C- or better, (MAT 022A C- or better or MAT 027A C- or better), (MAT 022B C- or better or MAT 027B C- or better)), (PHY 009A C- or better, PHY 009B C- or better, PHY 009C C- or better).

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken EAD 115.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 121 – Engineering Applications of Dynamics (4 units)**

*Course Description:* Technical elective that revisits dynamic principles with emphasis on engineering applications; Equations of motion are derived and put into a format for computer solution; There is a computer laboratory where real engineering systems are simulated.

*Prerequisite(s):* ENG 102 C- or better; (ENG 006 C- or better or EME 005 C- or better or ECS 030 C- or better).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, and Mechanical Engineering/Materials Science Engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EME 134 – Vehicle Stability (4 units)**

*Course Description:* Analytical and experimental studies of the dynamics, stability and control of vehicles such as cars, trailers, airplanes, motorcycles, bicycles and rail cars.

*Prerequisite(s):* ENG 102 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, and Mechanical Engineering/Materials Science Engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EME 139 – Stability of Flexible Dynamic Systems (4 units)**

*Course Description:* Stability of flexible systems. Introduction to fluid-structure interaction. Mechanical vibrations. Design of mechanical subsystems or systems under constraints. Dynamic instabilities. Flutter. Control effectiveness. Energy extraction from fluid-structure interactions. Design applications to aerospace, mechanical and biomedical systems.

*Prerequisite(s):* ENG 102 C- or better; ENG 103 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* No credit for students who have completed former course EAE 139.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EME 150A – Mechanical Design (4 units)**

*Course Description:* Principles of mechanics applied to design. Deformation and stress analysis. Structural integrity under static and fluctuating loads. Projects demonstrate progression from concept to engineering analysis, with emphasis on strength and durability.

*Prerequisite(s):* (ENG 045 C- or better or ENG 045Y C- or better); (ENG 104 C- or better, EME 050 C- or better (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**EME 150B – Mechanical Design (4 units)**

*Course Description:* Principles of engineering mechanics applied to the design and selection of mechanical components. Design projects, which concentrate on conceptual design, engineering analysis, methods of manufacture, material selection, and cost.

*Prerequisite(s):* EME 150A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EME 151 – Statistical Methods in Design & Manufacturing (4 units)**

*Course Description:* Methods of statistical analysis with emphasis on applications in mechanical design and manufacturing. Applications include product evaluation and decision making, probabilistic design, systems reliability, and fatigue under random loading.

*Prerequisite(s):* EME 150A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EME 152 – Computer-Aided Mechanism Design (4 units)**

*Course Description:* Principles of computer-aided mechanism design. Computer-aided kinematic, static, and dynamic analysis and design of planar mechanisms such as multiple-loop linkages and geared linkages. Introduction to kinematic synthesis of mechanisms.

*Prerequisite(s):* ENG 102 C- or better; (EME 005 C- or better or ENG 006 C- or better or ECS 030 C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EME 154 – Mechatronics (4 units)**

*Course Description:* Overview of mechatronics system and control system design concepts, control software architecture, control hardware architecture, microcontroller and interface technology for mechatronics control, sensor for mechatronics systems, actuator drives.

*Prerequisite(s):* ENG 100 C- or better; ENG 102 C- or better; EME 050 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**EME 161 – Combustion & the Environment (4 units)**

*Course Description:* Introduction to combustion kinetics; premixed and diffusion flames; turbulent combustion; pollutant formation; examples of combustion devices such as internal combustion engines, gas turbines, furnaces and incinerators; alternative fuels.

*Prerequisite(s):* EME 106 C- or better.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 163 – Internal Combustion Engines & Future Alternatives (4 units)**

*Course Description:* Fundamentals of internal combustion engine design and performance. Future needs to adapt to environmental concerns, and the feasibility of better alternatives in the future.

*Prerequisite(s):* EME 050 C- or better; EME 106 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 164 – Introduction to Heating, Ventilation & Air Conditioning Systems (4 units)**

*Course Description:* Introduction to basic mechanisms and processes associated with heating, ventilation and air conditioning (HVAC), including equipment and systems used for HVAC in residential and commercial buildings.

*Prerequisite(s):* EME 106 C- or better; EME 165 C- or better.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Only 2 units for students who have completed ECI 125.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 165 – Heat Transfer (4 units)**

*Course Description:* Conduction, convection, and radiation heat transfer. Computational modeling of heat transfer in engineering. Applications to engineering equipment with the use of digital computers.

*Prerequisite(s):* (ENG 006 C- or better or EME 005 C- or better or ECS 030 C- or better); ENG 103 C- or better; ENG 105 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 171 – Analysis, Simulation & Design of Mechatronic Systems (4 units)**

*Course Description:* Modeling of dynamic engineering systems in various energy domains. Analysis and design of dynamic systems. Response of linear systems. Digital computer simulation and physical experiments.

*Prerequisite(s):* ENG 100 C- or better; ENG 102 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 172 – Automatic Control of Engineering Systems (4 units)**

*Course Description:* Classical feedback control systems; block diagrams; performance specifications; steady state errors; rise and settling times; root locus; PID controllers; Bode and Nyquist plots; stability; phase and gain margins; advanced topics as time allows.

*Prerequisite(s):* ENG 100 C- or better; ENG 102 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Mechanical Engineering, Aerospace Science & Engineering, Mechanical Engineering/Materials Science and Engineering.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 185A – Mechanical Engineering Systems Design Project (4 units)**

*Course Description:* Major mechanical engineering design experience; the mechanical engineering design process and its use in the design of engineering systems incorporating appropriate engineering standards and multiple realistic constraints.

*Prerequisite(s):* EME 050 C- or better; EME 150A C- or better; EME 165 C- or better (can be concurrent); ENG 003, CMN 001 or CMN 003 recommended; upper division composition recommended.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to Senior standing in Mechanical Engineering (EMEC).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL).

## **EME 185B – Mechanical Engineering Systems Design Project (4 units)**

*Course Description:* Major mechanical engineering design experience; the mechanical engineering design process and its use in the design of engineering systems incorporating appropriate engineering standards and multiple realistic constraints.

*Prerequisite(s):* EME 185A; senior standing in the Department of Mechanical and Aerospace Engineering.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **EME 189A – Selected Topics in Mechanical Engineering: Energy Systems & the Environment (1 unit)**

*Course Description:* Directed group study in Energy Systems & the Environment.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **EME 189B – Selected Topics in Mechanical Engineering: Engineering Controls (1-5 units)**

*Course Description:* Directed group study in Engineering Controls.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

### **EME 189C – Selected Topics in Mechanical Engineering: Engineering Dynamics (1-5 units)**

*Course Description:* Directed group study in Engineering Dynamics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189D – Selected Topics in Mechanical Engineering: Biomechanics (1-5 units)**

*Course Description:* Directed group study in Biomechanics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189E – Selected Topics in Mechanical Engineering: Fluid Mechanics (1-5 units)**

*Course Description:* Directed group study in Fluid Mechanics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189F – Selected Topics in Mechanical Engineering: Manufacturing Engineering (1-5 units)**

*Course Description:* Directed group study in Manufacturing Engineering.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189G – Selected Topics in Mechanical Engineering: Mechanical Engineering & Product Design (1-5 units)**

*Course Description:* Directed group study in Mechanical Engineering & Product Design.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189H – Selected Topics in Mechanical Engineering: Mechatronics Systems (1-5 units)**

*Course Description:* Directed group study in Mechatronics Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189I – Selected Topics in Mechanical Engineering: MEMS/Nanotechnology (1-5 units)**

*Course Description:* Directed group study in MEMS/Nanotechnology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189J – Selected Topics in Mechanical Engineering: Solid & Structural Mechanics (1-5 units)**

*Course Description:* Directed group study in Solid & Structural Mechanics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189K – Selected Topics in Mechanical Engineering: Thermodynamics (1-5 units)**

*Course Description:* Directed group study in Thermodynamics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 189L – Selected Topics in Mechanical Engineering: Vehicle & Transportation Systems (1-5 units)**

*Course Description:* Directed group study in Vehicle & Transportation Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

### **EME 192 – Internship in Engineering (1-5 units)**

*Course Description:* Supervised work experience in mechanical engineering.

*Prerequisite(s):* Upper division standing; approval of project prior to period of internship.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

### **EME 197TC – Mentoring & Tutoring Engineering in the Community (1-4 units)**

*Course Description:* Mentoring, coaching, tutoring and/or supervision of students in K-12 schools in Engineering-related topics.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

### **EME 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **EME 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **Medical Microbiology (MMI)**

School of Medicine

**MMI 098 – Directed Group Study (1-5 units)**

*Course Description:* Group Study in Medical Microbiology and Immunology; primarily for lower division students. Directed reading and discussion on selected topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**MMI 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Enrollment Restriction(s):* Restricted to lower division standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**MMI 130 – Medical Mycology (2 units)**

*Course Description:* Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy. Course offered in alternate years.

*Prerequisite(s):* Consent of instructor; a course in pathogenic microbiology.

*Learning Activities:* Lecture 2 hour(s).

*Cross Listing:* MMI 430.

*Grade Mode:* Letter.

**MMI 177 – Human Virology (3 units)**

*Course Description:* Covers viruses that cause diseases in humans, the structure and classification of medically-important viruses, methods of transmission and replication strategies. Viruses that are important human pathogens and epidemiology, immune response, detection, diagnosis and treatment of human viral infections. Discussion of clinical cases, cellular pathology, cancer and emerging and reemerging human viral diseases including Coronaviruses, vaccines, antivirals, and use of viruses in medicine.

*Prerequisite(s):* BIS 102 or BIS 101 or BIS 103 or BIS 104 or BIS 105.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MMI 188A – Human Immunology (3 units)**

*Course Description:* Understand the human immune system, the nomenclature and functional significance of the tissues, cells, proteins and genes, as well as the normal regulatory mechanisms and pathologic outcomes related to the immune response.

*Prerequisite(s):* Undergraduate level introductory Biology course.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Student cannot enroll in this course if already taken MMI 188 or MMI 188B.

*Grade Mode:* Letter.

**MMI 188B – Human Immunology (4 units)**

*Course Description:* Understand the human immune system, the nomenclature and functional significance of the tissues, cells, proteins and genes, as well as the normal regulatory mechanisms and pathologic outcomes related to the immune response.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have taken MMI 188 or MMI 188A.

*Grade Mode:* Letter.

**MMI 192 – Internship in Medical Microbiology (1-12 units)**

*Course Description:* Supervised work experience in medical microbiology and related fields.

*Prerequisite(s):* Upper division standing; approval of project prior to period of internship.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**MMI 194H – Senior Honors Project in Medical Microbiology & Immunology (5 units)**

*Course Description:* Project in research related to immunology of medically important viruses. Development of a hypothesis-driven project, performance of experimental protocols and preparation of graphical representation of original data. Requires oral and written presentation of research results.

*Prerequisite(s):* MMI 199; consent of instructor.

*Learning Activities:* Independent Study 15 hour(s).

*Repeat Credit:* May be repeated 3 time(s) with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**MMI 198 – Group Study in Medical Microbiology (1-5 units)**

*Course Description:* Directed reading and discussion and/or laboratory investigation on selected topics.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**MMI 199 – Research in Medical Microbiology (1-5 units)**

*Course Description:* Individual research.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**MMI 200D – Mechanisms for Microbial Interactions with Hosts (3 units)**

*Course Description:* Study of mechanisms involved in microbial interactions within a host environment. The following principles are basic to understanding these interactions: host recognition, invasion, competition and growth, and host defense.

*Prerequisite(s):* MIB 200A; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **MMI 210A – Critical Analysis of Contemporary Research on Animal Models of Human Infectious Disease (1 unit)**

*Course Description:* Topics will include diverse vertebrate and invertebrate models of human infectious diseases.

*Prerequisite(s):* Consent of instructor; students funded by the Animal Models of Infectious Diseases Training Grant.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MMI 210B – Comparative Analysis of Animal Models of Human Infectious Diseases (1 unit)**

*Course Description:* Compares the major vertebrate and invertebrate animal models that are used most commonly to study human infectious disease, including mouse, non-human primate, Caenorhabditis elegans, and drosophila.

*Prerequisite(s):* Students funded by the Animal Models of Infectious Diseases Training Grant; others by consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MMI 215 – Medical Parasitology (3 units)**

*Course Description:* Epidemiology, pathogenesis, diagnostic methods and current literature discussion of protozoa, helminths and arthropods of medical importance.

*Prerequisite(s):* Graduate student with consent of instructor.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s).

*Grade Mode:* Letter.

## **MMI 280 – The Endogenous Microbiota in Health & Disease (3 units)**

*Course Description:* Recent insights into the microbial communities inhabiting mucosal surfaces, and will discuss how the composition of these communities contributes to normal development, metabolism, education of the immune system, and disease susceptibility. Offered in spring quarter; even years.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MMI 291 – Seminar in Microbiology & Immunology (1 unit)**

*Course Description:* Research seminars on current topics in microbiology and immunology.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to students with upper division or graduate standing.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MMI 298 – Group Study in Medical Microbiology & Immunology (1-5 units)**

*Course Description:* Directed reading and discussion and/or laboratory investigation on selected topics. Sections 1, 2, 4, 5 are S/U grading only.

*Prerequisite(s):* Consent of instructor; open to graduate students.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MMI 299 – Research (1-12 units)**

*Course Description:* Laboratory investigation contributing to the dissertation for a graduate degree.

*Prerequisite(s):* Consent of instructor; open to graduate students.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MMI 410 – Physician Scientist Molecular Medicine Journal Club (1 unit)**

*Course Description:* Weekly seminars by students on research articles in current literature. Topics/articles to be selected by instructors to include a broad range of frontiers in biomedical literature.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **MMI 430 – Medical Mycology (2 units)**

*Course Description:* Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy.

*Prerequisite(s):* Consent of instructor; a course in pathogenic microbiology.

*Learning Activities:* Lecture 2 hour(s).

*Cross Listing:* MMI 130.

*Grade Mode:* Honors/Pass/Fail.

## **MMI 480A – Medical Immunology (2.5 units)**

*Course Description:* Helping to understand the immune system, the nomenclature and functional significance of the tissues, cells, proteins and genes of the immune system, as well as the normal regulatory mechanisms and pathologic outcomes related to the immune response.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 0.50 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

## **MMI 480B – Medical Microbiology (5.5 units)**

*Course Description:* Discussion of the diseases caused by infectious agents includes their pathogenesis, clinical manifestations, diagnosis, treatment epidemiology and prevention. Covers the general properties of and diagnostic techniques for bacteria, fungi and viruses.

*Learning Activities:* Lecture 2.75 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

## **MMI 480D – Medical Microbiology D (1 unit)**

*Course Description:* Continuation of longitudinal medical microbiology course series.

*Learning Activities:* Lecture/Lab 1 hour(s).

*Grade Mode:* Pass/Fail only.

## **MMI 497T – Tutoring in Medical Microbiology (1-5 units)**

*Course Description:* Assist instructor by tutoring medical students in one of the departmental courses that is a component of the required curriculum of the School of Medicine.

*Prerequisite(s):* Consent of instructor; appropriate preparation in subject matter.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **MMI 498 – Group Study in Medical Microbiology & Immunology (1-5 units)**

*Course Description:* Directed reading and discussion and/or laboratory investigation on selected topics.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **MMI 499 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Medical Pharmacology & Toxicology (PHA)**

School of Medicine

## **PHA 092 – Internship in Pharmacology (1-12 units)**

*Course Description:* Supervised work experience in pharmacology and related fields.

*Prerequisite(s):* Lower division student with good academic standing; approval of project prior to period of internship.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **PHA 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **PHA 192 – Internship in Pharmacology (1-12 units)**

*Course Description:* Supervised work experience in pharmacology and related fields.

*Prerequisite(s):* Consent of instructor; upper division standing; approval of project prior to period of internship.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **PHA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **PHA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

## **PHA 205 – Problem Solving in Pharmacology (1 unit)**

*Course Description:* Introduction to a current biomedical problem that would benefit from a developing drug and will develop an experimental strategy for addressing the issue. Develop model systems for testing various classic and recent pharmacological approaches.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Students in Pharmacology and Toxicology, Chemistry and Clinical Research Graduate Groups; other students may be accepted with consent of instructor.

*Repeat Credit:* May be repeated 12 time(s) as subject changes every quarter; each course is unique and may be taken as often as desirable; certain students (Trainees of the Training Program in Pharmacological Sciences) must take course for at least three years.

*Grade Mode:* Letter.

## **PHA 207 – Drug Discovery & Development (3 units)**

*Course Description:* Survey of the process by which a drug is discovered, developed and made available to the public. Topics include drug identification and optimization, safety testing, clinical evaluation, regulatory issues, intellectual property, formulation, and the global pharmaceutical industry.

*Prerequisite(s):* An equivalent course in general pharmacology, or knowledge of basic pharmacology.

*Learning Activities:* Lecture/Discussion 2 hour(s), Extensive Writing 1 hour(s).

*Enrollment Restriction(s):* Intended for graduate students in Pharmacology and Toxicology, Chemistry and Clinical Research Graduate Groups; other students, including undergraduates, may be accepted with consent of instructors.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **PHA 208 – Advanced Cardiac Physiology & Pharmacology (3 units)**

*Course Description:* Detailed characterization of the mechanisms involved in cardiac excitation–contraction coupling, alterations that occur in heart disease and pharmacological interventions. Topics include cardiac contractile apparatus, action potential, Ca cycling, excitation–transcription coupling, cardiac inotropy, heart failure and arrhythmias.

*Prerequisite(s):* An equivalent course in general pharmacology or physiology (example, BIM 204), or knowledge of basic pharmacology/physiology.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students from the Pharmacology and Toxicology, Molecular, Cellular and Integrated Physiology, Biomedical Engineering and Clinical Research Graduate Groups; other students (including undergraduates) may be accepted upon consultation with the instructors.

*Grade Mode:* Letter.

## **PHA 225 – Gene & Cellular Therapies (3 units)**

*Course Description:* Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variation, genetic diseases, methods to manipulate gene expression, viral and non-viral delivery vectors, history and progress of gene therapy, case studies, and ethical issues.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* GGG 225.

*Grade Mode:* Letter.

## **PHA 234 – Advances in Computational Physiology & Pharmacology (2 units)**

*Course Description:* Multi-scale biomedical modeling methodologies and applications, with emphasis on ion channel structure-function, computer-aided drug design, and membrane excitability. State-of-the-art techniques used for multi-scale modeling of biomedical systems and their applications.

*Prerequisite(s):* No formal requirements; basic knowledge of mathematics, physics, chemistry, and biology helpful.

*Learning Activities:* Lecture 2 hour(s).

*Cross Listing:* HPH 234.

*Grade Mode:* Letter.

## **PHA 291 – Pharmacology Research Seminar Series (1 unit)**

*Course Description:* Research seminars on current topics in Pharmacology.

*Prerequisite(s):* Consent of instructor; upper division or graduate standing.

*Learning Activities:* Seminar 1 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **PHA 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **PHA 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **PHA 400A – Pharmacology (2 units)**

*Course Description:* Principles in pharmacology, including pharmacokinetics, drug metabolism and the actions, uses and toxicities of the major classes of drugs.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Lecture 1 hour(s), Discussion/Laboratory 0.30 hour(s).

*Enrollment Restriction(s):* Restricted to Medical student only.

*Grade Mode:* Pass/Fail only.

## **PHA 400B – Pharmacology (1.5 units)**

*Course Description:* Principles in pharmacology, including autonomic pharmacology, general anesthetics, neuropharmacology and sedative/hypnotics.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress; medical students only.

*Learning Activities:* Lecture 1 hour(s), Discussion 0.25 hour(s).

*Grade Mode:* Pass/Fail only.

## **PHA 400C – Pharmacology (3.5 units)**

*Course Description:* Treatment of respiratory and cardiovascular disease, central nervous system drugs, GI, Toxicology and chemotherapy.

Specific topics include: asthma, chronic obstructive pulmonary disease, hypertension, congestive heart failure, and the treatment of arrhythmias. Pain Management, depression, psychosis, acid reflux, IBS and toxicology.

*Prerequisite(s):* PHA 400A; PHA 400B; approval by School of Medicine

Committee on Student Progress; medical students only.

*Learning Activities:* Lecture 2 hour(s), Discussion 0.50 hour(s).

*Grade Mode:* Pass/Fail only.

## **PHA 445 – Introduction to Integrative Medicine (1 unit)**

*Course Description:* Basic principles of alternative medical systems (e.g., traditional Chinese, Ayurvedic, Tibetan), alternative practices (e.g., chiropractic, osteopathy, naturopathy, homeopathy, herbalism, guided imagery/meditation, massage therapy), and mind/body connection are presented as introduction to integrating alternative treatments into traditional medicinal practice.

*Prerequisite(s):* Medical student in good standing.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PHA 490 – Seminar in Pharmacology for Medical Students (1 unit)**

*Course Description:* Seminar in pharmacology for medical students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PHA 497T – Tutoring in Pharmacology (1-5 units)**

*Course Description:* Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine.

*Prerequisite(s):* Advanced standing or consent of instructor.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PHA 498 – Special Study for Medical Students (1-5 units)**

*Course Description:* Special study in pharmacology for medical students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Discussion.

*Grade Mode:* Honors/Pass/Fail.

## **PHA 499 – Directed Research for Medical Students (1-12 units)**

*Course Description:* Directed research in pharmacology for medical students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Medical Sciences (MDS)**

**School of Medicine**

## **MDS 099 – Special Study in Medicine for Undergraduates (1-5 units)**

*Course Description:* Participate in research projects relating to medicine with faculty in the School of Medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MDS 192 – Medical Education Internship for Advanced Undergraduates (1-12 units)**

*Course Description:* Participate in projects related to curriculum development in support of curriculum for M.D. degree. Gain work experience and appreciation for innovative approaches to learning in basic and clinical sciences of medical education.

*Prerequisite(s):* Consent of instructor; competency with computers.

*Learning Activities:* Internship 3-36 hour(s).

*Enrollment Restriction(s):* Enrollment dependent on availability of intern positions.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **MDS 400 – Summer Pre-Matriculation Program (2 units)**

*Course Description:* Two-week program provides students from diverse backgrounds an early introduction to learning skills that will facilitate success in medical school.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* PE Activity 7 hour(s), Independent Study 15 hour(s), Lecture 14 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 401 – Applications of Computers to Medical Practice (2 units)**

*Course Description:* Proficiency in computer applications relative to practice of medicine, with emphasis on email, literature searching, file transfer, and hospital information services. Given online, at home or in lab; time and place determined by student.

*Prerequisite(s):* Enrollment in medical school.

*Learning Activities:* Auto Tutorial 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **MDS 402 – Clinical & Cultural Spanish (1-6 units)**

*Course Description:* Fluent Spanish-speaking medical students, nursing students and physician assistants students learn a comprehensive set of medical vocabulary and cultural aspects related to the treatment of Spanish speaking patients.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Practice 1 hour(s), Independent Study 4 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 403 – Science & Practice of Mindfulness & Compassion (1 unit)**

*Course Description:* Examines current scientific evidence for the effects of different mindfulness and compassion meditation practices in both healthy and clinical samples.

*Learning Activities:* Lecture/Discussion 10 hour(s), Independent Study 20 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 406 – Endocrinology, Nutrition, Reproduction & Genetics (9.5 units)**

*Course Description:* Basic and pathophysiologic processes involved in human reproductive and endocrine control systems, nutritional regulation, and foundational genetics across the lifespan. Integrate information across these systems and use clinical reasoning process to identify and understand relevant perturbations and diseases.

*Prerequisite(s):* BCM 410A; HPH 400; consent of instructor.

*Learning Activities:* Lecture 3.80 hour(s), Discussion/Laboratory 2.80 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/Fail only.

## **MDS 410 – Advancing Student-Run Clinics at UC Davis (1 unit)**

*Course Description:* Introduction to resources, applied clinical skills, and program-building for medical students who volunteer at student-run free clinics, with the goal to improve care for the patients served. Introduce and review application of basic clinical skills needed to care for common diseases. Connect students to resources from state and national organizations. Create sustainability of student-run clinics through program-building and training.

*Learning Activities:* Seminar.

*Grade Mode:* Pass/Fail only.

## **MDS 411 – Doctoring 1 (7 units)**

*Course Description:* Small group training in patient communication, interviewing techniques, physical exam and clinical identification. Outpatient clinical experiences and didactic presentations also included.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Clinical Activity 1 hour(s), Lecture 1 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 411B – Doctoring 1 (5 units)**

*Course Description:* Small, case-based learning groups with training in patient communication and interviewing techniques, clinical identification and problem solving, applications of social, psychological, cultural, bioethical, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentations.

*Learning Activities:* Discussion 1.50 hour(s), Clinical Activity 1.50 hour(s), Lecture/Discussion 1.80 hour(s).

*Enrollment Restriction(s):* Medical students only.

*Grade Mode:* Pass/Fail only.

## **MDS 411KA – ACE-PC Program Doctoring 1 (8 units)**

*Course Description:* Small case-based learning groups with training in patient communication and interviewing techniques clinical identification and problem solving applications of social psychological cultural bioethical and basic science concepts to patient case scenarios outpatient clinical experiences and didactic presentations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 5 hour(s), Lecture/Discussion 6 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 411KB – ACE-PC Program Doctoring 1 (5 units)**

*Course Description:* Application of multidisciplinary basic, social and clinical science to clinical cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 4 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 412 – ACE-PC Clinical Skills Foundation (6-12 units)**

*Course Description:* Application of multidisciplinary basic, social and clinical science to clinical cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. Includes small case-based learning groups with training in patient communication and interviewing techniques.

*Learning Activities:* Variable.

*Grade Mode:* Pass/Fail only.

**MDS 415A – Population Health & Evidence-Based Medicine (2 units)**

*Course Description:* Introduces the fundamental concepts and tools of population health, evidence-based medicine, and system science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 12 hour(s), Discussion 4 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 415B – Critical Appraisal of Topics in Population Health (0.5 units)**

*Course Description:* Apply foundational skills to explore critical issues in 21st-century public health, including tobacco control, firearm violence, and obesity. In a series of small-group discussions “interpreting the medical literature,” key concepts from epidemiology and biostatistics are reinforced while students are armed with specific strategies for addressing high-risk behaviors in the context of population health.

*Learning Activities:* Discussion 6 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 415C – Population Health & System Science (1.5 units)**

*Course Description:* Addresses the social, economic, cultural, policy-related, and environmental factors that affect the health of populations and individuals, and the role of health care systems (locally, regionally, nationally, and globally) in moderating the effects of these factors.

Content builds on MDS 415A & MDS 415B, the TeamPEACE (Teamwork for Professionalism, Ethics, and Cultural Enrichment) curriculum in Doctoring 1, and students' lived experience in UC Davis free clinics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 6 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 416 – Advanced Clinl Skills (1-6 units)**

*Course Description:* Longitudinal clinic component of the second year of the ACE-PC Program. Start with a four-week immersion experience and then 12 additional half-days over the course of the year, working one-on-one with a primary care preceptor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/Fail only.

**MDS 416A – Clinical Skills (7 units)**

*Course Description:* First in a series of courses that span across the pre-clerkship curriculum designed to integrate the clinical teaching within the pre-clerkship curriculum at the UC Davis School of Medicine. In year 1, students acquire the foundational knowledge, skills, and attitudes to succeed in medical training, including: history taking, physical exam, and interpersonal communication skills.

*Learning Activities:* Lecture/Discussion 1 hour(s), Clinical Activity 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 416B – Clinical Skills B (7 units)**

*Course Description:* Second in a series of courses designed to integrate the clinical teaching within the pre-clerkship curriculum at the UC Davis School of Medicine. In year 2, students build upon the foundation in clinical skills and professional behavior set out in year 1. The year 2 clinical skills course involves applying clinical skills to the caring for patients who present with active medical issues requiring further diagnostic investigation and therapeutic management.

*Learning Activities:* Discussion 1 hour(s), Lecture 1 hour(s), Clinical Activity 1 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 417A – Clinical Experiences A (1 unit)**

*Course Description:* Clinical Experiences longitudinal thread is designed to provide continued clinical exposure throughout the pre-clerkship curriculum at the UC Davis School of Medicine. In Year 1, students apply the basic physical exam and history taking skills to real-life patients in outpatient clinical settings.

*Learning Activities:* Clinical Activity 0.50 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 417B – Clinical Experiences B (1.5 units)**

*Course Description:* Clinical Experiences longitudinal thread is designed to provide continued clinical exposure throughout the pre-clerkship curriculum at the UC Davis School of Medicine. In year 2, students use their growing knowledge and skill set to complete supervised encounters with real patients in the inpatient setting. In addition to practicing their physical exam and history taking skills, students apply their presentation and counseling skills in real-life encounters.

*Learning Activities:* Clinical Activity 0.50 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 418A – Health & Humanity A (2 units)**

*Course Description:* Health and Humanity longitudinal thread is designed to integrate wellness, professionalism, and the behavioral sciences within the pre-clerkship curriculum at the UC Davis School of Medicine. Throughout Year 1, students acquire the foundational knowledge surrounding the social determinants of health, implicit bias, and cultural humility.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 420 – Multisystem Clinical Presentations (0.5 units)**

**Course Description:** Capstone course integrates coursework, knowledge, skills and experiential learning to enable the student to demonstrate a broad mastery of learning across the curriculum.

**Prerequisite(s):** Consent of instructor; completion of Pathophysiology Block.

**Learning Activities:** Extensive Problem Solving 15 hour(s), Independent Study 6 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 421A – Doctoring 2 (6 units)**

**Course Description:** Application of multidisciplinary basic, social and clinical science to clinical cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine.

**Prerequisite(s):** Approval by the School of Medicine Committee on Student Progress; medical students only.

**Learning Activities:** Discussion 1 hour(s), Lecture/Discussion 1 hour(s), Internship 0.50 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 421B – Doctoring 2 (6 units)**

**Course Description:** Application of multidisciplinary basic, social & clinical science concepts to cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality, and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine.

**Prerequisite(s):** Approval by the School of Medicine on Student Progress; medical students only.

**Learning Activities:** Discussion 1 hour(s), Lecture/Discussion 1 hour(s), Internship 0.50 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 421C – Doctoring 2 (6 units)**

**Course Description:** Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine.

**Prerequisite(s):** Approval by the School of Medicine Committee on Student Progress; medical students only.

**Learning Activities:** Discussion 1 hour(s), Lecture/Discussion 1 hour(s), Internship 0.50 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 421KA – ACE-PC Program Doctoring 2 (6 units)**

**Course Description:** MDS 421KA-C are a year-long series of courses. Objectives and assessments have been accelerated to accommodate the students enrolled in the ACEPC Program. Participate in all aspects of Doctoring 2, other than what was done in MDS 411KA & MDS 411KB.

**Prerequisite(s):** MDS 411KA; MDS 411KB; admission into ACE-PC.

**Learning Activities:** Discussion 1 hour(s), Lecture/Discussion 1 hour(s), Internship 0.50 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 421KB – ACE-PC Program Doctoring 2 (6 units)**

**Course Description:** MDS 421KA-C are a year-long series of courses.

Objectives and assessments have been accelerated to accommodate the students enrolled in the ACEPC Program. Participate in all aspects of Doctoring 2, other than what was done in MDS 411KA & MDS 411KB.

**Prerequisite(s):** Approval by the School of Medicine on Student Progress; medical students only.

**Learning Activities:** Discussion 1 hour(s), Lecture/Discussion 1 hour(s), Internship 0.50 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 421KC – ACE--PC Program Doctoring 2 (6 units)**

**Course Description:** MDS 421KA-C are a year-long series of courses.

Objectives and assessments have been accelerated to accommodate the students enrolled in the ACEPC Program. Participate in all aspects of Doctoring 2, other than what was done in MDS 411KA & MDS 411KB.

**Prerequisite(s):** Approval by the School of Medicine Committee on Student Progress; medical students only.

**Learning Activities:** Discussion 1 hour(s), Lecture/Discussion 1 hour(s), Internship 0.50 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 428 – Foundations of Bioethics (1 unit)**

**Course Description:** Exposure to core content in bioethics and the law and introduce a framework for ethical decision-making, while emphasizing relationships between bioethics and clinical care.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Discussion 3 hour(s), Lecture/Discussion 3 hour(s), Independent Study 16.50 hour(s), Web Virtual Lecture 1 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 429 – Transition to Clerkships (1-6 units)**

**Course Description:** Incoming third-year medical students participate in a variety of educational experiences designed to prepare them to begin their clerkship curriculum. Content disseminated in large and small group settings.

**Learning Activities:** Discussion/Laboratory 12 hour(s), Workshop 13 hour(s), Discussion 7 hour(s), Independent Study 2 hour(s).

**Grade Mode:** Pass/Fail only.

## **MDS 430 – Introduction to Doctoring 3 (1 unit)**

**Course Description:** Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine.

**Prerequisite(s):** Approval by SOM Committee on Student Progress.

**Learning Activities:** Discussion/Laboratory 2 hour(s).

**Enrollment Restriction(s):** Restricted to Medical students only.

**Grade Mode:** Honors/Pass/Fail.

## **MDS 430A – Doctoring 3 (1 unit)**

**Course Description:** Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine.

**Prerequisite(s):** Approval by SOM Committee on Student Progress.

**Learning Activities:** Discussion 3 hour(s).

**Enrollment Restriction(s):** Restricted to Medical students only.

**Grade Mode:** Honors/Pass/Fail.

**MDS 430B – Doctoring 3 (1 unit)**

*Course Description:* Application of multidisciplinary basic, social & clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine.

*Prerequisite(s):* Approval by SOM Committee on Student Progress.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Honors/Pass/Fail.

**MDS 430C – Doctoring 3 (1 unit)**

*Course Description:* Application of multidisciplinary basic, social & clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine.

*Prerequisite(s):* Approval by SOM Committee on Student Progress.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Honors/Pass/Fail.

**MDS 430D – Doctoring 3 (1 unit)**

*Course Description:* Application of multidisciplinary basic, social & clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine.

*Prerequisite(s):* Approval by SOM Committee on Student Progress.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Honors/Pass/Fail.

**MDS 435KA – ACE-PC Longitudinal Integrated Clerkship A (18 units)**

*Course Description:* Longitudinal Clerkship will combine the Internal Medicine, OBGYN, Pediatrics, Psychiatry and Surgery Clerkships for the ACE-PC Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s), Independent Study 6 hour(s), Discussion 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**MDS 435KB – ACE-PC Longitudinal Integrated Clerkship B (21 units)**

*Course Description:* Longitudinal Clerkship will combine the Internal Medicine, OBGYN, Pediatrics, Psychiatry and Surgery Clerkships for the ACE-PC Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s), Independent Study 6 hour(s), Discussion 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**MDS 435KC – ACE-PC Longitudinal Integrated Clerkship C (18 units)**

*Course Description:* Longitudinal Clerkship will combine the Internal Medicine, OBGYN, Pediatrics, Psychiatry and Surgery Clerkships for the ACE-PC Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s), Independent Study 6 hour(s), Discussion 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**MDS 440 – Doctoring 4 Teaching Fellowship (3-6 units)**

*Course Description:* Instruction on teaching methodology and pedagogy. Mentored teaching of junior medical students in seminar, lecture, and bedside.

*Prerequisite(s):* MDS 430A; MDS 430B; MDS 430C; MDS 430D; consent of instructor.

*Learning Activities:* Discussion 0.50 hour(s), Seminar 0.25 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

**MDS 441 – Combined Ophthalmology & Otolaryngology Clerkship (6 units)**

*Course Description:* Fundamental knowledge of ophthalmology and otolaryngology for the treatment of eye, ear, nose and throat problems at a level of training of general physicians, including when to refer patients to a specialist.

*Prerequisite(s):* Approval by Committee on Student Promotion and Evaluation.

*Learning Activities:* Clinical Activity 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**MDS 445 – Race & Health in the United States (3-6 units)**

*Course Description:* Interprofessional course facilitates the professional and personal developmental of medical students and other health professions students who think they would like to be leaders in securing equity in population health and work environments.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 449 – Transition to Residency (3-6 units)**

*Course Description:* Transition to Residency program addresses the graduating medical students need to improve clinical skills necessary for the first six months of residency and unmet graduation competencies in our competency-based curriculum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Pass/Fail only.

**MDS 450 – Introduction to UC Davis Medical Center (1 unit)**

*Course Description:* Designed to assist medical student in transition from classroom to hospital setting.

*Prerequisite(s):* Second-year medical student.

*Learning Activities:* Seminar.

*Grade Mode:* Honors/Pass/Fail.

**MDS 455 – Student Run Clinics (1-12 units)**

*Course Description:* Learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Meet all requirements and prerequisites of the particular clinic within which they work.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Enrollment Restriction(s):* Open to medical students in good standing.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**MDS 459 – Entry to ARC-MD (2 units)**

*Course Description:* Designed to orient ARC-MD and PSTP students to research opportunities at UC Davis, provide a structure for group engagement, expose them to hearing and asking critical research questions, and provide a foundation for the five-year research experience linked to the SOM curriculum.

*Learning Activities:* Lecture/Discussion 4 hour(s), Laboratory 25 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 460CR – Introduction to Clinical Research (2 units)**

*Course Description:* Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG mentored research project.

*Learning Activities:* Lecture 2 hour(s), Independent Study 3 hour(s).

*Enrollment Restriction(s):* Restricted to completion of M.D., D.D.S., D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program.

*Grade Mode:* Pass/Fail only.

**MDS 461CR – Strategies for Grant Writing (2 units)**

*Course Description:* Practical skills and strategies to create successful grant proposals in the NIH style and format. Generating ideas, identifying and accessing research resources, grant components, specific aims, background and significance, preliminary studies, budgets, and bios.

Matriculation through UC system, and resubmissions.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Restricted to completion of M.D., D.D.S., D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MDS 462CR – Introduction to Clinical Epidemiology & Study Design (3 units)**

*Course Description:* Anatomy and physiology of conducting clinical epidemiologic research. Familiarity with three basic study designs (cross-sectional, case-control, and cohort). Discussion of principles of measurements in clinical epidemiological studies, basic methods for analyzing data, and ethical issues involved in conducting research.

*Learning Activities:* Lecture 25 hour(s), Discussion 10 hour(s).

*Enrollment Restriction(s):* Restricted to completion of M.D., D.D.S., D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MDS 463CR – Methods in Clinical Research (5 units)**

*Course Description:* Overview of major approaches to clinical research, including health services research techniques, informatics, the GCRC, and preclinical methodologies to enhance clinical projects. Overview of UC Davis clinical research support infrastructure. Methodologies applicable to clinical research and its multi-disciplinary perspective.

*Learning Activities:* Lecture 3 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to completion of M.D., D.D.S., D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MDS 464CR – Responsible Conduct of Research (3 units)**

*Course Description:* The nine NIH-mandated modules: Data Acquisition and Reporting, Mentor Training, Publication Practices and Authorship, Peer Review/Grant Process, Collaborative Science, Human Subjects, Research with Animals, Conflict of Interest, Research Misconduct, and Entrepreneurship/Industry Collaborations/Intellectual Property/Technology Transfer.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to completion of M.D., D.D.S., D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MDS 465CR – Introduction to Medical Statistics (4 units)**

*Course Description:* Biomedical applications of statistical methods in clinical, laboratory and population medicine. Graphical/tabular data presentation, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary nonparametric methods, simple linear regression/correlation, life tables. Microcomputer applications of statistical procedures in population medicine.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Restricted to completion of M.D., D.D.S., D.M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MDS 468C – International Clinical Preceptorship (1-12 units)**

*Course Description:* Multidisciplinary preceptorship in a foreign country. Clinical credit will be awarded using this course, once approval has been received from the appropriate governing committee.

*Prerequisite(s):* Consent of instructor; medical students.

*Learning Activities:* Clinical Activity 30 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**MDS 468D – International Elective (1-12 units)**

*Course Description:* Multidisciplinary preceptorship in a foreign country. Used to award non-clinical credit for international experiences which have been approved by the appropriate governing committee.

*Prerequisite(s):* Consent of instructor; medical students.

*Learning Activities:* Independent Study 20 hour(s), Clinical Activity 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**MDS 469 – Rx One Health SSM (6 units)**

*Course Description:* Field course in epidemiology and public health leadership.

*Learning Activities:* Clinical Activity 30 hour(s), Independent Study 8 hour(s), Lecture 10 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 470 – Introduction to Dentistry (3-18 units)**

*Course Description:* Introduction to Dentistry and basic Oral and Maxillofacial Surgery. Offered by the Oral and Maxillofacial Surgery department at UC San Francisco.  
*Prerequisite(s):* Consent of instructor; fourth-year medical student in good standing.  
*Learning Activities:* Clinical Activity 34 hour(s), Lecture 6 hour(s), Variable 3-18 hour(s).  
*Grade Mode:* Pass/Fail only.

**MDS 471 – Human Architecture & Function (12 units)**

*Course Description:* First course of the pre-clerkship phase curriculum of the I-EXPLORE; runs eight weeks from August-September. Disciplines include gross anatomy, microscopic anatomy (normal histology), clinical history & physical examination skills, and health systems science.  
*Learning Activities:* Lecture.  
*Grade Mode:* Pass/Fail only.

**MDS 472 – Molecular & Cellular Medicine (12 units)**

*Course Description:* Second course of the pre-clerkship phase curriculum of the I-EXPLORE. Run six weeks from late September to early November.  
*Learning Activities:* Clinical Activity.  
*Grade Mode:* Pass/Fail only.

**MDS 473 – Pathogens & Host Defense (7.5 units)**

*Course Description:* Third course of the pre-clerkship phase curriculum of the I-EXPLORE. Runs five weeks from November-December.  
*Learning Activities:* Clinical Activity.  
*Grade Mode:* Pass/Fail only.

**MDS 474 – Cardiovascular, Pulmonary, & Renal Systems (15 units)**

*Course Description:* Fourth course of the pre-clerkship phase curriculum of the I-EXPLORE. Runs 19 weeks from January-May.  
*Learning Activities:* Clinical Activity.  
*Grade Mode:* Pass/Fail only.

**MDS 475 – Endocrinology, Reproduction, & Gastrointestinal Systems (12 units)**

*Course Description:* Endocrinology, Gastroenterology, & Reproduction is the fifth course of the pre-clerkship phase of the I-EXPLORE curriculum and will run 16 weeks from July through November.  
*Learning Activities:* Clinical Activity.  
*Grade Mode:* Pass/Fail only.

**MDS 476 – Dermatology & Musculoskeletal Systems (4.5 units)**

*Course Description:* Sixth course of the pre-clerkship phase of the I-EXPLORE curriculum. Runs three weeks from November through December.  
*Learning Activities:* Discussion 28 hour(s), Clinical Activity 8 hour(s), Web Virtual Lecture 20 hour(s).  
*Grade Mode:* Pass/Fail only.

**MDS 477 – Brain & Behavior (12 units)**

*Course Description:* Seventh course of the pre-clerkship phase of the I-EXPLORE curriculum. Run eight weeks from January through February.  
*Learning Activities:* Discussion 60 hour(s), Clinical Activity 30 hour(s), Web Virtual Lecture 61 hour(s).  
*Grade Mode:* Pass/Fail only.

**MDS 478 – I-RESTORE (Pre-Clerkship Intersession) (12 units)**

*Course Description:* Presents additional integration of the biomedical, clinical and health systems sciences, support for professional identity formation and wellness. Held longitudinally throughout the pre-clerkship phase.

*Learning Activities:* Seminar.

*Grade Mode:* Pass/Fail only.

**MDS 478B – I-RESTORE (Pre-Clerkship Intersession) (12 units)**

*Course Description:* Presents additional integration of the biomedical, clinical and health systems sciences, support for professional identity formation and wellness. Held longitudinally throughout the pre-clerkship phase.

*Learning Activities:* Seminar.

*Grade Mode:* Pass/Fail only.

**MDS 479 – Clerkship Intersession Course (1.5-4 units)**

*Course Description:* Longitudinal experience to supplement and support the clerkships in their efforts to facilitate students' acquisition of the graduation competencies; to ensure biomedical science and health systems science are taught and learned in the context of the clinical science-focused clerkship year; to support students' professional identity formation and wellness, and provide time for enrichment activities and scholarly work.

*Learning Activities:* Clinical Activity 18 hour(s).

*Grade Mode:* Pass/Fail only.

**MDS 480 – Insights in Clinical Research (1 unit)**

*Course Description:* Seminars on research presented by Medical School faculty; overview of pertinent issues, including medical ethics, human subjects protocols, case control methods, etc.

*Prerequisite(s):* Medical student in good standing.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**MDS 481 – Insights into Clinical Specialties (1 unit)**

*Course Description:* Exposure to various medical specialties, their residency programs and ways in which medical students can prepare for and improve their candidacy for such programs.

*Prerequisite(s):* Medical student in good standing.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**MDS 482 – Lecture Series in Reproductive Health (1 unit)**

*Course Description:* Psychosocial and public health aspects of providing quality reproductive health care and application in student-run free clinics and in 3rd year clerkships.

*Learning Activities:* Lecture 1 hour(s).

*Credit Limitation(s):* Only medical students may enroll for credit; undergraduates may audit the course.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/Fail only.

## **MDS 483 – Insights in Political, Legal & Business Aspects of Medicine (1 unit)**

*Course Description:* Practical aspects of a medical career.

*Prerequisite(s):* Medical students in good standing.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Restricted to Medical student only.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/Fail only.

## **MDS 484 – First Aid for Health Policy (1 unit)**

*Course Description:* Introduces the fundamental concepts and tools of health policy which are becoming necessary for students and physicians to become invested and active participants in healthcare. Focuses on the basic principles of health policy—the structure of government, how a bill becomes a law, the role of legislative visits, the role of healthcare foundations in California, the role of non-profits in California, our current healthcare system after the Affordable Care Act.

*Learning Activities:* Lecture.

*Grade Mode:* Pass/Fail only.

## **MDS 485 – Health Policy Lecture Series (1 unit)**

*Course Description:* Lecture series provides an overview of local, state, national and international health policy. The current challenges health care reform implementation is facing provides how medical students can successfully advocate for changes in health policy.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 486 – Topics in Health Care Improvement (0.5 units)**

*Course Description:* Lecture series will cover major topics in health care improvement, presented by guest speakers who are leaders in the field.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 487 – History & Ethics of Medicine (1 unit)**

*Course Description:* Introduction to ethical problems and events in health care in both modern and historical contexts. Eight one-hour and fifteen-minute interactive sessions designed to introduce students to historical topics in medicine and medical ethics.

*Learning Activities:* Lecture 1.25 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 489 – Directed Studies (1-9 units)**

*Course Description:* Independent studies to accommodate modified curriculums, prepare for taking USMLE exams and for remediation course work directed by the Committee on Student Progress.

*Prerequisite(s):* Consent of instructor; individual directed studies in extended preparation for modified curriculum, USMLE exams, and/or as required by Committee on Student Progress.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 489C – Clinical Reintroduction Experience (1-9 units)**

*Course Description:* Learn and practice basic clinical skills in a supervised clinical setting. Skills include patient interviewing, history, physical examination, diagnostic and clinical reasoning, case presentation, and medical records documentation. Direct observation and individual feedback on clinical skills development is provided.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 20 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 489R – USMLE Directed Remedial Studies (1-9 units)**

*Course Description:* Independent studies to accommodate remediation for taking USMLE exams directed by the Committee on Student Progress.

*Prerequisite(s):* Recommendation by Committee on Student Progress.

*Learning Activities:* Independent Study 20 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 490A – Community Health Scholars Seminar A (1 unit)**

*Course Description:* Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 490B – Community Health Scholars Seminar B (0.5 units)**

*Course Description:* Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 490C – Community Health Scholars Seminar C (0.5 units)**

*Course Description:* Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 490D – Community Health Scholars Seminar D (0.5 units)**

*Course Description:* Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **MDS 491 – TEACH-MS Pediatric Advocacy & Community Health Elective (3 units)**

*Course Description:* Through this elective, third- or fourth- year students gain understanding in the importance of community partnerships by directly engaging with community organizations that provide health education, patient navigation services, and other resources that they may refer their patients to. Students who complete this elective will develop key skills necessary for educating the public and lobbying key decision-makers in government.

*Learning Activities:* Clinical Activity, Web Virtual Lecture.

*Grade Mode:* P/NP only.

## **MDS 492 – Interpretive Electrophysiology & Applied Cardiology–SSM (6 units)**

*Course Description:* Four-week special study module teaches and provides a basis for systemic interpretation of the EKG as well as cardiology management with the underserved populations in the Central Valley. Addresses underlying normal cardiac structure/function and cardiac abnormalities as reflected in the EKG and tie in the underlying basic science principles of cardiac electrophysiology.

*Learning Activities:* Lecture/Discussion 12 hour(s), Clinical Activity 20 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 493 – Independent Special Study Module (3-12 units)**

*Course Description:* Student developed alternative to the SSM/SPO Requirement. Approval by FYOC is required.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 20 hour(s).

*Enrollment Restriction(s):* FYOC approval required.

*Grade Mode:* Honors/Pass/Fail.

## **MDS 493A – International & Comparative Health Care: SSM (6 units)**

*Course Description:* Through a series of lectures, seminars and clinical experiences, all occurring in other nations, students will research how health care systems address critical health issues. SSM Component.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 20 hour(s), Lecture 10 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **MDS 493B – International & Comparative Health Care: Clinical (3-9 units)**

*Course Description:* Through a series of lectures, seminars and clinical experiences, all occurring in other nations, students will research how health care systems address critical health issues. Clinical Component.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **MDS 493D – Teaching the Basic Sciences SSM (6 units)**

*Course Description:* Special Studies Module, a yearlong in progress court to teach lecture and discussion education technique and theory.

*Prerequisite(s):* MDS 440 required concurrently; consent of instructor.

*Learning Activities:* Lecture 6 hour(s), Lecture/Lab 8 hour(s), Laboratory 30 hour(s), Tutorial 10 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **MDS 493Q – Improving Quality in Health Care (6 units)**

*Course Description:* Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 8 hour(s), Discussion/Laboratory 10 hour(s), Project 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **MDS 493QA – Improving Quality in Health Care (3 units)**

*Course Description:* Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 8 hour(s), Discussion/Laboratory 10 hour(s), Project 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **MDS 493QB – Improving Quality in Health Care (3 units)**

*Course Description:* Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 8 hour(s), Discussion/Laboratory 10 hour(s), Project 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **MDS 493QC – Enhancing Patient Safety in Health Care (6 units)**

*Course Description:* Inter-professional module is designed to explore the theory and practical methods being employed to improve patient safety in health care while providing an opportunity for interprofessional educational experience.

*Prerequisite(s):* Consent of instructor; fourth-year Medical student.

*Learning Activities:* Seminar 6 hour(s), Clinical Activity 8 hour(s), Discussion 6 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **MDS 494 – Non-Clinical Medical Student Externship (3-9 units)**

*Course Description:* Generic course for awarding externship credit for medical student rotations that are not primarily focused on patient care.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 20 hour(s), Clinical Activity 10 hour(s).

*Enrollment Restriction(s):* Restricted to students with approval of credit by the Fourth Year Oversight Committee.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **MDS 495 – Medicine Literature Review (1-9 units)**

*Course Description:* Independent study: topics for selection include, but are not restricted to, medical ethics, economics and jurisprudence, culture and medicine, ethnicity and medicine, gender and medicine, history of medicine, health manpower, and medical education. A prepared paper on the selected topic will be required.

*Prerequisite(s):* Medical student in good academic standing and permission of the Associate Dean of Curricular Affairs.

*Learning Activities:* Discussion 3-27 hour(s).

*Grade Mode:* Pass/Fail only.

## **MDS 496 – California Oregon Medical Partnership to Address Disparities in Rural Education & Health (COMPADRE) (3-6 units)**

*Course Description:* Through this elective, third- or fourth-year students enrolled in COMPADRE participate in the clinical care of patients from rural, underserved, or indigenous communities. Students may rotate through outpatient clinics, inpatient wards, and consult services, and may also be introduced to local community organizations that provide health education, patient navigation services, and other resources that they may refer their patients to.

*Learning Activities:* Variable.

*Grade Mode:* P/NP only.

## **MDS 497 – Scholarly Project (6 units)**

*Course Description:* Develop a research project on a focused topic area, implements the research, writes a publishable paper, and presents an oral summary of the project.

*Prerequisite(s):* Consent of instructor; project proposal must be accepted by the Scholarly Project Executive Committee (SPEC).

*Learning Activities:* Seminar 0.25 hour(s), Independent Study 0.50 hour(s).

*Enrollment Restriction(s):* Restricted to 4th year medical school students only.

*Grade Mode:* Honors/Pass/Fail.

## **MDS 498 – Scholarly Project Selective (1-12 units)**

*Course Description:* Individual, scholarly project, approved by mentor. Includes scientific inquiry, development of a testable hypothesis or clinical research and concludes with written report and public, oral, presentation, taking place during Clerkship curriculum phase.

*Learning Activities:* Variable, Clinical Activity.

*Grade Mode:* Pass/Fail only.

## **MDS 499 – Medical Student Research Fellowship (1-9 units)**

*Course Description:* Independent research project as part of the Medical Student Research Fellowship.

*Prerequisite(s):* Medical students in good standing; competency with computers.

*Learning Activities:* Independent Study 10-36 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **Medicine & Epidemiology (VME)**

### **School of Veterinary Medicine**

## **VME 057V – Global Population, Health, & Environment (4 units)**

*Course Description:* Students critically examine multi-scale processes involving human, animal, and ecosystem health. Online team and independent work engage local and global topics around population pressures on environments and environmental pressures on populations.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Grade Mode:* Letter.

## **VME 125 – Knights Landing One Health Center (1 unit)**

*Course Description:* Internship at Knights Landing One Health Center (KLOHC) for undergraduate pre-veterinary student. Application of veterinary and One Health concepts to their work at the center.

*Prerequisite(s):* VME 125L (can be concurrent); consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s); students can enroll in each quarter (fall, winter, spring) once.

*Grade Mode:* Pass/No Pass only.

## **VME 125L – Knights Landing One Health Center Lab (1 unit)**

*Course Description:* Internship at Knights Landing One Health Center (KLOHC) for undergraduate pre-veterinary students. Interns may offer technical help, assist with patient registration and records, animal handling, and foreign language interpretation.

*Prerequisite(s):* VME 125 (can be concurrent); and consent of instructor.

*Learning Activities:* Laboratory 1.50 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **VME 158 – Infectious Disease in Ecology & Conservation (3 units)**

*Course Description:* Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and application to field data. Scientists' role in developing disease control policies.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C; or equivalent. EVE 100 is recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **VME 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## VME 199 – Special Studies for Advanced Undergraduates (1-5 units)

*Course Description:* Special studies for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## VME 217 – Evaluation & Use of Diagnostic Tests (2 units)

*Course Description:* Clinical and epidemiologic properties and application of diagnostic tests for disease, with emphasis on selecting tests; validating, evaluating, and interpreting new tests individually and in aggregate; determining cutoff values; and developing testing strategies.

*Prerequisite(s):* MPM 205 or EPI 205; consent of instructor.

*Learning Activities:* Lecture 14 hour(s), Laboratory 6 hour(s), Discussion 3 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

## VME 225 – Viral Pathogenesis Seminar/Journal Club (1 unit)

*Course Description:* Participatory seminar addressing the mechanisms of retroviral pathogenesis in a journal club format. Focus on the review of current scientific journal papers concerning viral pathogenesis, immunology and virology with a special focus on retroviruses.

*Prerequisite(s):* Consent of instructor; graduate student status in the Comparative Pathology, Microbiology or Immunology graduate groups.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated 12 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## VME 258 – Infectious Disease in Ecology & Conservation (1 unit)

*Course Description:* Presentation, analysis and discussion of primary literature on the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Multidisciplinary approach combines perspectives of ecology and veterinary medicine.

*Prerequisite(s):* VME 158 must be taken concurrently.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Letter.

## VME 298 – Group Study (1-5 units)

*Course Description:* Group study in selected areas of the clinical sciences.

*Prerequisite(s):* Student in School of Veterinary Medicine or consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## VME 299 – Research (1-12 units)

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Medieval Studies (MST)

College of Letters & Science

## MST 020A – Early Medieval Culture (4 units)

*Course Description:* Readings (in translation) in medieval culture, such as Codes of Justinian, Confessions of Saint Augustine, Beowulf, the Nibelungenlied, The Song of Roland, the Summa Theologica of Thomas Aquinas, the Chronicles of Froissart, Chaucer's Canterbury Tales, and Dante's Divine Comedy.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## MST 020B – The Culture of the High Middle Ages (4 units)

*Course Description:* Great transformations that created the modern world: Constitutional Government, the Hundred Years War, the Black Death, and the Peasants Revolts, the Renaissance, Reformation and Counter-Reformation, and the Baroque.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## MST 098 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## MST 098F – Student Facilitated Course (1-4 units)

*Course Description:* Student facilitated course intended primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## MST 099 – Special Study for Undergraduates (1-5 units)

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## MST 130A – Special Themes in Medieval Cultures (4 units)

*Course Description:* Each offering concentrates on an interdisciplinary aspect of medieval culture in the Middle East and Europe: the idea of the hero, mysticism, urban development. Extensive readings focused on medieval source material.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **MST 130B – Special Themes in Renaissance Culture (4 units)**

*Course Description:* Each theme illuminates an interdisciplinary aspect of Renaissance culture in the eastern and western hemispheres: exploration, medical pathology, daily life, baroque culture. Immersion in source material from 1500-1650.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **MST 131 – Cross-Cultural Relations in the Medieval and/or Early Modern World (4 units)**

*Course Description:* Medieval and/or Renaissance aspects of cross culturalism. Relations between Christians, Jews, and Muslims: Europeans, Africans, and Asians; Old World and New World.

*Prerequisite(s):* MST 020A or MST 020B; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC); Writing Experience (WE).

## **MST 189 – Seminar in Medieval & Early Modern Culture (4 units)**

*Course Description:* Focus on a particular problem or issue in the Medieval or Early Modern periods. Seminar topics might include (but not limited to) monasticism, origins of the university, chivalry, exploration, the role of women in the Medieval and Early Modern world.

*Prerequisite(s):* MST 020A or MST 020B; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **MST 190 – Senior Thesis (4 units)**

*Course Description:* Preparation of a research paper dealing with a selected aspect of medieval culture, under supervision of three members of the Committee in Charge.

*Prerequisite(s):* Senior standing and major in Medieval Studies.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MST 197T – Tutoring in Medieval Studies (1-5 units)**

*Course Description:* Tutoring in MST 020A & MST 020B, including leadership in small discussion groups affiliated with the course.

*Prerequisite(s):* MST 020A; MST 020B; upper division standing; consent of instructor and chairperson of curriculum committee.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

## **MST 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **MST 198F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for upper division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MST 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **MST 199FA – Student Facilitated Course Development (1-4 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 098F/198F.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MST 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* Student facilitated. Under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MST 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching Assistant training practicum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3 hour(s).

*Enrollment Restriction(s):* Graduate standing.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Microbiology (MIB)**

### **Graduate Studies**

## **MIB 200A – Microbial Biology (3 units)**

*Course Description:* Designed to provide an overview of various aspects of microbiology and microbial processes. Topics will include microbial genetics and genomics, microbial metabolism, signaling, and adaptations.

*Prerequisite(s):* MIC 102; or equivalent; prior coursework in Microbiology.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **MIB 201L – Advanced Microbiology Laboratory Rotations (5 units)**

*Course Description:* Two five-week assignments in microbiology research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental design.

*Learning Activities:* Laboratory 15 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

### **MIB 210 – Microbial Interactions (2 units)**

*Course Description:* Analysis at the molecular level of the interactions of microbes with the environment, microbes with other microbes, and microbes in symbiotic and/or pathogenic associations with eukaryotic hosts. Topics discussed will vary.

*Prerequisite(s):* MIB 200A; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

### **MIB 290C – Advanced Research Conference (1 unit)**

*Course Description:* Presentation and critical discussion of staff research activities. Designed for advanced graduate students.

*Prerequisite(s):* Graduate standing and/or consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **MIB 298 – Group Study (1-5 units)**

*Course Description:* Directed reading and discussion on select topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **MIB 299 – Research (1-12 units)**

*Course Description:* Research under the guidance of dissertation committee.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Microbiology (MIC)**

College of Biological Sciences

### **MIC 010 – Natural History of Infectious Diseases (3 units)**

*Course Description:* Topics in the natural history of infectious diseases principally affecting humans. Introduction to infectious microbial agents, ecology, epidemiology, and induction of disease. Focus on diseases of a contemporary nature.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MIC 101, MIC 102, or MIC 104.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

### **MIC 091 – Introduction to Research (1 unit)**

*Course Description:* Discussion of faculty research focusing on the biochemistry, genetics, and cell biology of microorganisms, along with ways undergraduates can participate in research projects of faculty members.

*Prerequisite(s):* BIS 002A; or equivalent.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to lower division standing.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

### **MIC 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **MIC 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

### **MIC 101 – Introductory Microbiology (5 units)**

*Course Description:* Survey of microorganisms emphasizing their interactions with humans and diseases. Topics include microscopy, survey of various microbes, the immune system, food microbiology, microbial pathogens, and mechanisms of disease transmission.

Designed for students requiring microbiology for professional schools.

*Prerequisite(s):* (BIS 001A or BIS 002A); CHE 002B (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MIC 102, MIC 102L, MIC 104, or MIC 104L.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

### **MIC 102 – Introductory Microbiology (3 units)**

*Course Description:* Essentials of microbial biology, emphasizing phylogeny, physiology, genetics, ecology, and pathogenesis. Interactions with other microbes, humans, and the biosphere. Uses of microbes in agriculture and biotechnology. May be taught abroad.

*Prerequisite(s):* (BIS 001A or BIS 002A); CHE 002B (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MIC 101 or MIC 104.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

### **MIC 103L – Introductory Microbiology Laboratory (2 units)**

*Course Description:* Introduction to principles and laboratory methods employed in working with microorganisms. Designed for students requiring microbiology for professional school admission. May be taught abroad.

*Prerequisite(s):* MIC 102 C- or better; CHE 002B.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open to students who completed MIC 101 before spring 2016, or who have completed MIC 102L or MIC 104L.

*Grade Mode:* Letter.

## **MIC 104L – General Microbiology Laboratory (3 units)**

*Course Description:* Principles and laboratory methods employed in working with microorganisms. Designed for students continuing in microbiology, genetics, or biochemistry.

*Prerequisite(s):* MIC 102 C or better; (CHE 008B or CHE 118B or CHE 129A); and consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Students must complete a petition for consideration of enrollment; petition available on department of Microbiology and Molecular Genetics website.

*Credit Limitation(s):* Only 2 units of credit for students who completed MIC 101 before spring 2016, or who have completed MIC 103L; not open to students who have completed MIC 102L.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **MIC 105 – Microbial Diversity (3 units)**

*Course Description:* Survey of the major groups of microorganisms emphasizing diversity of energy metabolism, morphology, evolution, and natural history.

*Prerequisite(s):* MIC 102 or MIC 104; BIS 101; BIS 103 or BIS 105 strongly recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MIC 105L – Microbial Diversity Laboratory (3 units)**

*Course Description:* Classical enrichments for the isolation of metabolically diverse microbes; modern molecular methods for the identification of isolates; cultivation independent analysis of microbial communities from local environmental samples.

*Prerequisite(s):* (MIC 102 or MIC 104); (MIC 102L or MIC 104L); MIC 105 (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **MIC 111 – Human Microbiology (3 units)**

*Course Description:* Biology of microorganisms that form commensal, mutualistic, and pathogenic relationships with human beings, emphasizing their phylogeny, physiology, genetics, and ecology. Effects on human nutrition, development and physiology. Mechanisms of pathogenesis, immune response evasion, antibiotic action, and antibiotic resistance.

*Prerequisite(s):* MIC 102; BIS 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MIC 115 – Recombinant DNA Cloning & Analysis (3 units)**

*Course Description:* Cloning and analysis of recombinant DNA, with emphasis on Escherichia coli host-vector systems. DNA-modifying enzymes; vectors and their use; manipulation and expression of insert DNA; polymerase chain reaction; and sequence annotation. Graduate students see MIC 215.

*Prerequisite(s):* BIS 101; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MIC 117 – Analysis of Molecular Genetic Circuits (4 units)**

*Course Description:* Project-based course focused on problem-solving strategies in biology and medicine. Testing hypotheses by translating real-world problems into an appropriate mathematical model and translating the results into real-world understanding.

*Prerequisite(s):* BIS 002A; MAT 017A; MAT 017B; MAT 017C; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken BIM 117.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MIC 120 – Microbial Ecology (3 units)**

*Course Description:* Interactions between non-pathogenic microorganisms and their environment, emphasizing physiological and metabolic characteristics of various groups and their adaptation to and modification of specific habitats.

*Prerequisite(s):* MIC 105; (BIS 102 or BIS 105).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MIC 140 – Bacterial Physiology (3 units)**

*Course Description:* Fundamentals of bacterial growth and bacterial responses to environmental stresses. Topics will include carbon and nitrogen regulation, growth rate control, post-exponential growth, and motility and chemotaxis.

*Prerequisite(s):* (BIS 101, BIS 102, BIS 103 (can be concurrent)) or (BIS 101, BIS 105); MIC 102 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MIC 130A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MIC 150 – Genomes of Pathogenic Bacteria (3 units)**

*Course Description:* Molecular genetics and comparative genomics of representative pathogenic bacteria. Roles of mobile genetic elements, lateral gene transfer, and genome rearrangements in pathogen evolution. Mutation, recombination, and complementation as tools for genetic analysis. Content includes close examination of primary research articles.

*Prerequisite(s):* MIC 102; BIS 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MIC 155L – Bacterial Physiology Lab (4 units)**

*Course Description:* Physiology and genetics of bacteria. Isolation and characterization of mutant strains. Mapping of mutations by conjugation and transduction studies of control of enzyme synthesis by induction, repression, and catabolite repression.

*Prerequisite(s):* (MIC 140 or MIC 150); MIC 120L; and consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 8 hour(s).

*Grade Mode:* Letter.

**MIC 162 – General Virology (3 units)**

*Course Description:* Integrated presentation of the nature of animal, bacterial, and plant viruses, including their structure, replication and genetics.

*Prerequisite(s):* BIS 101; BIS 102 or BIS 105 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have taken PMI 128.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MIC 170 – Yeast Molecular Genetics (3 units)**

*Course Description:* Survey of the genetics, cell biology and technologies in yeasts and related lower eukaryotes. Topics include diversity of yeasts; cell structure; metabolism; cell cycle; genetic approaches and genomics; gene expression; yeasts as models to study higher eukaryotes; and contemporary techniques.

*Prerequisite(s):* BIS 101; MIC 102 or MIC 105 strongly recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MIC 172 – Host-Parasite Interactions (3 units)**

*Course Description:* Exploration of host-parasite interactions at multiple levels, with an emphasis on global health and medically important human parasites.

*Prerequisite(s):* MIC 102 or MIC 101 or MIC 104; BIS 101; Biological Sciences 102 or 105 strongly recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**MIC 175 – Cancer Biology (3 units)**

*Course Description:* Exploration of the causes and treatments of cancer at multiple levels: molecular/cell biology, clinical manifestations, epidemiology and prevention.

*Prerequisite(s):* BIS 101; (BIS 102 or BIS 105).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**MIC 190C – Undergraduates Research Conference (1 unit)**

*Course Description:* Presentation and critical discussion of staff research activities: designed for advanced undergraduate students.

*Prerequisite(s):* MIC 199 (can be concurrent); and consent of instructor; upper division standing; MIC 199 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**MIC 191 – Introduction to Research for Advanced Undergraduates (1 unit)**

*Course Description:* Discussion of faculty research focusing on the biochemistry, genetics, and cell biology of microorganisms, along with ways undergraduates can participate in research projects of faculty members.

*Prerequisite(s):* BIS 002A; or equivalent.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MIC 192 – Internship (1-12 units)**

*Course Description:* Technical and/or professional experience on or off campus. Supervised by a member of the Microbiology Section faculty.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**MIC 194H – Microbiology Honors Research (2 units)**

*Course Description:* Continuation of an individual microbiological research project culminating in writing of a senior thesis under a faculty director.

*Prerequisite(s):* Senior standing; eligibility for college honors; completion of 6 units of MIC 199; consent of section.

*Learning Activities:* Independent Study 6 hour(s).

*Grade Mode:* Pass/No Pass only.

**MIC 197T – Tutoring in Microbiology (1-12 units)**

*Course Description:* Assisting the instructor in one of the section's regular courses by tutoring individual or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activities.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**MIC 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**MIC 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**MIC 200B – Advanced Bacteriology (3 units)**

*Course Description:* Intended for first-year graduate students in Microbiology and closely-related fields. Advanced topics in phylogeny, physiology and diversity of bacteria.

*Prerequisite(s):* MIB 200A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MIC 215 – Recombinant DNA (3 units)**

*Course Description:* Application of recombinant DNA technology to modern problems in biology, biochemistry, and genetics, emphasizing molecular cloning strategies, choice of vectors, preparation of insert DNA, and selection procedures.

*Prerequisite(s):* BIS 101; BIS 102; BIS 103; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MIC 217 – Analysis of Molecular Genetic Circuits (4 units)**

*Course Description:* Project-based course focused on problem-solving strategies in biology. Emphasis on testing hypotheses by translating real-world problems into an appropriate mathematical model and translating the results into real-world understanding.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have previously taken BIM 117 or MIC 117.

*Grade Mode:* Letter.

**MIC 262 – Advanced General & Molecular Virology (3 units)**

*Course Description:* Advanced integrated presentation of animal, bacterial, and plant viruses, including their structure, modes of regulation, expression and replication, and effects on host cells and organisms.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MIC 263 – Principles of Protein-Nucleic Acid Interactions (3 units)**

*Course Description:* Physical basis of protein-nucleic acid interaction.

Topics include nucleic acid recognition by proteins, thermodynamics of protein-nucleic acid stability, and kinetics of binding process for both non-specific and sequence-specific nucleic acid binding proteins. Emphasis on systems that represent paradigms in protein-nucleic acid interactions.

*Prerequisite(s):* Advanced graduate standing and completion of one year of basic graduate course work in biochemistry, biophysics, chemistry, genetics, microbiology, or molecular biology.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MIC 274 – Seminar in Genetic Recombination (1 unit)**

*Course Description:* Biochemical and genetic aspects of genetic recombination in prokaryotes and eukaryotes. Mechanisms of recombination and biochemical and genetic characteristics of recombination proteins. Proteins include DNA strand exchange, DNA helicases, and Holliday junction resolving proteins.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MIC 275 – Seminar in DNA Repair & Recombination (1 unit)**

*Course Description:* Review and discussion of current research and literature in DNA repair and recombination with presentations by individual students and invited speakers.

*Prerequisite(s):* Consent of instructor; graduate standing in Microbiology or closely-related field.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MIC 276 – Advanced Concepts in DNA Metabolism (3 units)**

*Course Description:* DNA damage checkpoints, homologous recombination, and meiotic recombination. An advanced treatment of the clinical and current literature to discuss emerging principles and current models in these research areas.

*Prerequisite(s):* MCB 221C or GGG 201C or equivalent course recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MIC 290C – Advanced Research Conference (1 unit)**

*Course Description:* Presentation and critical discussion of staff research activities. Designed for advanced graduate students.

*Prerequisite(s):* Graduate standing and/or consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Conference 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MIC 291 – Selected Topics in Microbiology (1 unit)**

*Course Description:* Current progress in microbiology and cellular and molecular biology.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MIC 292 – Seminar in Bacterial Physiology & Genetics (1 unit)**

*Course Description:* Review and discussion of current research and literature in bacterial physiology and genetics, with presentations by individual students.

*Prerequisite(s):* Consent of instructor; graduate standing in Microbiology or closely-related field.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MIC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MIC 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MIC 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Middle East/South Asian Studies (MSA)**

College of Letters & Science

## **MSA 092 – Internship (1-12 units)**

*Course Description:* Supervised internship on and off campus in the area of Middle East & South Asia Studies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **MSA 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **MSA 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **MSA 100 – Middle East & South Asia: Comparative Perspectives (4 units)**

*Course Description:* Ethnographic and historical points of intersection and divergence in various aspects of the Middle East and South Asia in precolonial, colonial, and postcolonial societies. Anthropological, historical, and theoretical debates surrounding the region.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **MSA 111A – Great Cities of Arab Middle East & South Asia (4 units)**

*Course Description:* In-depth examination of the great cities of North Africa, the Middle East and South Asia as cultural and historical artifacts. Topics include: the concept of the Islamic city, processes of modernity, and representations that reinforce imagination, memory and personal identity.

*Prerequisite(s):* Consent of instructor; some knowledge of Islamic/Middle Eastern history is very useful.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **MSA 112 – History of South Asian Islam (4 units)**

*Course Description:* Comparative study of Muslim communities of South Asia. Commonalities in cultural identity and historical experience. Rise and spread of Islam, comparative history of Islamic Empires, colonial rule, and post-colonial nationalism.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **MSA 121A – Shahnameh: The Persian Book of Kings (4 units)**

*Course Description:* In-depth analysis of the Persian Book of Kings (Shahnameh) by Abu al-Qasim Ferdowsi (d. 1020 CE) in its historical context with a comparative perspective on the role of this work in Persian and world literature.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* COM 175.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **MSA 121C – A Story for a Life: The Arabian Nights (4 units)**

*Course Description:* In-depth exploration of The Arabian Nights, the best-known work of pre-modern Arabic literature and a major work of world literature. Analysis of the work in its historical context and in comparison to other frame tales in world literature.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* COM 172, ARB 140.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **MSA 122A – Themes in the Arabic Novel (4 units)**

*Course Description:* Select modern Arabic fiction (novels and short stories) in translation. Thematically connected readings supplemented by non-fictional writings when appropriate.

*Learning Activities:* Lecture/Discussion 3 hour(s), Independent Study, Extensive Writing.

*Enrollment Restriction(s):* Limited to 30 students.

*Repeat Credit:* May be repeated 2 time(s) when texts/theme of required course readings sufficiently change.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **MSA 131A – Modern Iranian Cinema (4 units)**

*Course Description:* Iranian cinema of the 20th century in the context of profound cultural and social changes in Iran especially since the Iranian Revolution. Productions by representative directors such as Kiarostami, Makhmalbaf, Bahram Beizaie are included. Knowledge of Persian not required.

*Prerequisite(s):* Upper division standing, or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* CTS 146A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MSA 131B – Modern South Asia Cinema (4 units)**

*Course Description:* South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* CTS 146B, ANT 147.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MSA 131C – Religion & Media in Arab World (4 units)**

*Course Description:* Exploration of the role and experience of media technologies in the Arab world. Study of digital and electronic media as well as alternative media practices. Investigation of new trends in political activism and identity formation.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* RST 166.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MSA 150 – Women & Islamic Discourses (4 units)**

*Course Description:* Introduction to the debates/discourses about women and Islam. Transformations in debates/discourses in colonial and postcolonial periods in the Middle East & South Asia. Comparative study of debates/discourses on family, work, law, sexuality, religion, comportment, human rights, feminist and religious movements.

*Prerequisite(s):* GSW 050; or comparable course.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* GSW 185.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

**MSA 151A – Iranian Society & Culture (4 units)**

*Course Description:* In-depth investigation of modern Iranian society and culture. Exploration of structures of Iranian society: family, gender, religion, minorities, economy, politics, and state. Iran's role in the globalizing world, and the role of Iranian diasporas.

*Learning Activities:* Lecture 2 hour(s), Term Paper, Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MSA 180 – Topics in Middle East & South Asian Studies (4 units)**

*Course Description:* Comparative perspective on the Middle East and South Asia. Topics may include: modernity, religious traditions, colonialism, subalternity and social movements, gender and sexuality, history and memory, science and development, ritual and performance, public culture, diasporas.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**MSA 181A – Topics in Regional ME/SA Studies (4 units)**

*Course Description:* Iran & Persian topics for students specializing in region-specific Middle East & South Asia Studies.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**MSA 181B – Topics in Regional ME/SA Studies (4 units)**

*Course Description:* Indian/South Asia topics for students specializing in region-specific Middle East & South Asia Studies.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**MSA 181C – Topics in Regional ME/SA Studies: Arab Studies (4 units)**

*Course Description:* Arab Studies topics.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) when topics and themes differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

**MSA 182A – Undergraduate Proseminar in Middle East/ South Asia (4 units)**

*Course Description:* Seminar in Iran & Persian topics specializing in region-specific Middle East & South Asia studies.

*Prerequisite(s):* MSA 100 recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 15 students.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

**MSA 182B – Undergraduate Proseminar in Middle East/ South Asia (4 units)**

*Course Description:* Seminar in India/South Asia topics specializing in region-specific Middle East & South Asia studies.

*Prerequisite(s):* MSA 100 recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 15 students.

*Repeat Credit:* May be repeated 3 time(s) when topics and themes differs.

*Grade Mode:* Letter.

**MSA 182C – Undergraduate Proseminar in Middle East/ South Asia: Arab Studies Seminar (4 units)**

*Course Description:* Seminar in Arab Studies topics.

*Prerequisite(s):* MSA 100 recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 15 students.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**MSA 192 – Internship (1-12 units)**

*Course Description:* Supervised internship on and off campus in the area of Middle East & South Asia Studies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**MSA 194H – Special Study for Honors Students (1-5 units)**

*Course Description:* Independent study of a problem in Middle East/South Asian studies involving the writing of an honors thesis.

*Prerequisite(s):* Consent of instructor; open only to majors of senior standing who qualify for honors program.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Letter.

**MSA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**MSA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# Military Science (MSC)

College of Letters & Science

**MSC 011 – U.S. Army Leadership & Personal Development (1 unit)**

*Course Description:* United States Army, its organization, customs, courtesies, and rank structure. Surveys personal development skills needed for effective leadership such as critical thinking, time management, and health and fitness. Familiarization with the Army ROTC program.

*Prerequisite(s):* Lower division standing.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MSC 012 – Introduction to Tactical Military Leadership (1 unit)**

*Course Description:* Military leadership fundamentals to include setting direction, problem-solving, presenting briefs, and using effective writing skills. Basic military tactics, orienteering and land navigation. Dimensions of leadership values, attributes, skills, and actions.

*Prerequisite(s):* Lower division standing.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MSC 013 – Introduction to Basic Military Operations (1 unit)**

*Course Description:* Basic military tactical theories and their application at the individual and squad level. Military tactical operations and basic military first aid.

*Prerequisite(s):* Lower division standing.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Letter.

**MSC 014A – Introduction to Military Leadership Skills (0.5 units)**

*Course Description:* Personal and organizational leadership skills introduced in leadership laboratory. Extensive supervised leadership experiences conducted in a military environment. Basic military skills necessary to function in a leadership role.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**MSC 014B – Introduction to Military Leadership Skills (0.5 units)**

*Course Description:* Continuation of development of leadership and military skills introduced in MSC 014A. Emphasis on the role of the individual, the basic organizational element of the Army, the squad. Supervisory controls reduced as students gain capabilities.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**MSC 014C – Introduction to Military Leadership Skills (0.5 units)**

*Course Description:* Development of skills required for promotion to junior non-commissioned officer level. Chain of command from company through individual levels. Interrelationship of squad and platoon organizations.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**MSC 021 – Military History, Study of Battles (2 units)**

*Course Description:* Application of the nine Principles of War to key battles in American and World history. Tactics on a strategic and operational level. Evaluation of leadership and decision-making processes of key leaders.

*Prerequisite(s):* MSC 022B; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MSC 022A – Innovative Team Leadership (2 units)**

*Course Description:* Leadership values, attributes and theories. Use of basic military skills such as land navigation and squad operations to enhance understanding of the Army. Types of military briefings. Practice in interpersonal skills. Presentation of a briefing.

*Prerequisite(s):* Lower division standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **MSC 022B – Foundations of Tactical Leadership (2 units)**

*Course Description:* Leadership of tactical teams in complex operating environment. Self-assessment of leadership style. Basic military skills: terrain analysis, patrolling and operations orders. Dynamics of adaptive leadership in the context of military operations.

*Prerequisite(s):* MSC 022A; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **MSC 024A – Individual Military Leadership Skills (0.5 units)**

*Course Description:* Develop and practice personal military leadership skills in extensive supervised leadership labs. Cadets perform basic military skills, improve on troop leading procedures and lead subordinates in tactical situations. Begin with drill and ceremony, land navigation and individual movement techniques.

*Prerequisite(s):* MSC 014A; MSC 014B; MSC 014C; MSC 022A (can be concurrent); or consent of instructor. MSC 022A required concurrently.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MSC 024B – Individual Military Leadership Skills (0.5 units)**

*Course Description:* Development and practice of personal military leadership skills in extensive supervised leadership labs. Performance of basic military skills, improvement on troop-leading procedures, leadership of subordinates in tactical situations.

*Prerequisite(s):* MSC 014A; MSC 014B; MSC 014C; MSC 022B (can be concurrent); or consent of instructor. MSC 022B required concurrently.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MSC 024C – Individual Military Leadership Skills (0.5 units)**

*Course Description:* Develop and practice personal military leadership skills in extensive supervised leadership labs. Begin with drill and ceremony, land navigation and individual movement techniques. Cadets perform basic military skills, improve on troop leading procedures and lead subordinates in tactical situations.

*Prerequisite(s):* MSC 014A; MSC 014B; MSC 014C; MSC 021 (can be concurrent); or consent of instructor; MSC 021 required concurrently.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MSC 131 – Military Leadership & Management (2 units)**

*Course Description:* Leadership and management in organizational context. Team dynamics, leadership styles, professional ethics, development of a leadership framework. Management skills for planning, decision making, and organizing developed through definition of problems, development of courses of action, implementation of solutions.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **MSC 132A – Advanced Military Operations (2 units)**

*Course Description:* Military small unit tactical theory as the basis for leadership development. Principles of war, contemporary operating environment, Geneva Law of Land Warfare, military offensive and defensive operations. Emphasis on development of critical thinking, problem solving, and communication skills.

*Prerequisite(s):* MSC 131; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **MSC 132B – Applied Leadership (2 units)**

*Course Description:* Military small unit tactical theory and application as basis for leadership development. Application of leadership styles and skills to complete problem-solving exercises and the development of an adaptable framework applicable to a variety of shifting environments and situations.

*Prerequisite(s):* MSC 132A; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **MSC 134A – Adaptive Tactical Leadership (0.5 units)**

*Course Description:* Small unit tactical operations serve as the basis for enhancement of leadership performance through tactical application. Assessment of leadership attributes, skills, and actions through participation in a variety of leadership roles in problem-solving exercises.

*Prerequisite(s):* MSC 131; or consent of instructor; upper division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MSC 134B – Adaptive Tactical Leadership (0.5 units)**

*Course Description:* Small unit tactical operations as the basis for enhancement of leadership performance through tactical application. Assessment of leadership attributes, skills, and actions through participation in a variety of leadership roles in problem-solving exercises.

*Prerequisite(s):* MSC 132A; or consent of instructor; upper division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MSC 134C – Adaptive Tactical Leadership (0.5 units)**

*Course Description:* Small unit tactical operations are taught, serve as basis for students exploration, development. Serve in variety of leadership roles in which leadership attributes, skills, actions are closely assessed and developed while they are faced with series of problem solving exercises.

*Prerequisite(s):* MSC 132B; or consent of instructor; upper division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

## **MSC 141 – Ethical Leadership (2 units)**

*Course Description:* Direct influence of leaders on individual motivation and group processes. The complexities of balancing moral, legal, and ethical obligations while applying fundamental business principles in determining the best possible outcome from competing solutions.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MSC 142 – Military Law (2 units)**

*Course Description:* The United States Constitution and the Military Justice System. Basic law of war, with an emphasis on issues that might arise on the battlefield or during a national emergency.

*Prerequisite(s):* MSC 141; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MSC 143 – U.S. Army Management Systems (2 units)**

*Course Description:* Leadership and management, focusing on four management systems: planning, organizing, leading and controlling. Practical methodologies for assessing management decisions while balancing competing ethical, economic, infrastructure and future growth trade-offs.

*Prerequisite(s):* MSC 142; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**MSC 144A – Military Training Leadership Skills (0.5 units)**

*Course Description:* Enhancement of student leadership performance through practical application. Small unit military tactical operations as the basis for the student exploration and development.

*Prerequisite(s):* MSC 141; or consent of instructor; upper division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**MSC 144B – Military Training Leadership Skills (0.5 units)**

*Course Description:* Enhancement of student leadership performance through practical application. Small unit military tactical operations serve as the basis for student exploration and development.

*Prerequisite(s):* MSC 142; or consent of instructor; upper division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**MSC 144C – Military Training Leadership Skills (0.5 units)**

*Course Description:* Enhancement of student leadership performance through practical application. Small unit military tactical operations as the basis for student exploration and development.

*Prerequisite(s):* MSC 143; or consent of instructor; upper division standing.

*Learning Activities:* Laboratory 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**MSC 191 – Special Studies in Military Science (2 units)**

*Course Description:* Intensive examination of one or more special problems in military science. Possible areas of study include leadership dimensions, principles of war, air-land battle imperatives, military strategy, the operational art and professional ethics.

*Prerequisite(s):* MSC 131; MSC 132A; MSC 132B; MSC 141; MSC 142; MSC 143; consent of department chair.

*Learning Activities:* Independent Study 6 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

**Molecular & Cellular Biology (MCB)**

**College of Biological Sciences**

**MCB 010 – Introduction to Human Heredity (4 units)**

*Course Description:* Topics in human heredity and human gene structure and function, including the genetic basis of human development, causes of birth defects, mental retardation, genetic diseases, sexual determination, development, and behavior.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**MCB 023 – Biography of Cancer: Past, Present & Future (3 units)**

*Course Description:* Historical account of the progression of cancer treatment, prevention, and human understanding of the biological basis of cancer. Past, present and future social implications of cancer treatment and prevention. May be taught abroad.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Scientific Literacy (SL); Writing Experience (WE).

**MCB 099 – Special Study (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 110Y – iBioseminars in Cell & Molecular Biology (3 units)**

*Course Description:* Hybrid course in Cellular & Molecular Biology for senior level (1) Biochemistry/Molecular Biology; (2) Genetics; or (3) Cell Biology majors. Face-to-face instruction combined with online lectures available at iBioseminars website delivered by leading researchers in Cellular & Molecular Biology.

*Prerequisite(s):* BIS 101; BIS 102; (BIS 103 or BIS 105); BIS 104.

*Learning Activities:* Web Virtual Lecture 1.50 hour(s), Web Electronic Discussion 1.50 hour(s), Lecture/Discussion 2 hour(s).

*Credit Limitation(s):* Students who have previously taken MCB 110V cannot receive credit for MCB 110Y.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**MCB 112 – Communicating Research in the Biological Sciences (3 units)**

*Course Description:* Writing and communicating research concepts in the biological sciences for scientific audiences. Refining brief, informal, oral descriptions of research, writing documents required for graduate school applications, preparing conference posters, and drafting proposals for scientific fellowships.

*Prerequisite(s):* Consent of instructor; open to students with senior status and currently involved in laboratory research.

*Learning Activities:* Extensive Writing/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MCB 120 – Molecular Biology & Biochemistry Laboratory Associated Lecture (3 units)**

*Course Description:* Introduction to laboratory methods and procedures employed in studying molecular biology and biochemical processes. Lecture component for MCB 120L.

*Prerequisite(s):* BIS 102; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to upper division

Biochemistry & Molecular Biology majors; concurrent enrollment in MCB 120L required; on-time attendance for first lecture is mandatory.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **MCB 120L – Molecular Biology & Biochemistry Laboratory (3 units)**

*Course Description:* Introduction to laboratory methods and procedures employed in studying molecular biology and biochemical processes. Designed for students who need experience in use of molecular biology and biochemical techniques as research and analytical tools.

*Prerequisite(s):* BIS 102; or consent of instructor; must be taken concurrently with MCB 120.

*Learning Activities:* Laboratory 10 hour(s).

*Enrollment Restriction(s):* Pass One restricted to upper division Biochemistry & Molecular Biology majors; concurrent enrollment in MCB 120 required; on-time attendance for first lab is mandatory.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

## **MCB 121 – Advanced Molecular Biology (3 units)**

*Course Description:* Structure, expression, and regulation of eukaryotic genes. Chromosome structure and replication; gene structure, transcription, and RNA processing; protein synthesis and translation control; development, immune system, and oncogenes.

*Prerequisite(s):* BIS 101; (BIS 102 (can be concurrent) or BIS 105 (can be concurrent) or ABI 102 (can be concurrent)); BIS 102 or BIS 105 or ABI 102 can be concurrent although prior completion is recommended.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MCB 161.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **MCB 123 – Behavior & Analysis of Enzyme & Receptor Systems (3 units)**

*Course Description:* Introduction to the principles of enzyme kinetics and receptor-ligand interactions with emphasis on metabolic regulation and data analysis. Topics include simultaneous equilibria, chemical and steady-state kinetics, allosteric enzymes, multireactant systems, enzyme assays, membrane transport and computer-assisted simulations and analyses.

*Prerequisite(s):* BIS 103.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **MCB 124 – Macromolecular Structure & Function (4 units)**

*Course Description:* In-depth investigation into protein and nucleic acid structure and thermodynamics and how these properties influence their biological functions. Key examples of important functional classes of these molecules are examined.

*Prerequisite(s):* BIS 102 C- or better; BIS 101.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed CHE 108.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **MCB 126 – Plant Biochemistry (3 units)**

*Course Description:* The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants.

*Prerequisite(s):* BIS 103 or BIS 105.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PLB 126.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **MCB 138 – Undergraduate Seminar in Biochemistry (1 unit)**

*Course Description:* Discussion of the historical developments of modern biochemistry or current major research problems.

*Prerequisite(s):* BIS 103.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

## **MCB 139 – Undergraduate Seminar in Biochemistry (2 units)**

*Course Description:* Discussion of the historical developments of modern biochemistry or current major research problems.

*Prerequisite(s):* BIS 103.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

## **MCB 140 – Cell Biology Laboratory Associated Lecture (3 units)**

*Course Description:* Lectures illustrating the principles of cell biology with emphasis on light microscopy. Accompanies MCB 140L.

*Prerequisite(s):* BIS 104; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to upper division Cell Biology majors; concurrent enrollment in MCB 140L required; on-time attendance for first lecture is mandatory.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Writing Experience (WE).

**MCB 140L – Cell Biology Laboratory (5 units)**

*Course Description:* Exercises illustrating the principles of cell biology with emphasis on light microscopy.

*Prerequisite(s):* BIS 104 (can be concurrent).

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL);

Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**MCB 142 – Advanced Cell Biology: Contractile & Motile Systems (4 units)**

*Course Description:* Advanced cell biology with emphasis on molecular, biophysical and cellular properties of contractile and motile systems.

*Prerequisite(s):* BIS 102; BIS 104 (can be concurrent); MAT 016B.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MCB 143 – Cell & Molecular Biophysics (3 units)**

*Course Description:* Physical chemical principles by which molecules form living, moving, reproducing cells. Physical nature of cytoplasm; molecular structure/bonding in macromolecules, macromolecular assemblies and protein machines. Physical techniques and modeling of cytoskeletal polymer-motor dynamics and function during intracellular transport, mitosis and motility.

*Prerequisite(s):* BIS 101; BIS 102; BIS 103; BIS 104.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**MCB 144 – Mechanisms of Cell Division (3 units)**

*Course Description:* The molecules and mechanisms that allow eukaryotic cells to coordinate cell growth, DNA replication, segregation of chromosomes and cell division.

*Prerequisite(s):* BIS 101; BIS 102; BIS 104.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**MCB 145 – Assembly & Function of Cell Signaling Machinery (3 units)**

*Course Description:* Molecular basis of cell signaling, including positioning of cellular machinery, components of various signaling pathways, and downstream effects of signaling on cell adhesion, cell differentiation, and programmed cell death.

*Prerequisite(s):* BIS 101; BIS 102; BIS 104.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MCB 148 – Undergraduate Seminar in Cell Biology (2 units)**

*Course Description:* Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included.

*Prerequisite(s):* Upper division standing in the biological sciences or a related discipline.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

**MCB 150 – Developmental Biology (4 units)**

*Course Description:* Analysis of the mechanistic basis for animal development with a focus on experimental evidence and the relevant fundamental experimental strategies. Fertilization and early development, morphogenesis and patterning, cell differentiation, regulation of cell proliferation and tissue growth.

*Prerequisite(s):* BIS 101.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**MCB 158 – Undergraduate Seminar in Developmental Biology (2 units)**

*Course Description:* Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included.

*Prerequisite(s):* Upper division standing in the biological sciences or a related discipline.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

**MCB 160 – Genetics Laboratory Associated Lecture (3 units)**

*Course Description:* Lecture instruction in the theoretical basis of laboratory techniques in transmission and molecular genetics, discussion of lab results and experiment interpretation.

*Prerequisite(s):* BIS 101; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to upper division Genetics and Genomics majors; concurrent enrollment in MCB 160L required; on-time attendance for first lecture is mandatory.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Writing Experience (WE).

**MCB 160L – Principles of Genetics Laboratory (5 units)**

*Course Description:* Laboratory work in basic and molecular genetics including gene mapping, isolation and characterization of mutants in eukaryotic model systems, reverse genetics, gel electrophoresis, recombinant DNA techniques, and PCR.

*Prerequisite(s):* BIS 101.

*Learning Activities:* Laboratory 6 hour(s), Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**MCB 162 – Human Genetics & Genomics (3 units)**

*Course Description:* Human genome and genetic variation in human populations, molecular and genomic approaches in the practice of human genetics, epigenetic gene regulation, personal genetics and genomic medicine.

*Prerequisite(s):* BIS 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**MCB 163 – Developmental Genetics (3 units)**

*Course Description:* Current aspects of developmental genetics. Historical background and current genetic approaches to the study of development of higher animals.

*Prerequisite(s):* MCB 121 (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MCB 164 – Advanced Eukaryotic Genetics (3 units)**

*Course Description:* Principles and logic of modern genetic analysis to understand mechanisms governing Mendelian and epigenetic inheritance, with a focus on model organisms. Molecular basis of human genetic diseases and cancers explored through reading primary literature.

*Prerequisite(s):* MCB 121.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MCB 178 – Undergraduate Seminar in Molecular Genetics (1 unit)**

*Course Description:* Discussion of current topics in molecular genetics to show advanced applications of basic principles and to highlight professional career opportunities.

*Prerequisite(s):* BIS 101; MCB 121 (can be concurrent); upper division standing, and completion or concurrent enrollment in MCB 121.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL).

**MCB 182 – Principles of Genomics (3 units)**

*Course Description:* Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disciplines on research in the biological sciences. Social impacts of genomic research.

*Prerequisite(s):* BIS 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MCB 185 – Computer Programming for Biologists (3 units)**

*Course Description:* Introduction to computer programming specifically for biology majors. Programming projects have molecular biology and bioinformatic themes.

*Prerequisite(s):* BIS 101 C- or better.

*Learning Activities:* Lecture/Lab 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to all undergraduate majors in the College of Biological Sciences.

*Credit Limitation(s):* Only two units of credit for students who have previously taken ECS 012, ECS 032A or ENG 006.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**MCB 190C – Undergraduate Research Conference (1 unit)**

*Course Description:* Presentation and discussion of current research by faculty and students.

*Prerequisite(s):* MCB 193 (can be concurrent) or MCB 199 (can be concurrent); and consent of instructor; upper division standing; MCB 193 or MCB 199 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 191 – Introduction to Research (1 unit)**

*Course Description:* Various topics in molecular and cellular biology including biochemistry, genetics, and cell biology will be discussed, along with ways undergraduates can participate in research projects of faculty members.

*Prerequisite(s):* BIS 102 (can be concurrent); or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 192 – Internship (1-12 units)**

*Course Description:* Technical and/or practical experience on and off campus, supervised by a member of the Section of Molecular and Cellular Biology faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 193 – Advanced Research (3 units)**

*Course Description:* Research project carried out under the supervision of a faculty sponsor. Discussion and analysis of results and proposed experiments on a weekly basis with faculty sponsor. May include presentation of a seminar to a research group.

*Prerequisite(s):* Consent of instructor; upper division standing; completion of an upper division Molecular Cellular Biology (MCB) laboratory course.

*Learning Activities:* Laboratory 6 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 194 – Thesis Research (3 units)**

*Course Description:* Continuation of an intensive, individual laboratory research project in biochemistry, genetics, or cell biology culminating with the presentation of the work in a written thesis and in a seminar.

*Prerequisite(s):* Consent of instructor; 6 units of MCB 193 and/or MCB 199 with faculty director; senior standing.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

**MCB 194H – Research Honors (3 units)**

*Course Description:* Honors project. Continuation of an intensive, individual laboratory research project in biochemistry, genetics, or cell biology culminating with the presentation of the work in a written thesis and in a seminar.

*Prerequisite(s):* Consent of instructor; 6 units of MCB 193 and/or MCB 199 with faculty director; senior standing; GPA of at least 3.250.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

**MCB 197T – Tutoring in Molecular & Cellular Biology (1-5 units)**

*Course Description:* Assisting the instructor in one of the section's regular courses by tutoring individual or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activities.

*Prerequisite(s):* Consent of instructor; upper division standing, completion of course to be tutored.

*Learning Activities:* Tutorial 2-6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**MCB 248 – Seminar in Cell Biology (2 units)**

*Course Description:* Discussion of recent literature on the physical and chemical aspects of organization and function of living systems, topics of current interest in ultrastructure and function of cells. Organizational and functional properties of the molecular and cellular levels of biological systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MCB 258 – Seminar in Development (2 units)**

*Course Description:* Reports and discussion on embryology, morphogenesis, and developmental mechanisms.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MCB 259 – Literature in Developmental Biology (1 unit)**

*Course Description:* Critical presentation and analysis of recent journal articles in developmental biology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCB 282 – Biotechnology Internship (7-12 units)**

*Course Description:* Research at a biotechnology company or interdisciplinary cross-college lab for a minimum of 3 months as part of the Designated Emphasis in Biotechnology Program.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Internship 21-36 hour(s).

*Enrollment Restriction(s):* Open only to students participating in the Designated Emphasis in Biotechnology program.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCB 290C – Research Conference (1 unit)**

*Course Description:* Presentations and critical discussions of faculty and graduate student research in molecular and cellular biology including biochemistry, genetics, and cell biology.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCB 291 – Current Progress in Molecular & Cellular Biology (1 unit)**

*Course Description:* Seminars presented by guest lecturers on subject of their own research activities.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MCB 295 – Literature in Molecular & Cellular Biology (1 unit)**

*Course Description:* Critical reading and evaluation of current literature in molecular and cellular biology disciplines. Papers presented and discussed in detail.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MCB 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MCB 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Independent Study 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MCB 390 – Methods of Teaching (1 unit)**

*Course Description:* Practical experience in the methods and problems of teaching biochemistry/genetics/cell biology. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion and laboratory sections, formulating examinations under supervision of instructor. Participating in the teaching program required for Ph.D.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Molecular Biosciences (VMB)**

School of Veterinary Medicine

## **VMB 092 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the Department of Molecular Biosciences. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **VMB 101V – Principles of Pharmacology & Toxicology (3 units)**

*Course Description:* Online course provides training in core concepts of pharmacological and toxicological sciences and prepares to develop higher-order problem solving and critical thinking skills. Designed for advanced undergraduate students with interests in pursuing graduate degrees in pharmacology, toxicology, physiological sciences, and for students with an interest in pursuing D.V.M., M.D., Pharmacy, Dentistry and Nursing professional degrees. Students who pursue careers in environmental sciences, public health management, and epidemiology may also benefit from the subject matter presented in this course.

*Prerequisite(s):* Consent of instructor; upper division standing in a science major; chemistry through organic chemistry, general biology, or consent of instructor; good standing with the university; computing capability (use MS Word®, Excel®, PowerPoint®, menu driven software programs, Course LMS); own a computer or have ready access to a computer with broadband Internet access; NPB 101 and BIS 104 recommended.

*Learning Activities:* Web Virtual Lecture 0.25 hour(s), Web Electronic Discussion 1.50 hour(s), Project 1.50 hour(s), Auto Tutorial 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL).

## **VMB 101Y – Principles of Pharmacology & Toxicology (3 units)**

*Course Description:* Hybrid course provides training in core concepts of pharmacological and toxicological sciences. Develop higher-order problem solving and critical thinking skills.

*Prerequisite(s):* Upper division standing in a science major; chemistry through organic chemistry and general biology, or consent from instructor; good standing with university; computing capability using MS Word®, Excel®, PowerPoint®, menu driven software programs, SmartSite; computer, or ready access to a computer, with broadband Internet access.

*Learning Activities:* Discussion/Laboratory 1.50 hour(s), Web Virtual Lecture 1 hour(s), Web Electronic Discussion 0.50 hour(s), Auto Tutorial 5 hour(s).

*Enrollment Restriction(s):* Restricted to upper division undergraduate students in good standing with school and fulfill course prerequisites.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL).

## **VMB 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered by the Department of Molecular Biosciences. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **VMB 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **VMB 220 – Oxidative Stress & Free Radical Signaling (2 units)**

*Course Description:* Nature of nitrogen and oxygen radicals, their role in health, disease, medicine, toxicology, pharmacology, and related disciplines. Free radicals, antioxidants, and biological pathways. Clinical cases of increased oxidative stress.

*Prerequisite(s):* Advanced undergraduates, graduates, and professional students with a solid background in biochemistry and physiology.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory Only.

## **VMB 234 – Current Topics in Neurotoxicology (3 units)**

*Course Description:* General principles of neurotoxicology, the cell and molecular mechanisms and health impacts of specific neurotoxicants and the contribution of neurotoxic compounds to complex neurodevelopmental disorders and neurodegenerative diseases.

*Prerequisite(s):* Core courses in one of the following graduate programs: Pharmacology Toxicology (PTX), Agricultural Environmental Chemistry (AGC), Biochemistry Molecular Biology (BMB), Cell Developmental Biology (CDB), Immunology (IMM), Molecular Cellular Integrative Physiology (MCP) or Neuroscience (NSC).

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper level undergraduate students must obtain permission from the course coordinator.

*Cross Listing:* ETX 234, MCP 234.

*Grade Mode:* Letter.

## **VMB 253 – Metabolism of Toxicants & Drugs (2 units)**

*Course Description:* Significance/chemical pathways of toxicants and drug metabolism, enzymology and molecular aspects of P450 and flavin monooxygenases, hydrolases and phase 2 transferases and experimental approaches for metabolism studies.

*Prerequisite(s):* PTX 201; PTX 202; PTX 203; general biochemistry or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **VMB 254 – Toxicology of the Respiratory System (3 units)**

*Course Description:* Survey of structure and function of the respiratory system, the pathophysiology of major lung diseases, the interactions of toxicants with the lung and response of this organ to injury.

*Prerequisite(s):* PTX 201; PTX 202; PTX 203; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion.

*Grade Mode:* Letter.

## **VMB 255 – Pharmacokinetics & Biopharmaceuticals (2 units)**

*Course Description:* In-depth study of pharmacokinetics, including the fundamentals of pharmacokinetics, how to design a pharmacokinetic study and how to use both compartmental and non-compartmental analysis to interpret the data.

*Learning Activities:* Lecture 16 hour(s), Discussion 4 hour(s).

*Grade Mode:* Letter.

## **VMB 290 – Seminar (1 unit)**

*Course Description:* Topics in nutrition, pharmacology/toxicology, and biochemistry.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VMB 297T – Tutoring in Graduate Molecular Biosciences (1-5 units)**

*Course Description:* Assist in preparation and teaching of courses in Nutrition, Pharmacology and Toxicology, or other courses offered by the department under direct supervision of the instructor. Designed for graduate or professional students who desire teaching experience in graduate courses.

*Prerequisite(s):* Consent of instructor; graduate or professional student standing.

*Learning Activities:* Practice 1-5 hour(s).

*Repeat Credit:* May be repeated 5 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VMB 298 – Group Study (1-5 units)**

*Course Description:* Description:

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VMB 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Molecular, Cellular, & Integrative Physiology (MCP)**

## **Graduate Studies**

### **MCP 200L – Animal Cell Culture Laboratory (4 units)**

*Course Description:* Techniques of cell culture, with emphases on cell physiology and the actions of drugs and toxicants on cultured somatic cells. Design, performance and interpretation of experiments with animal cells in vitro.

*Prerequisite(s):* Courses in undergraduate Biochemistry, Cell Biology, or General Physiology, or consent of instructor.

*Learning Activities:* Discussion 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

### **MCP 210A – Advanced Physiology (5 units)**

*Course Description:* Advanced course on fundamental principles of cell physiology, transport physiology, signal transduction, physiology of excitable cells, and muscle physiology.

*Prerequisite(s):* Physiology Ph.D. program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* MCP 210A (or HPH 210A) is a required core course for the Molecular, Cellular, & Integrative Physiology graduate group; course contains thermodynamics discussions and requires substantial math and physics background in order to succeed; approval for registering from Co-IRs is required to get CRN.

*Cross Listing:* HPH 210A.

*Grade Mode:* Letter.

**MCP 210B – Advanced Physiology (6 units)**

*Course Description:* Advanced course in general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology.  
*Prerequisite(s):* Physiology Ph.D. program, or consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MCP 210C – Advanced Physiology (5 units)**

*Course Description:* Graduate level instruction in the general principles of physiology and the neural and humoral control of the cardiovascular, renal, respiratory, gastrointestinal, sensory, musculoskeletal, and reproductive systems.

*Prerequisite(s):* Doctoral student in the Molecular, Cellular, Integrative Physiology graduate group, or consent of instructor.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

**MCP 210L – Physiology Laboratory Rotations (5 units)**

*Course Description:* One mandatory rotation and up-to two voluntary rotations. Students learn techniques and perform experiments related to particular research problems. At the end of the rotations students give a short talk and hand in a research paper.

*Learning Activities:* Laboratory 15 hour(s).

*Enrollment Restriction(s):* Restricted to Molecular, Cellular, & Integrative Physiology graduate students.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCP 215 – Electrophysiology Techniques & Applications (3 units)**

*Course Description:* Broad scope of topics in electrophysiology techniques and applications.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s).

*Cross Listing:* PTX 215.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCP 216 – Neurophysiology Literature (3 units)**

*Course Description:* Lectures covering experimental and theoretical methods in studying cell membrane ion channels and the resulting characterization of the physiological functions and structure/function relationships of some of the most important channel types. Discussion of classical and current original papers.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

**MCP 219 – Muscle Growth & Development (3 units)**

*Course Description:* Integration of growth and development of skeletal muscle; morphology, biochemistry, neural control mechanisms, circulatory and nutritional factors. Prenatal and neonatal differentiation of fiber types. Experimental and hereditary myopathies.

*Prerequisite(s):* BIS 103; (BIS 104 or MCB 150); or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

**MCP 220 – General & Comparative Physiology of Reproduction (3 units)**

*Course Description:* Basic phenomena of sexual and asexual reproduction and comparisons of processes in a wide variety of animals; gamete formation, structure, and metabolism; fertilization; neuroendocrine mechanisms in maturation and reproductive cycles; behavioral aspects.

*Prerequisite(s):* BIS 101; BIS 103; NPB 110; NPB 110L.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MCP 222 – Mammalian Gametogenesis & Fertilization (3 units)**

*Course Description:* Emphasizes our current understanding of events in mammalian gametogenesis and the fertilization process. Published results, conclusions drawn from these results, and their contribution to our understanding are discussed.

*Prerequisite(s):* NPB 121; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MCP 230 – Advanced Endocrinology (2 units)**

*Course Description:* Focus on timely topic of endocrine research. Critical review of current literature and discussion of future research strategies in the area.

*Prerequisite(s):* NPB 130; or the equivalent, and graduate standing.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**MCP 231 – Neuroendocrinology (3 units)**

*Course Description:* Neural-endocrine interactions; neural regulation of the endocrine system, especially in relation to reproduction; the role of hormones and growth factors in sexual differentiation of the brain.

*Prerequisite(s):* NPB 130; or the equivalent course in endocrinology; NPB 110 or the equivalent course in systemic physiology.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**MCP 234 – Current Topics in Neurotoxicology (3 units)**

*Course Description:* General principles of neurotoxicology, the cell and molecular mechanisms and health impacts of specific neurotoxicants and the contribution of neurotoxic compounds to complex neurodevelopmental disorders and neurodegenerative diseases.

*Prerequisite(s):* Core courses in one of the following graduate programs: Pharmacology Toxicology (PTX), Agricultural Environmental Chemistry (AGC), Biochemistry Molecular Biology (BMB), Cell Developmental Biology (CDB), Immunology (IMM), Molecular Cellular Integrative Physiology (MCP) or Neuroscience (NSC).

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper level undergraduate students must obtain permission from the course coordinator.

*Cross Listing:* ETX 234, VMB 234.

*Grade Mode:* Letter.

**MCP 242 – Biological Rhythms (3 units)**

*Course Description:* General aspects and basic mechanisms of biological rhythms; the importance of rhythm desynchronization in areas of pharmacology and space medicine; telemetry; mathematical methods; chronometry; daily, reproductive, and annual periods; shift-work, jet lag and sleep disorders.

*Prerequisite(s):* NPB 110 or the equivalent.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

**MCP 255 – Physiology of the Stress Response (2 units)**

*Course Description:* Definition of Stress; Physiological mechanisms of adaptation to stress; Hormonal control of the systemic stress response; Mechanisms of the cellular stress response; Discussion of current trends in stress physiology and current methods for studying the stress response.

*Prerequisite(s):* Graduate Student Status.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* ABG 255.

*Grade Mode:* Letter.

**MCP 261A – Topics in Vision: Eyes & Retinal Mechanisms (2 units)**

*Course Description:* Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing.

*Prerequisite(s):* NPB 100 or NPB 112; or the equivalent; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 261A, NPB 261A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCP 261B – Topics in Vision: Systems, Psychophysics, Computational Models (2 units)**

*Course Description:* Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system.

*Prerequisite(s):* Consent of instructor; MCP 261A recommended.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 261B, NPB 261B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCP 261C – Topics in Vision: Clinical Vision Science (2 units)**

*Course Description:* Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease.

*Prerequisite(s):* MCP 261A; MCP 261B; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 261C, NPB 261C.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**MCP 275 – Neurohumoral Regulatory Mechanisms of Thermogenesis (3 units)**

*Course Description:* Designed for graduate and advanced undergraduate students, examines thermogenic systems in homeotherms (primarily mammals) with respect to regulation (hormonal and central nervous control) and effector mechanisms (basis of heat generation at the target cell).

*Prerequisite(s):* BIS 104; BIS 102; or equivalent courses, and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**MCP 290 – Seminar (1 unit)**

*Course Description:* Discussion and critical evaluation of advanced topics and current trends in research.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**MCP 290C – Research Conference in Physiology (1 unit)**

*Course Description:* Presentation and discussion of faculty and graduate student research in physiology.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**MCP 291B – Seminar in Cellular Mechanisms of Adaptation (1 unit)**

*Course Description:* Review and evaluation of current literature and research in cellular adaptations to the environment.

*Prerequisite(s):* BIS 103; NPB 100B; consent of instructor.

*Learning Activities:* Discussion 0.50 hour(s), Seminar 0.50 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**MCP 291D – Research Approaches in Physiology (2 units)**

*Course Description:* Current research in physiology. Overall design of experiments and particular research areas.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**MCP 293 – Current Progress in Physiology (1 unit)**

*Course Description:* Seminars presented by guest lecturers describing their current research activities.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**MCP 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**MCP 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## MCP 300A – Pedagogical Aspects of Physiology in Higher Education (3 units)

*Course Description:* Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, writing and grading quizzes, operation and use of laboratory equipment, and reading and grading laboratory reports. Meets teaching requirements for Ph.D. program in Physiology.

*Prerequisite(s):* Meet qualifications for teaching assistant in physiology.

*Learning Activities:* Lecture, Discussion, Laboratory.

*Grade Mode:* Pass/No Pass only.

## MCP 300B – Pedagogical Aspects of Physiology in Higher Education (3 units)

*Course Description:* Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, writing and grading quizzes, operation and use of laboratory equipment, and reading and grading laboratory reports. Meets teaching requirements for Ph.D. program in Physiology.

*Prerequisite(s):* Meet qualifications for teaching assistant in physiology.

*Learning Activities:* Lecture, Discussion, Laboratory.

*Grade Mode:* Pass/No Pass only.

## MCP 390 – The Teaching of Physiology (1 unit)

*Course Description:* Practical experience in methods and problems of teaching physiology lecture courses. May include analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion sessions, and formulation of topics and questions for examinations under supervision of instructor.

*Prerequisite(s):* Consent of instructor; Teaching Assistant assignment to a physiology lecture course.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# Music (MUS)

College of Letters & Science

## MUS 002A – Keyboard Competence, Part 1 (2 units)

This version has ended; see updated course, below.

*Course Description:* Training to meet the minimum piano requirements for the major in music. Scales and simple harmonic progressions in twelve keys, both major and minor.

*Prerequisite(s):* MUS 006A (can be concurrent); MUS 016A (can be concurrent); consent of instructor. MUS 006A and MUS 016A required concurrently.

*Learning Activities:* Performance Instruction 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## MUS 002A – Keyboard Competence, Part 1 (2 units)

*Course Description:* Training to meet the minimum piano requirements for the major in music. Scales and simple harmonic progressions in twelve keys, both major and minor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Performance Instruction 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## MUS 002B – Keyboard Competence, Part 2 (2 units)

This version has ended; see updated course, below.

*Course Description:* Training to meet the minimum piano requirements for the major in music. Harmonic progressions, modulations and score reading at the piano.

*Prerequisite(s):* MUS 002A; (MUS 006B (can be concurrent), MUS 016B (can be concurrent)); consent of instructor. MUS 006B and MUS 016B required concurrently. Completion of MUS 002A or demonstration of required keyboard proficiency level on diagnostic exam.

*Learning Activities:* Performance Instruction 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## MUS 002B – Keyboard Competence, Part 2 (2 units)

*Course Description:* Training to meet the minimum piano requirements for the major in music. Harmonic progressions, modulations and score reading at the piano.

*Prerequisite(s):* MUS 002A; consent of instructor; completion of MUS 002A or demonstration of required keyboard proficiency level on diagnostic exam.

*Learning Activities:* Performance Instruction 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## MUS 002C – Keyboard Competence, Part 3 (2 units)

This version has ended; see updated course, below.

*Course Description:* Training to meet the minimum piano requirements for the major in music. Harmonic progressions, figured bass realization, sight reading and keyboard repertory.

*Prerequisite(s):* MUS 002B; (MUS 006C (can be concurrent), MUS 016C (can be concurrent)); consent of instructor. MUS 006C and MUS 016C required concurrently; completion of MUS 002B or demonstration of required keyboard proficiency level on diagnostic exam.

*Learning Activities:* Performance Instruction 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## MUS 002C – Keyboard Competence, Part 3 (2 units)

*Course Description:* Training to meet the minimum piano requirements for the major in music. Harmonic progressions, figured bass realization, sight reading and keyboard repertory.

*Prerequisite(s):* MUS 002B; consent of instructor; completion of MUS 002B or demonstration of required keyboard proficiency level on diagnostic exam.

*Learning Activities:* Performance Instruction 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Spring Quarter 2024.

## MUS 003A – Introduction to Music Theory, Part 1 (4 units)

*Course Description:* Fundamentals of music theory, ear-training, harmony, counterpoint, and analysis directed toward the development of listening and writing techniques. Intended for the general student.

*Learning Activities:* Lecture 1 hour(s), Recitation 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 003B – Introduction to Music Theory, Part 2 (4 units)**

*Course Description:* Continuation of MUS 003A. Development of melodic and harmonic writing skills. Basic analysis training. Intended for the general student.

*Prerequisite(s):* MUS 003A; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Recitation 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 006A – Elementary Theory, Part 1 (3 units)**

This version has ended; see updated course, below.

*Course Description:* Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors.

*Prerequisite(s):* MUS 002A (can be concurrent); MUS 016A (can be concurrent); required concurrently.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 006A – Elementary Theory, Part 1 (3 units)**

*Course Description:* Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors.

*Prerequisite(s):* MUS 016A (can be concurrent); required concurrently.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## **MUS 006B – Elementary Theory, Part 2 (3 units)**

This version has ended; see updated course, below.

*Course Description:* Continuation of MUS 006A.

*Prerequisite(s):* MUS 002B (can be concurrent); MUS 016B (can be concurrent); required concurrently; completion of MUS 006A or demonstration of required proficiency level on diagnostic exam.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 006B – Elementary Theory, Part 2 (3 units)**

*Course Description:* Continuation of MUS 006A.

*Prerequisite(s):* MUS 016B (can be concurrent); required concurrently; completion of MUS 006A or demonstration of required proficiency level on diagnostic exam.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Spring Quarter 2024.

## **MUS 006C – Elementary Theory, Part 3 (3 units)**

Starting Spring Quarter 2024, this course is no longer offered.

*Course Description:* Continuation of MUS 006A & MUS 006B.

*Prerequisite(s):* MUS 002C (can be concurrent); MUS 016C (can be concurrent); MUS 002C MUS 016C required concurrently; completion of MUS 006B or demonstration of required proficiency level on diagnostic exam.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 007A – Intermediate Theory, Part 1 (3 units)**

This version has ended; see updated course, below.

*Course Description:* Homophonic music of the Classical era with a focus on analysis of music by Haydn, Mozart, and Beethoven. Composition of pieces in the homophonic forms such as minuet and trio, theme and variations, rondo and sonata. Intended for music majors.

*Prerequisite(s):* MUS 006C; MUS 017A (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 007A – Intermediate Theory, Part 1 (3 units)**

*Course Description:* Homophonic music of the Classical era with a focus on analysis of music by Haydn, Mozart, and Beethoven. Composition of pieces in the homophonic forms such as minuet and trio, theme and variations, rondo and sonata. Intended for music majors.

*Prerequisite(s):* (MUS 006B; MUS 017A (can be concurrent)); or consent of instructor; students can place into MUS 007A based on the results of a diagnostic test given at the beginning of fall term.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## **MUS 007B – Intermediate Theory, Part 2 (3 units)**

*Course Description:* Harmony and voice of the 19th century leading through the music of the Romantic era. Focus on analysis of music by Chopin, Schumann, Brahms, Wagner, and Wolf. Composition of character pieces and songs. Intended for Music majors.

*Prerequisite(s):* MUS 007A; MUS 017B (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 007C – Intermediate Theory, Part 3 (3 units)**

*Course Description:* Music of the first thirty years of the 20th century and various analytical tools pertaining to it. Works of Debussy, Stravinsky, Schoenberg, Berg, and others. Composition of small pieces for solo instruments, voice and piano. Intended for music majors.

*Prerequisite(s):* MUS 007B; MUS 017C (can be concurrent).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 010 – Introduction to Musical Literature (4 units)**

*Course Description:* Introduction to composers and major styles of Western music. Lectures, listening sections, and selected readings. For non-majors.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## **MUS 011 – Musics of the World (4 units)**

*Course Description:* Survey of selected art, folk, and popular music cultures from different parts of the world. Emphasis on understanding relationship of musical style, aesthetic principles, and performance practice to wider cultural contexts.

*Learning Activities:* Lecture 3 hour(s), Listening 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**MUS 016A – Elementary Musicianship, Part 1 (2 units)**

This version has ended; see updated course, below.

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 002A (can be concurrent); MUS 006A (can be concurrent); MUS 002A and MUS 006A required concurrently.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 016A – Elementary Musicianship, Part 1 (2 units)**

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 006A (can be concurrent).

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

**MUS 016B – Elementary Musicianship, Part 2 (2 units)**

This version has ended; see updated course, below.

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 016A; (MUS 002B (can be concurrent), MUS 006B (can be concurrent)); MUS 002B and MUS 006B required concurrently; completion of MUS 016A or demonstration of required proficiency level on diagnostic exam.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 016B – Elementary Musicianship, Part 2 (2 units)**

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 016A; MUS 006B (can be concurrent); completion of MUS 016A or demonstration of required proficiency level on diagnostic exam.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

**MUS 016C – Elementary Musicianship, Part 3 (2 units)**

Starting Spring Quarter 2024, this course is no longer offered.

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 016B; (MUS 002C (can be concurrent), MUS 006C (can be concurrent)); MUS 002C and MUS 006C required concurrently; completion of MUS 016B or demonstration of required proficiency level on diagnostic exam.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 017A – Intermediate Musicianship, Part 1 (2 units)**

This version has ended; see updated course, below.

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 016C; MUS 007A (can be concurrent); or demonstrate required proficiency level on diagnostic exam.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 017A – Intermediate Musicianship, Part 1 (2 units)**

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 016B; MUS 007A (can be concurrent); or demonstrate required proficiency level on diagnostic exam.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

**MUS 017B – Intermediate Musicianship, Part 2 (2 units)**

*Course Description:* Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 017A; (MUS 007B (can be concurrent); MUS 007B required concurrently. Completion of MUS 017A or demonstration of required proficiency level on diagnostic exam.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 017C – Intermediate Musicianship, Part 3 (2 units)**

*Course Description:* The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.

*Prerequisite(s):* MUS 017B; completion of MUS 017B or demonstration of required proficiency level on diagnostic exam; MUS 007C required concurrently.

*Learning Activities:* Lecture/Lab 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 024A – History of Western Music: Baroque & Classic Eras (4 units)**

*Course Description:* History of western music in the baroque and classic eras, roughly 1600-1800. Intended primarily for majors in music.

*Prerequisite(s):* MUS 006A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Listening.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**MUS 024B – History of Western Music: Romantic Era (4 units)**

*Course Description:* History of music from the romantic period, roughly 1800-1900. Intended primarily for music majors.

*Prerequisite(s):* MUS 024A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Listening.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## MUS 028 – Introduction to African American Music (4 units)

*Course Description:* Survey of African American music, such as spirituals, blues, ragtime, jazz, theater, gospel, R&B, rap, and art music. Emphasis on historical and sociocultural contexts, as well as African roots.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion 1 hour(s), Listening, Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); Writing Experience (WE).

## MUS 098 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## MUS 099 – Special Study for Undergraduates (1-5 units)

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## MUS 101A – Advanced Theory, Part 1 (4 units)

*Course Description:* Music of the 20th century from 1930 through 1950 and the various analytical tools pertaining to it. Works of Copland, Sessions, Schoenberg, Bartók, and Stravinsky. Composition of small pieces for piano and voice.

*Prerequisite(s):* MUS 007C.

*Learning Activities:* Lecture 3 hour(s), Lecture/Lab 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## MUS 101B – Advanced Theory, Part 2 (4 units)

*Course Description:* Music from 1950 to the present and the analytical tools pertaining to it. Works of Babbitt, Carter, Dallapiccola, Ligeti, Messiaen, Reich and others. Composition of small pieces for ensemble.

*Prerequisite(s):* MUS 101A.

*Learning Activities:* Lecture 3 hour(s), Lecture/Lab 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## MUS 102 – Tonal Counterpoint (4 units)

This version has ended; see updated course, below.

*Course Description:* Imitative tonal counterpoint with an analytical focus on the Two-Part Inventions and fugues from the The Well-Tempered Klavier by J. S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors.

*Prerequisite(s):* MUS 006C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Practice 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## MUS 102 – Tonal Counterpoint (4 units)

*Course Description:* Imitative tonal counterpoint with an analytical focus on the Two-Part Inventions and fugues from the The Well-Tempered Klavier by J. S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors.

*Prerequisite(s):* MUS 006B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Practice 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## MUS 103 – Workshop in Composition (3 units)

This version has ended; see updated course, below.

*Course Description:* Workshop in musical composition for undergraduates who are interested in pursuing serious compositional studies and intending to follow the composition track of the major. Explores the techniques and materials of musical composition.

*Prerequisite(s):* MUS 006C; or consent of instructor.

*Learning Activities:* Workshop 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## MUS 103 – Workshop in Composition (3 units)

*Course Description:* Workshop in musical composition for undergraduates who are interested in pursuing serious compositional studies and intending to follow the composition track of the major. Explores the techniques and materials of musical composition.

*Prerequisite(s):* MUS 006B; or consent of instructor.

*Learning Activities:* Workshop 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## MUS 105 – History & Analysis of Jazz (4 units)

*Course Description:* Jazz and the evolution of jazz styles in historical and cultural context. For non-majors.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010 or MUS 011 or MUS 028; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**MUS 106 – History of Rock Music (4 units)**

*Course Description:* Rock and the evolution of rock styles in historical and cultural context. For non-majors.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

**MUS 107A – Introduction to Electronic Music (4 units)**

*Course Description:* Basics of electronic music history, techniques, and composition. Fixed media creation using field recordings. Focus on history, theory and techniques of musique concrète, elektronische musik, and related repertoire.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment. Pass One restricted to Music and Cinema and Digital Media undergraduate students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 107B – Handmade Electronic Music (4 units)**

*Course Description:* Hacking, bending, and creating electronic circuits to make sound. Learning to read circuit diagrams, to build prototypes, and to solder components together. Repertoire study.

*Prerequisite(s):* MUS 107A; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 107C – Computer Music (4 units)**

*Course Description:* Making electronic music in an open source programming environment. Intermediate synthesis, physical controllers, and algorithmic music. Overview of history, aesthetics, and techniques of digital sonic art. Three composition projects.

*Prerequisite(s):* MUS 107A.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 108A – Orchestration (2 units)**

This version has ended; see updated course, below.

*Course Description:* Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instrumental combinations.

*Prerequisite(s):* MUS 006C; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**MUS 108A – Orchestration (2 units)**

*Course Description:* Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instrumental combinations.

*Prerequisite(s):* MUS 006B; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

This course version is effective from, and including: Winter Quarter 2024.

**MUS 108B – Orchestration (2 units)**

*Course Description:* Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instrumental combinations.

*Prerequisite(s):* MUS 108A; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL).

**MUS 110A – The Musical World of Beethoven (4 units)**

*Course Description:* Work of Beethoven will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**MUS 110B – The Musical World of a 20th-Century Composer (4 units)**

*Course Description:* Overview of concert music by a significant twentieth-century composer outside the United States (for example: Igor Stravinsky, Claude Debussy, Gustav Mahler, Arnold Schoenberg, Bela Bartok, Dmitri Shostakovich, Benjamin Britten, Olivier Messiaen, Osvaldo Golijov, Tan Dun, Kaija Saariaho). Lectures, discussion/guided listening sections, and selected readings. For non-majors.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**MUS 110C – The Musical World of J. S. Bach (4 units)**

*Course Description:* Work of J. S. Bach will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**MUS 110D – The Musical World of Mozart (4 units)**

*Course Description:* Work of Mozart will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## MUS 110E – The Musical World of an 18th-Century Composer (4 units)

**Course Description:** Overview of concert music by a significant European eighteenth-century composer other than Mozart, Beethoven, or J. S. Bach (for example: Franz Joseph Haydn, George Frideric Handel, Antonio Vivaldi). Lectures, discussion/guided listening sections, and selected readings. For non-majors.

**Prerequisite(s):** MUS 003A or MUS 006A or MUS 010; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## MUS 110F – The Musical World of an American Composer (4 units)

**Course Description:** Overview of American concert music by a significant American composer (for example: Aaron Copland, George Gershwin, Ruth Crawford, Charles Ives, Duke Ellington, Leonard Bernstein, John Cage, John Adams). Lectures, discussion/guided listening sections, and selected readings. For non-majors.

**Prerequisite(s):** MUS 003A or MUS 006A or MUS 010 or MUS 011 or MUS 028; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## MUS 112A – Jazz Fundamentals (2 units)

**Course Description:** Fundamentals of Jazz music theory, ear training, harmony and composition techniques. Designed to complement participation in Jazz Combo or Jazz Band. First of a three-course sequence.

**Prerequisite(s):** MUS 003A C- or better; or consent of instructor.

**Learning Activities:** Lecture/Lab 2 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment with MUS 140 or MUS 146 required.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH).

## MUS 112B – Jazz Theory (2 units)

**Course Description:** Intermediate level Jazz music theory, ear training, harmony, and composition techniques including improvisation. Designed to complement participation in Jazz Combo or Jazz Band. Second of a three-course sequence.

**Prerequisite(s):** MUS 112A C- or better; consent of instructor.

**Learning Activities:** Lecture/Lab 2 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment in MUS 140 or MUS 146 required.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH).

## MUS 112C – Jazz Composition (2 units)

**Course Description:** Jazz compositions and arranging in different styles using techniques of Jazz theory, harmony and improvisation. Third of a three-course sequence.

**Prerequisite(s):** MUS 112B C- or better; consent of instructor.

**Learning Activities:** Lecture/Lab 2 hour(s).

**Enrollment Restriction(s):** Concurrent enrollment in MUS 140 required.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH).

## MUS 113 – Introduction to Conducting (2 units)

This version has ended; see updated course, below.

**Course Description:** Principles and techniques of conducting as they apply to both choral and instrumental ensembles.

**Prerequisite(s):** MUS 006C; or consent of instructor.

**Learning Activities:** Lecture 1 hour(s), Performance Instruction 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH).

## MUS 113 – Introduction to Conducting (2 units)

**Course Description:** Principles and techniques of conducting as they apply to both choral and instrumental ensembles.

**Prerequisite(s):** MUS 006B; or consent of instructor.

**Learning Activities:** Lecture 1 hour(s), Performance Instruction 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH).

This course version is effective from, and including: Winter Quarter 2024.

## MUS 114 – Intermediate Conducting (2 units)

**Course Description:** Intermediate conducting with a continued focus on principles and techniques as they apply to both choral and instrumental ensembles.

**Prerequisite(s):** MUS 113; or consent of instructor.

**Learning Activities:** Lecture 1 hour(s), Performance Instruction 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH).

## MUS 115 – History of Film Music (4 units)

**Course Description:** Film music from silent films to movies of the past decade. How music supports and shapes film narrative and structure. Use of jazz, rock and classical music in film.

**Learning Activities:** Lecture 3 hour(s), Film Viewing 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## MUS 116 – Introduction to the Music of The Beatles (4 units)

**Course Description:** Survey of music of The Beatles, focusing on the songs of Lennon and McCartney. Emphasis on understanding their evolution as musicians, composers and cultural figures. Discussion of their musical influences in wider cultural contexts.

**Learning Activities:** Lecture 3 hour(s), Listening 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

## **MUS 117 – The Broadway Musical (4 units)**

*Course Description:* Exploration of a variety of Broadway and film musicals from different time periods, and how musicals reflect and help create social reality, and the different aspects of the creative process as manifested through music, dance, scenery, and acting.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL).

## **MUS 121 – Topics in Music Scholarship (4 units)**

This version has ended; see updated course, below.

*Course Description:* Sources and problems of a historical period or musical style selected by the instructor and announced in advance.

*Prerequisite(s):* MUS 006C; MUS 024B; or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL).

## **MUS 121 – Topics in Music Scholarship (4 units)**

*Course Description:* Sources and problems of a historical period or musical style selected by the instructor and announced in advance.

*Prerequisite(s):* MUS 006B; MUS 024B; or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL).

This course version is effective from, and including: Winter Quarter 2024.

## **MUS 122 – Topics in Analysis & Theory (4 units)**

This version has ended; see updated course, below.

*Course Description:* Analysis of works of a composer or musical style selected by the instructor and announced in advance. Consideration of theoretical issues.

*Prerequisite(s):* MUS 006C; MUS 024B; or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL).

## **MUS 122 – Topics in Analysis & Theory (4 units)**

*Course Description:* Analysis of works of a composer or musical style selected by the instructor and announced in advance. Consideration of theoretical issues.

*Prerequisite(s):* MUS 006B; MUS 024B; or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL).

This course version is effective from, and including: Winter Quarter 2024.

## **MUS 123 – Music as Culture (4 units)**

*Course Description:* Introduction to the study of music in cross-cultural perspective. Basic theories and frameworks of ethnomusicology; in-depth case studies of three musical traditions from around the world. Intended for music majors.

*Prerequisite(s):* MUS 024B; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Listening.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **MUS 124C – History of Western Music: 20th Century to the Present (4 units)**

*Course Description:* History of Western Music from 1900 to the present.

*Intended primarily for music majors.*

*Prerequisite(s):* MUS 024B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s); Listening.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **MUS 124D – History of Western Music: Middle Ages & Renaissance (4 units)**

*Course Description:* History of Western Music in the Middle Ages and Renaissance, roughly 800-1600. Intended primarily for music majors.

*Learning Activities:* Lecture 3 hour(s); Listening.

*Prerequisite(s):* MUS 024C or MUS 124C; or consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **MUS 126 – American Music (4 units)**

*Course Description:* Introductory survey of American musics, including Native American music, Hispanic polyphony, New England psalmody, and selected 20th-century composers and styles.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010 or MUS 011 or MUS 028; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Listening 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **MUS 127 – Music from Latin America (4 units)**

*Course Description:* Examination of music from Latin America.

Characteristic music (i.e., tango, bossa nova, salsa, musica motena, musica andina) as well as its implications in other musical genres. Taught in English or Spanish depending on instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken SPA 171S or MUS 127S.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Cross Listing:* SPA 171.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **MUS 127S – Music from Latin America (4 units)**

*Course Description:* Examination of music from Latin America.

Characteristic music (i.e. tango, bossa nova, salsa, musica motena, musica andina) as well as its implications in other musical genres. Taught abroad in Spanish or English depending on instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken SPA 171 or MUS 127.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Cross Listing:* SPA 171S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MUS 129A – Musics of the Americas (4 units)**

*Course Description:* Survey of music cultures from North, Central, and South America, including the Caribbean, with emphasis on the role of music in society and on the elements of music (instruments, theory, genres and form, etc.). Introduction to ethnomusicological theory, methods, approaches.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010 or MUS 011 or MUS 028; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MUS 129B – Musics of Africa, Middle East, Indian Subcontinent (4 units)**

*Course Description:* Survey of music cultures with special emphasis on the role of music in society and on the elements of music (instruments, theory, genres and form, etc.). Introduction to ethnomusicological theory, methods, approaches.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010 or MUS 011 or MUS 028; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MUS 129C – Musics of East & Southeast Asia (4 units)**

*Course Description:* Survey of music cultures from Japan, China, Korea, Vietnam, and Indonesia, with special emphasis on the role of music in society and on the elements of music (instruments, theory, genres and form, etc.). Introduction to ethnomusicological theory, methods, approaches.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010 or MUS 011 or MUS 028; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MUS 129D – Folk Musics of Europe (4 units)**

*Course Description:* Survey of folk musics from all of Europe, with emphasis on the role of music in society and on the elements of music (instruments, genres, form, etc.). Introduction to ethnomusicological theory, methods, approaches.

*Prerequisite(s):* MUS 003A or MUS 006A or MUS 010 or MUS 011 or MUS 028; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**MUS 130A – Applied Study of Music: Advanced; Voice (1 unit)**

*Course Description:* Class instruction, arranged by section; Voice. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130B – Applied Study of Music: Advanced; Piano (1 unit)**

*Course Description:* Class instruction, arranged by section; Piano. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130C – Applied Study of Music: Advanced; Harpsichord (1 unit)**

*Course Description:* Class instruction, arranged by section; Harpsichord. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130D – Applied Study of Music: Advanced; Organ (1 unit)**

*Course Description:* Class instruction, arranged by section; Organ. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130E – Applied Study of Music: Advanced: Violin (1 unit)**

*Course Description:* Class instruction, arranged by section; Violin. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130F – Applied Study of Music: Advanced; Viola (1 unit)**

*Course Description:* Class instruction, arranged by section; Viola. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130G – Applied Study of Music: Advanced; Cello (1 unit)**

*Course Description:* Class instruction, arranged by section; Cello. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130H – Applied Study of Music: Advanced; Double Bass (1 unit)**

*Course Description:* Class instruction, arranged by section; Double Bass. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130I – Applied Study of Music: Advanced; Flute (1 unit)**

*Course Description:* Class instruction, arranged by section; Flute. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130J – Applied Study of Music: Advanced; Oboe (1 unit)**

*Course Description:* Class instruction, arranged by section; Oboe. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130K – Applied Study of Music: Advanced; Clarinet (1 unit)**

*Course Description:* Class instruction, arranged by section; Clarinet. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130L – Applied Study of Music: Advanced; Bassoon (1 unit)**

*Course Description:* Class instruction, arranged by section; Bassoon. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130M – Applied Study of Music: Advanced; French Horn (1 unit)**

*Course Description:* Class instruction, arranged by section; French Horn.

*Offered as demand indicates.*

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130N – Applied Study of Music: Advanced; Trumpet (1 unit)**

*Course Description:* Class instruction, arranged by section; Trumpet.

*Offered as demand indicates.*

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130O – Applied Study of Music: Advanced; Trombone (1 unit)**

*Course Description:* Class instruction, arranged by section; Trombone.

*Offered as demand indicates.*

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130P – Applied Study of Music: Advanced; Tuba (1 unit)**

*Course Description:* Class instruction, arranged by section; Tuba. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130Q – Applied Study of Music: Advanced; Percussion (1 unit)**

*Course Description:* Class instruction, arranged by section; Percussion. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 130R – Applied Study of Music: Advanced; Classical Guitar (1 unit)**

*Course Description:* Class instruction, arranged by section. Offered as demand indicates.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 131A – Applied Study of Music: Advanced (Individual) (2 units)**

*Course Description:* Individual instruction in voice.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131B – Applied Study of Music: Advanced (Individual); Piano (2 units)**

*Course Description:* Individual instruction in Piano.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131C – Applied Study of Music: Advanced (Individual); Harpsichord (2 units)**

*Course Description:* Individual instruction in Harpsichord.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131D – Applied Study of Music: Advanced (Individual); Organ (2 units)**

*Course Description:* Individual instruction in Organ.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131E – Applied Study of Music: Advanced (Individual); Violin (2 units)**

*Course Description:* Individual instruction in Violin.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131F – Applied Study of Music: Advanced (Individual); Viola (2 units)**

*Course Description:* Individual instruction in Viola.

*Prerequisite(s):* Consent of instructor; open to Music majors only; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131G – Applied Study of Music: Advanced (Individual); Cello (2 units)**

*Course Description:* Individual instruction in Cello.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131H – Applied Study of Music: Advanced (Individual); Double Bass (2 units)**

*Course Description:* Individual instruction in Double Bass.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131I – Applied Study of Music: Advanced (Individual); Flute (2 units)**

*Course Description:* Individual instruction in Flute.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131J – Applied Study of Music: Advanced (Individual); Oboe (2 units)**

*Course Description:* Individual instruction in Oboe.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131K – Applied Study of Music: Advanced (Individual); Clarinet (2 units)**

*Course Description:* Individual instruction in Clarinet.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131L – Applied Study of Music: Advanced (Individual); Bassoon (2 units)**

*Course Description:* Individual instruction in Bassoon.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

### **MUS 131M – Applied Study of Music: Advanced (Individual); French Horn (2 units)**

*Course Description:* Individual instruction in French Horn.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 131N – Applied Study of Music: Advanced (Individual); Trumpet (2 units)**

*Course Description:* Individual instruction in Trumpet.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 131O – Applied Study of Music: Advanced (Individual); Trombone (2 units)**

*Course Description:* Individual instruction in Trombone.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 131P – Applied Study of Music: Advanced (Individual); Tuba (2 units)**

*Course Description:* Individual instruction in Tuba.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 131Q – Applied Study of Music: Advanced (Individual); Percussion (2 units)**

*Course Description:* Individual instruction in Percussion.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 131R – Applied Study of Music: Advanced (Individual); Classical Guitar (2 units)**

*Course Description:* Individual instruction in Classical Guitar.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 131U – Applied Study of Music: Advanced (Individual); Saxophone (2 units)**

*Course Description:* Individual instruction in Saxophone.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Enrollment Restriction(s):* Open to Music majors only; admission by audition.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 131W – Applied Study of Music: Advanced (Individual); Harp (2 units)**

*Course Description:* Individual instruction in Harp.

*Prerequisite(s):* Consent of instructor; admitted by audition.

*Learning Activities:* Performance Instruction 0.50 hour(s), Independent Study 5 hour(s).

*Enrollment Restriction(s):* Priority to Music majors.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **MUS 132 – Singing for Actors (1 unit)**

*Course Description:* Elements of basic singing techniques, through selected exercises, vocalises, and songs.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Performance Instruction 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **MUS 140 – University Jazz Band (2 units)**

*Course Description:* Rehearsal, study, and performance of jazz band music and a full variety of jazz band styles, including swing, be-bop, and contemporary jazz styles.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 4 hour(s), Practice.

*Enrollment Restriction(s):* Open to students in any major.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **MUS 141 – University Symphony (2 units)**

*Course Description:* Open to any student in the University whose proficiency meets the requirements of concert performance. Sight-reading, rehearsal and performance of music from the orchestral literature.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **MUS 142 – University Chamber Singers (2 units)**

*Course Description:* Rehearsal and performance of works for small choral group.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **MUS 143 – University Concert Band (2 units)**

*Course Description:* Rehearsal and performance of music for band.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 4 hour(s).

*Enrollment Restriction(s):* Open to any student in the University whose proficiency meets the requirements of concert performance.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 144 – University Chorus (2 units)**

*Course Description:* Rehearsal and performance of choral music.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 4 hour(s).

*Enrollment Restriction(s):* Open to any student in the University.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 145 – Early Music Ensemble (2 units)**

*Course Description:* Rehearsal and performance of Medieval, Renaissance, and Baroque music for vocal ensemble and historical instruments.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 146 – Chamber Music Ensemble (1 unit)**

*Course Description:* Open to any student in the University whose proficiency meets the requirements of concert performance. Study, rehearsal, and performance of ensemble music for strings, winds, voice, piano, harpsichord, and organ.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 2 hour(s), Practice 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 147 – University Wind Ensemble (2 units)**

*Course Description:* Rehearsal, study, and performance of a full variety of wind ensemble music; and to have students share their work in public performances.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Rehearsal 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 148 – Hindustani Vocal Ensemble (2 units)**

*Course Description:* Basics of Hindustani music through theory and practice. Fundamentals of raga (mode) and tala (rhythms) with special emphasis on improvisation, a central feature of khyal (singing style). Five ragas each quarter.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Rehearsal 2 hour(s).

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 149 – Indonesian Gamelan Ensemble (2 units)**

*Course Description:* Indonesian music practice. Basic instrumental technique and repertory. Focus on two styles of Sundanese gamelan (tuned percussion orchestras): salendro and degung.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Rehearsal 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 150 – Brazilian Samba School (2 units)**

*Course Description:* Practice of Brazilian music. Basic instrumental technique and repertory. Focus on the percussion traditions of Rio de Janeiro and Bahia.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Performance Instruction 2 hour(s).

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 151 – Korean Percussion Ensemble (2 units)**

*Course Description:* Practice of Korean percussion styles. Basic instrumental technique and repertory. Focus on the percussion traditions of samulnori and basic concepts of p'ungmul.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Rehearsal 2 hour(s), Listening 2 hour(s), Practice 2 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 152 – Afro-Cuban Ensemble (2 units)**

*Course Description:* Performance of African derived folkloric music of Cuba. Basic instrumental technique and repertory. Focus on percussion and song traditions from Havana, Matacas and Santiago, Cuba.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Performance Instruction 2 hour(s).

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 153 – Brazilian Capoeira Ensemble (2 units)**

*Course Description:* Basic instrumental techniques, songs, and dance movements of Capoeira Angola. Protocols of a Capoeira Angola performance and the meanings of Capoeira in Brazil with its connections to Afro-Brazilian culture.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Rehearsal 4 hour(s), Listening, Practice.

*Repeat Credit:* May be repeated 6 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 155 – Percussion Ensemble (2 units)**

*Course Description:* Study and rehearsals of percussion chamber music from the 20th and 21st centuries. Study of standard and extended techniques for a broad range of percussion instruments. Public performance of significant works for percussion ensemble.

*Prerequisite(s):* Consent of instructor; admission by audition.

*Learning Activities:* Rehearsal 2 hour(s), Listening, Practice.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 156 – Mariachi Ensemble (2 units)**

*Course Description:* Rehearsal and performance of traditional and contemporary mariachi repertoire.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Rehearsal 4 hour(s); Practice.

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* P/NP only.

*General Education:* Arts & Humanities (AH).

**MUS 157 – Bluegrass & Old Time String Band (2 units)**

*Course Description:* Performance of bluegrass and Appalachian old time music. Practice of instrumental and vocal techniques and repertory in vernacular American string band idioms.

*Learning Activities:* Rehearsal 4 hour(s), Practice.

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* P/NP only.

*General Education:* Arts & Humanities (AH).

**MUS 192 – Internship in Music (1-4 units)**

*Course Description:* Internship outside the university related to music.

*Prerequisite(s):* Consent of instructor or academic advisor.

*Learning Activities:* Internship 3-12 hour(s).

*Enrollment Restriction(s):* Student must submit a written proposal to an appropriate Music Department instructor.

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 194HA – Special Study for Honors Students (2-4 units)**

*Course Description:* Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of music.

*Prerequisite(s):* MUS 007C; MUS 123; consent of instructor.

*Learning Activities:* Independent Study 6-12 hour(s).

*Enrollment Restriction(s):* Open only to students who qualify for the honors program and admission to music Senior Honors Program.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 194HB – Special Study for Honors Students (2-4 units)**

*Course Description:* Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of music.

*Prerequisite(s):* MUS 194HA; consent of instructor.

*Learning Activities:* Independent Study 6-12 hour(s).

*Enrollment Restriction(s):* Open only to students who qualify for honors program and admission to Music Senior Honors Program.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 195 – Senior Project (2 units)**

*Course Description:* Preparation of a senior project in music composition (public presentation of a new work), in music performance (a public recital), or in music history and theory (public presentation of research results).

*Prerequisite(s):* MUS 007C; MUS 123; consent of instructor.

*Learning Activities:* Project 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**MUS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

**MUS 202 – Notation (4 units)**

*Course Description:* Study of musical notation; investigation of techniques for editing Medieval and Renaissance music.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Grade Mode:* Letter.

**MUS 203 – Music Composition (4 units)**

*Course Description:* Technical projects that explore compositional problems, the skill and techniques with which to solve them, and free composition.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 204 – Advanced Conducting (3 units)**

*Course Description:* Technical aspects of conducting and the broader issues in music history and analysis that conductors must face before leading a rehearsal or performance.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 2 hour(s), Practice.

*Enrollment Restriction(s):* Open to graduate students in conducting.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**MUS 207 – Advanced Electronic & Computer Music (4 units)**

*Course Description:* Advanced composition of computer and electronic music.

*Prerequisite(s):* MUS 107A; MUS 107B; MUS 107C; consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**MUS 210A – Proseminar in Music: Theory & Analysis (4 units)**

*Course Description:* Voice-leading analysis of tonal music derived from Schenker and pitchclass set theory. Recent work on compositional design, generalizations of the concept of interval, psychologically oriented music theory, and theories of durational structure and timbre.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Grade Mode:* Letter.

## **MUS 210B – Proseminar in Music: Musicology & Criticism (4 units)**

*Course Description:* Issues and concepts of music history, including performance practice questions for specific repertoires and periods; principles, aims, and methods of archival study; historical theory; evolution of musical styles; philosophical debates about goals and aims of the discipline in general.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Grade Mode:* Letter.

## **MUS 210C – Proseminar in Music: Ethnomusicology (4 units)**

*Course Description:* Introduction to ethnomusicology through its intellectual history, theoretical approaches, analytical techniques, and methodologies.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Grade Mode:* Letter.

## **MUS 212 – Ethics of Musical Ethnography (4 units)**

*Course Description:* Role, methodology, perception, and assumptions of the ethnomusicologist in ethnographic scholarship. Examination of complex ethical and political questions in relation to practical fieldwork techniques.

*Learning Activities:* Seminar 3 hour(s), Fieldwork.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Grade Mode:* Letter.

## **MUS 213 – Transcription & Notation (4 units)**

*Course Description:* Practical instruction in the transcription and analysis of primarily non-Western musics. Analytical and theoretical issues, the politics of representation, and the cultural values and ideologies implicit in notation.

*Learning Activities:* Seminar 3 hour(s), Project.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Grade Mode:* Letter.

## **MUS 214 – Recent Issues in Ethnomusicology (4 units)**

*Course Description:* Issues, schools of thought, and basic literature in ethnomusicology from the 1980s to present. Emphasis on theory and methodology.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Grade Mode:* Letter.

## **MUS 221 – Topics in Music History (4 units)**

*Course Description:* Studies in selected areas of music history and theory.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 222 – Techniques of Analysis (4 units)**

*Course Description:* Analysis and analytical techniques as applied to music of all historical style periods.

*Learning Activities:* Seminar 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in Music; advanced undergraduates with consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 223 – Topics in Ethnomusicology (4 units)**

*Course Description:* In-depth ethnomusicological studies of selected cultures and their musics; study of historical, theoretical, contextual, and cultural features.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in music; advanced undergraduates & Anthropology students with consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **MUS 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed Group Study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated for credit when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

*General Education:* Arts & Humanities (AH).

## **MUS 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **MUS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching Assistant Training Practicum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Native American Studies (NAS)**

College of Letters & Science

## **NAS 001 – Introduction to Native American Studies (4 units)**

*Course Description:* Introduction to Native American Studies with emphasis upon basic concepts relating to Native American historical and political development.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **NAS 005 – Introduction to Native American Literature (4 units)**

*Course Description:* Intensive focus on analysis of Native American literary texts, with frequent writing assignments to develop critical thinking and composition skills.

*Prerequisite(s):* Completion of Subject A requirement.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **NAS 005A – Writer's Workshop (2 units)**

*Course Description:* Disciplinary writing support course focuses on the development of writing and revision strategies, exploring ways to understand a writing task, to develop appropriate content for a writing task, to revise content to reflect competence as a communicator.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in a lower division writing course required, preferably NAS 005; if necessary, based upon demand and academic advisor approval, students may concurrently enroll in an equivalent course (ENL 003 or UWP 001), instead.

*Grade Mode:* Letter.

## **NAS 007 – Indigenous & Minority Languages (4 units)**

*Course Description:* Survey of the status of indigenous, immigrant, and other minority languages in the Americas and around the world. Topics include linguistic diversity, language endangerment & revitalization, heritage language maintenance in immigrant communities, and language change due to transcultural interactions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **NAS 010 – Native American Experience (4 units)**

*Course Description:* Introduction to the diverse cultures of Native American peoples from North, Central, and South America. Emphasis on Native American voices in the expression of cultural views and in the experience of conflicting values.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **NAS 012 – Native American/Indigenous Film (4 units)**

*Course Description:* Survey and analysis of the visual colonization of Native American peoples and the contemporary responses by Native American/Indigenous filmmakers claiming visual sovereignty. Examines a range of filmic genres including documentary, features, shorts, festivals, TV and Internet screening.

*Learning Activities:* Lecture 3 hour(s), Film Viewing, Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **NAS 032 – Native American Music & Dance (4 units)**

*Course Description:* Introduction to the music and dance of Indigenous peoples across the Americas. Indigenous music and dance from comparative, interdisciplinary, and global perspectives in order to learn about historic and contemporary issues (e.g., social, cultural, economic, technical, and aesthetic) facing Indigenous communities, and the ways in which the issues are expressed through music and dance practices.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL).

## **NAS 033 – Introduction to Native American Art (4 units)**

*Course Description:* Introduction to Native American Art from throughout North America, inclusive of traditional forms, techniques and designs in a range of media including ceramics, basketry, fiberwork, carving, painting, sculpture and photography within a context of social and political history.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **NAS 034 – Native American Art Studio (4 units)**

*Course Description:* Studio projects to be influenced by contemporary and traditional Native American arts. Examples of designs and media presented in lectures will be of indigenous origin. Introduction and familiarized with various materials and techniques.

*Learning Activities:* Lecture 2 hour(s), Studio 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

## **NAS 093 – Powwow Internship (1-4 units)**

*Course Description:* Supervised internship for the annual UC Davis Powwow.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-12 hour(s).

*Repeat Credit:* May be repeated 12 unit(s) including course 189 and other internships taken in other departments and institutions.

*Grade Mode:* Pass/No Pass only.

## **NAS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **NAS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**NAS 101 – Contemporary Native American Art (4 units)**

*Course Description:* Examination of contemporary artworks by selected Native American and Indigenous Master artists, in a wide range of media, including ceramics, metal arts, photography, video, painting, installation and performance within a context of political and social histories.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**NAS 107 – Learning Native American Languages (4 units)**

*Course Description:* Self-directed study of a Native American language using revitalization strategies. Origins of language endangerment and the importance of language for cultural reclamation.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated when in a different language or undertaking more advanced work on a language previously studied.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC).

**NAS 108 – Indigenous Languages of California (4 units)**

*Course Description:* Survey of the indigenous languages of the California region: linguistic prehistory, languages at first European contact, subsequent language loss, current efforts at language and cultural revitalization, indigenous languages of recent immigrants to California.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**NAS 109 – Native American Language Spotlight (4 units)**

*Course Description:* In-depth examination of the history, structure, and sociolinguistics of a particular Native American language or language family. Different language studied each time the course is offered. Oral proficiency component included in some years.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated when language/language family differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**NAS 110A – Quechua Language & Society: Beginning Level 1 (4 units)**

*Course Description:* Quechua language and society emphasizing the practical use of the language. Provides some basic Quechua communication skills and with an initial knowledge about contemporary Andean society and the status of Quechua language today.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Not open to students who took NAS 107 in the fall quarter of 2007.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**NAS 110B – Quechua Language & Society: Beginning Level 2 (4 units)**

*Course Description:* Second Level of the teaching of Quechua language and society. Emphasis on development of conversational and reading skills. Continuation of the study of aspects of contemporary Andean society and the status of Quechua language today.

*Prerequisite(s):* NAS 110A.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**NAS 110C – Quechua Language & Society: Intermediate Level 1 (4 units)**

*Course Description:* Third level of the teaching of Quechua language and society. Emphasis on development of conversational and reading skills. Introduction to more complex grammatical structures. Continuing the study of contemporary Andean society and the status of Quechua language today.

*Prerequisite(s):* NAS 110A; NAS 110B.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**NAS 110D – Quechua Language & Society: Intermediate Level 2 (4 units)**

*Course Description:* Fourth level of the teaching of Quechua language and society. Emphasis on complex structural patterns while emphasizing conversational skills and improving reading competence. Study of different sociopolitical processes that have affected Andean identity and the status of Quechua language.

*Prerequisite(s):* NAS 110A; NAS 110B; NAS 110C.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**NAS 115 – Native Americans in the Contemporary World (4 units)**

*Course Description:* Important issues facing Native Americans in the contemporary world. Focus primarily on the diverse ways of life, histories and realities of indigenous people throughout the Americas as they develop their own cultural and political institutions.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**NAS 116 – Native American Traditional Governments (4 units)**

*Course Description:* Study of selected Native American Tribal Governments, confederations, leagues, and alliance systems.

*Prerequisite(s):* NAS 001; ANT 002.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **NAS 117 – Native American Governmental Decision Making (4 units)**

*Course Description:* Native American governmental and community decision making with emphasis on federal and state programs, tribal sovereignty, current political trends and funding for tribal services.

*Prerequisite(s):* NAS 116; POL 002; ANT 123 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **NAS 118 – Native American Politics (4 units)**

*Course Description:* Examination of the various interest groups and movements found among Native people and how they relate to the determination of Indian affairs. Study of political action available to Native groups, and local communities, along with relevant theory relating to underdevelopment.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **NAS 119 – Introduction to Federal Indian Law (4 units)**

*Course Description:* Introduction to the foundational cases and statutes of federal Indian law, from European Contact through the 20th century.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **NAS 120 – Ethnopolitics of South American Indians (4 units)**

*Course Description:* Social, political, cultural movements of indigenous South Americans in response to establishment, expansion of European colonialism, post-colonial nation-states. Ethnopolitical processes developed through interactions between Indians, Euroamericans. Socioethnographic analysis of main indigenous areas and the development of national societies. May be taught abroad.

*Prerequisite(s):* NAS 001; (NAS 010 or NAS 055).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **NAS 121 – Corporate Colonialism (4 units)**

*Course Description:* Price of progress and modernity for native and non-native people. History of the corporation and neoliberalism, military and intelligence agencies, debt, Taylorism, education institutions, media, and law. Discussion of alternatives advocated by contemporary and indigenous social movements.

*Prerequisite(s):* NAS 001, NAS 010 or NAS 012 encouraged, but not required.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **NAS 122 – Native American Community Development (4 units)**

*Course Description:* Application of community development theory and techniques to the development problems of Native American communities.

*Prerequisite(s):* NAS 001 or NAS 010.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **NAS 123 – Native Foods & Farming of the Americas (4 units)**

*Course Description:* Crop domestication, agrodiversity, and cuisines of the Americas. Cultural and social history of native American foods like maize, potatoes, quinoa, chocolate, peppers, beans, avocados, etc. Discussion of socio-economic, environmental, legal challenges facing indigenous and peasant farmers today.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC).

## **NAS 125 – Performance & Culture Among Native Americans (4 units)**

*Course Description:* Interdisciplinary study of public expressive forms among Native Americans. Comparison and analysis of music, dances, rituals, and dramas from throughout North, Central, and South America in their social and cultural contexts. Extensive film viewing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MUS 125.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **NAS 130A – Native American Ethno-Historical Development (4 units)**

*Course Description:* Study of Native American ethno-history in North America before 1770s.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **NAS 130B – Native American Ethno-Historical Development (4 units)**

*Course Description:* Study of Native American ethno-history in North America, 1770-1890.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## NAS 130C – Native American Ethno-Historical Development (4 units)

*Course Description:* Study of Native American ethno-history in North America after 1890.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## NAS 133 – Ethnohistory of Native People of Mexico & Central America (4 units)

*Course Description:* Ethnohistorical development of pre-colonial, colonial, post-colonial Mexican and Central American indigenous people; the impact of economic and political factors on the process of cultural adaptation. Attention is given to the questions of nation-building, forced assimilation, indigenous resistance, organized political responses.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## NAS 133A – Ethnohistory of Native Peoples of Mexico & Central America to 1500 (4 units)

*Course Description:* Ethnohistorical development of the indigenous peoples of Mexico and Central America up to and including the earliest period of European contact. Focus is on indigenous written historical records of the Maya, Mixtec, and Nahuatl peoples.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## NAS 133B – Ethnohistory of Native Peoples of Mexico & Central America 1500 to 2000 (4 units)

*Course Description:* Ethnohistory of indigenous peoples of Mexico and Central America from 1500 to contemporary times. Focus on social and cultural dynamics, particularly the role of indigenous people in the process of nation-state building in Mexico and Central America.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

## NAS 134 – Race, Culture, & Nation (4 units)

*Course Description:* Exploration of complexities of Native American racial, cultural and national identities and alliances. Study of tribal and federal citizenship, mixed descent and diasporic people(s), claims to resources, ethnic fraud and contemporary movements of cultural resurgence and political sovereignty and self-determination.

*Prerequisite(s):* Upper division standing or consent of instructor; NAS 001 or NAS 010 encouraged, but not required.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## NAS 135 – Gender Construction in Native Societies (4 units)

*Course Description:* Historical and traditional Native American constructions of feminine, masculine, and non-binary genders with attention to culture- and place-based gender roles and statuses. Analysis of problems with contemporary terminologies and impacts of colonization on contemporary constructions of gender identities.

*Prerequisite(s):* Upper division standing or consent of instructor; NAS 001 or NAS 010 encouraged, but not required.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## NAS 146 – Orientation to Research in Native American Studies (4 units)

*Course Description:* Introduction to basic research resources pertinent to Native American subjects available in the region, including libraries, archives, museums, etc. Emphasis on learning to use documentary resources or other collections of data. Students will carry out individual projects.

*Prerequisite(s):* Consent of instructor; Native American Studies major or minor, or consent of instructor; NAS 001 or NAS 010 encouraged, but not required.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Writing Experience (WE).

## NAS 157 – Native American Religion & Philosophy (4 units)

*Course Description:* Religious and philosophical traditions of Native American/indigenous peoples of the Americas.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Writing Experience (WE).

## NAS 161 – California Indian Environmental Policy I (4 units)

*Course Description:* Contemporary California Indian environmental policy issues, with a focus on water, minerals, contamination, and alliance-building. Issues will be placed within historical and political context, drawing on theories of Native environmental ethics, environmental justice, and Federal Indian law.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **NAS 162 – California Indian Environmental Policy II (4 units)**

*Course Description:* Contemporary California Indian environmental policy issues, with a focus on planning, site protection, and collaborative structures. Issues will be placed within historical and political context, drawing on theories of Native environmental ethics, environmental justice, and Federal Indian law.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **NAS 165 – Keepers of the Flame: Native American Cultural Burning & Land Stewardship in California (4 units)**

*Course Description:* Use of fire by California Indian tribes to maintain ecosystems that sustain their economic, cultural, and spiritual well being. Guests include Native American cultural practitioners and prescribed fire professionals.

*Prerequisite(s):* consent of instructor; course involves regular field days working with cultural burn practitioners.

*Learning Activities:* Lecture/Discussion 1.5 hour(s), Fieldwork.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **NAS 180 – Native American Women (4 units)**

*Course Description:* Native American women's life experiences, cross-cultural comparisons of gender roles, and Native women's contemporary feminist thought. Utilizes texts from literature, social science, and autobiography/biography.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **NAS 181A – Native American Literature (4 units)**

*Course Description:* Works of fiction (short story, novel) by contemporary Native American authors, with an emphasis on writers from the United States.

*Prerequisite(s):* NAS 005 or ENG 003 or COM 001 or COM 002 or COM 003.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **NAS 181B – Native American Literature (4 units)**

*Course Description:* Works by or about Native Americans including non-fiction novels, biographies and autobiographies. Explore ways Native Americans create and recreate their culture through the creative process in literature. Examine from a critical perspective autobiographies and testimonial literature.

*Prerequisite(s):* NAS 005 or ENG 003 or COM 001 or COM 002 or COM 003.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **NAS 181C – Contemporary Native American Poetry (4 units)**

*Course Description:* Works of poetry by contemporary Native American/indigenous poets, with some attention to traditional cultural poetic expressions.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **NAS 184 – Contemporary Indigenous Literature of Mexico (4 units)**

*Course Description:* Contemporary indigenous literature of Mexico, with a focus on the genres (poetry, fiction, drama, essay); analysis of cultural, historical, and spiritual themes, imagery, styles and performances; biographies of and influences on the Native writers themselves.

*Prerequisite(s):* NAS 001 or NAS 010; NAS 181A or NAS 181C recommended; reading knowledge of Spanish required.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC).

## **NAS 185 – Native American Literature in Performance (4 units)**

*Course Description:* Performance of contemporary Native American literature onstage, through adaptations of selected literature as well as the creation of original pieces.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Performance Instruction 4 hour(s).

*Repeat Credit:* May be repeated 4 unit(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); World Cultures (WC).

## **NAS 188 – Special Topics in Native American Literary Studies (4 units)**

*Course Description:* Special topics drawn from Native American literature.

*Prerequisite(s):* Upper division standing and one of the following recommended: NAS 005, NAS 010, NAS 181A, NAS 181C.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## **NAS 189 – Powwow Internship (1-4 units)**

*Course Description:* Supervised internship for the annual UC Davis Powwow.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-12 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Repeat Credit:* May be repeated 12 unit(s) including course 189 and other internships taken in other departments and institutions.

*Grade Mode:* Pass/No Pass only.

## NAS 190 – Seminar in Native American Studies (2 units)

*Course Description:* Seminar of critical issues faced by Native American people.

*Prerequisite(s):* Senior Standing.

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## NAS 191 – Topics in Native American Studies (4 units)

*Course Description:* Selected topics in Native American Studies related to indigenous knowledges and worldviews from a historical, cultural, hemispheric perspective.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated when instructor and/or topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

## NAS 192 – Internship (1-12 units)

*Course Description:* Supervised internship in the CN Gorman Museum, community, and institutional settings related to Native American concerns.

*Prerequisite(s):* Consent of instructor; enrollment dependent on availability of intern position in Native American Studies or the CN Gorman Museum, with priority to Native American Studies minors/majors.

*Learning Activities:* Internship 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Repeat Credit:* May be repeated 12 unit(s) including course 192 and other internships taken in other departments and institutions.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## NAS 194HA – Special Studies for Honors Students (4 units)

*Course Description:* Directed reading, research and writing culminating in the completion of a senior honors thesis or project under direction of faculty advisor.

*Prerequisite(s):* Senior qualifying for honors.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

## NAS 194HB – Special Studies for Honors Students (4 units)

*Course Description:* Directed reading, research and writing culminating in the completion of a senior honors thesis or project under direction of faculty advisor.

*Prerequisite(s):* Senior qualifying for honors.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

## NAS 195 – Field Experience in Native American Studies (12 units)

*Course Description:* Field work with governmental and community groups, under supervision of faculty advisor and sponsor. Knowledge acquired in other courses to be applied in field work.

*Prerequisite(s):* NAS 161; senior standing and major in Native American Studies, completion of lower division major requirements.

*Learning Activities:* Fieldwork 36 hour(s).

*Grade Mode:* Pass/No Pass only.

## NAS 196 – Senior Project in Native American Studies (4 units)

*Course Description:* Guided research project that enables student to apply the theory and research principles from major course work. Final product is to be a major senior project or thesis.

*Prerequisite(s):* NAS 195 (can be concurrent); and consent of instructor; senior standing and major in Native American Studies.

*Learning Activities:* Discussion 1 hour(s), Independent Study 3 hour(s).

*Grade Mode:* Pass/No Pass only.

## NAS 197TC – Community Tutoring in Native American Studies (1-5 units)

*Course Description:* Supervise tutoring in community.

*Prerequisite(s):* Consent of major committee; upper division standing with major in Native American Studies.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

## NAS 198 – Directed Group Study (1-5 units)

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## NAS 199 – Special Study for Advanced Undergraduates (1-5 units)

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## NAS 200 – Basic Concepts in Native American Studies (4 units)

*Course Description:* Analysis of characteristics of the discipline of Native American Studies. Concentration of traditional and contemporary native scholarship and thought as well as theoretical and methodological consequences derived from application of these ideas.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated 3 time(s) when instructor differs.

*Grade Mode:* Letter.

## NAS 202 – Advanced Topics in Native American Studies (4 units)

*Course Description:* Advanced study of selected topics or themes relevant to the field of Native American studies. Topics will be announced at the time of offering.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## NAS 207 – Leadership Skills & Strategies in California Language Documentation & Revitalization (4 units)

*Course Description:* Introduction to the indigenous languages of the Americas, with a focus on California; an examination of how contemporary Native communities document and revitalize their heritage languages. Learn to assist and administer language programs.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## NAS 208 – Advanced Study of Native American Languages (4 units)

*Course Description:* Advanced study of Native American languages. Development of proficiency in a particular language in order to incorporate language into Native American Studies research and argumentation. Engagement with theoretical perspectives on social, cultural, and structural dimensions of language to guide language study. *Prerequisite(s):* NAS 107 or equivalent background with a Native American language.

*Learning Activities:* Seminar 3 hour(s), Practice, Term Paper.

*Grade Mode:* Letter.

## NAS 212 – Community Development for Sovereignty & Autonomy (4 units)

*Course Description:* Examines a sample of contemporary indigenous communities from south, central and north America with the goal of understanding and evaluating the strategies adopted by Native American communities to develop and implement forms of sovereignty or autonomous self-management.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## NAS 213 – Native Criminality & Deviance (4 units)

*Course Description:* Examination of "deviance" in Native communities with focus on Native criminality in North America. Analysis of the concept of deviance from several different world views. Readings from a range of theories to incorporate varying theoretical perspective on criminality and deviance.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## NAS 217 – Public Law 83-280: Colonial Termination (4 units)

*Course Description:* Examination of the signature law of the Termination Era, Public Law 83-280. Discussions to include termination, societal conformity, political consent, jurisdiction, self-determination & decolonization, and colonial relationship between Native Peoples and the United States.

*Prerequisite(s):* Graduate standing, including school of law students.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## NAS 220 – Colonialism, Neoliberalism, & Indigenous Self-Determination (4 units)

*Course Description:* History, political economy and legacies of imperial/colonial systems. Continuities and discontinuities with corporate globalization and neoliberalism. Focus on resistance and self-determination of indigenous peoples, but with comparison to other groups.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## NAS 224 – Performance in the Americas (4 units)

*Course Description:* Ethnomusicological and anthropological approaches to study of public performance in the Americas. New ways of looking at music, dance, rituals and other forms of public expressive forms normally called "folklore" or "popular culture."

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have completed MUS 224. (Former MUS 224.).

*Grade Mode:* Letter.

## NAS 233 – Visual Sovereignty (4 units)

*Course Description:* Extensively examine the field of contemporary Native American and Indigenous photography, film and performance through research of artworks, writings by artists, theorists, and material in museum collections.

*Learning Activities:* Seminar 3 hour(s), Film Viewing 2 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

## NAS 237 – Native American Art Collections & Museums (4 units)

*Course Description:* Research and examination of regional Native American art held in museums and other public institutions, as well as privately-held collections. Includes onsite viewing and research of museum collections and archives.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## NAS 240 – Native American Public Health: Topics & Issues (4 units)

*Course Description:* Introduction to Native American public health issues and contributing causal factors (including environmental justice and historical trauma); the dimensions of cultural competency in diagnosis and service provision; the structure of Native health care institutions; and debates in Native treatment modalities.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## NAS 246 – Native American/Indigenous Research Methodologies (4 units)

*Course Description:* Introduction to advanced methodologies currently influencing research in Native American Studies and among Indigenous communities. Develop an original project and course assignments will guide them through the process of research design and implementation.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## NAS 250 – Indigenous Critique of Classic Maya Ethnographies (4 units)

*Course Description:* Construction of the Maya world through ethnographic writing during the present century. Deconstruction of ethnographies about the Mayans considering the modern theories and social/anthropological critiques of modern ethnographies.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**NAS 254 – Native American Literature (4 units)**

*Course Description:* Introduction to the field of Native American Literature, creative works (fiction, poetry, memoir, personal essay), literary studies.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to graduate students only.

*Repeat Credit:* May be repeated 1 time(s) when readings content is completely distinct from the course previously taken.

*Grade Mode:* Letter.

**NAS 257 – Indigenous Religious Traditions in the Americas (4 units)**

*Course Description:* Religious/spiritual traditions, belief-systems, and world-views of Native American/indigenous peoples in the Americas. Land, ecological knowledge, sacred sites, the role of tricksters, language (revitalization), gender, ethics of representation, cultural revitalization, renewed ancient knowledge and practices, ceremonial (and daily) performance of the sacred, music, the arts, the worlds of the sacred, the rules of the sacred, freedom of religion.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Graduate student enrollment only.

*Repeat Credit:* May be repeated 1 time(s) when readings content is completely distinct from the course previously taken.

*Grade Mode:* Letter.

**NAS 280 – Ethnohistorical Theory & Method (4 units)**

*Course Description:* Discussion of the ethnohistorical method; the utilization of diverse types of data, especially documentary sources, to reconstruct socio-cultural history. Particular attention to the applied area of ethnohistory in the solution of contemporary social problems.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**NAS 298 – Group Study for Graduate Students (1-5 units)**

*Course Description:* Group study for graduate students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NAS 299 – Special Study for Graduate Students (1-12 units)**

*Course Description:* Special study for graduate students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NAS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Nematology (NEM)**

College of Agricultural & Environmental Sciences

**NEM 010V – General Biology (4 units)**

*Course Description:* Concepts and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Designed for students not specializing in biology.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed BIS 002A or BIS 002B or BIS 002C or BIS 010 or equivalent.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**NEM 100 – Plant Nematology (4 units)**

*Course Description:* Plant-parasitic nematodes. Cellular, biochemical, and molecular aspects of plant-nematode interaction.

*Prerequisite(s):* BIS 101.

*Learning Activities:* Lecture 1 hour(s), Discussion/Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Entomology, Global Disease Biology, Microbiology, and Biochemistry & Molecular Biology majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NEM 110 – Introduction to Nematology (2 units)**

*Course Description:* Relationship of nematodes to the human environment. Classification, morphology, ecology, distribution, and importance of nematodes occurring in water and soil as parasites of plants and animals.

*Prerequisite(s):* BIS 002B; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

**NEM 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**NEM 201 – Molecular & Physiological Plant Nematology (2 units)**

*Course Description:* Molecular biology and physiology of nematodes using *Caenorhabditis elegans* as a model, but with emphasis on plant-parasitic species. Plant responses to nematodes. Discussion of current literature emphasized.

*Prerequisite(s):* BIS 101; PLP 120; (NEM 100 or NEM 110).

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**NEM 203 – Ecology of Parasitic Nematodes (2 units)**

*Course Description:* Major concepts in population and community ecology of animal- and plant-parasitic nematodes. Current advances in techniques, theory, and basic information about nematode-host dynamics, and application to management of nematode diseases.

*Prerequisite(s):* (NEM 100 or NEM 110 or ENT 156); (EVE 101 or PLB 117).

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **NEM 204 – Management of Plant-Parasitic Nematodes (2 units)**

*Course Description:* Theory, foundation, principles and practices of nematode management. Techniques and equipment used to manage nematodes and methods used to analyze their effectiveness.

*Prerequisite(s):* NEM 100 or NEM 110.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **NEM 205 – Insect Nematology & Biological Control (2 units)**

*Course Description:* Biology of insect-parasitic nematodes, their effect on the host, and their potential as biological control agents of insect and other invertebrate pests. Application of ecological theory in classical and augmentative biological control.

*Prerequisite(s):* NEM 100; NEM 110; (ENT 100 or ENT 110).

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **NEM 206 – Nematode Systematics & Evolution (2 units)**

*Course Description:* Nematode diversity as revealed by morphological and molecular evidence. Laboratory experience focuses on structural features used in taxonomy. Phylogenetic relationships based on morphological and molecular data used to consider patterns of character change among taxa.

*Prerequisite(s):* NEM 100 or NEM 110 or ENT 156; EVE 100 recommended.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **NEM 210 – Molecular Phylogenetic Analysis (3 units)**

*Course Description:* Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Cross Listing:* EVE 210.

*Grade Mode:* Letter.

## **NEM 245 – Field Nematology (1 unit)**

*Course Description:* Six-day demonstration and field study in applied nematology including diagnosis and prediction of nematode field problem strategies for control field plot design, and establishment in association with diverse California crops.

*Prerequisite(s):* NEM 100.

*Learning Activities:* Fieldwork.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NEM 290 – Seminar (1 unit)**

*Course Description:* Seminar.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NEM 290C – Advanced Research Conference (1 unit)**

*Course Description:* Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group.

*Prerequisite(s):* Graduate standing and consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NEM 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NEM 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Nephrology (NEP)**

School of Medicine

### **NEP 192 – Internship in Nephrology (1-12 units)**

*Course Description:* Supervised work experience in nephrology.

*Prerequisite(s):* Upper division standing; approval of project by preceptor prior to internship.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

### **NEP 299 – Nephrology Research (1-12 units)**

*Course Description:* Research topics in Nephrology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **NEP 444 – Curriculum Design for Doctoring (1 unit)**

*Course Description:* Design of Doctoring curriculum for medical students in focused topic areas to be announced annually. Students design sessions, consider resource needs, and work with IORs to initiate the curriculum.

*Prerequisite(s):* Consent of instructor; second-year standing in School of Medicine.

*Learning Activities:* Project 2 hour(s), Seminar 1 hour(s).

*Grade Mode:* Pass/Fail only.

### **NEP 460 – Nephrology & Fluid Balance (3-6 units)**

*Course Description:* Active participation in all inpatient/outpatient clinical activities, attendance at specific lectures and conferences at UC Davis Medical Center covering the field of nephrology and fluid-electrolyte disorders.

*Prerequisite(s):* Consent of instructor; completion of third-year medical school; completion of Medicine Core Clerkship.

*Learning Activities:* Clinical Activity 4 hour(s), Lecture/Discussion 10 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

### **NEP 499 – Research in Nephrology (3-18 units)**

*Course Description:* Independent laboratory research on a specific problem related to biochemical or immunologic causes of renal disease and/or uremic disorders in humans or animals.

*Prerequisite(s):* Consent of instructor; individual arrangement.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# Neurobiology, Physiology, & Behavior (NPB)

College of Biological Sciences

## NPB 010 – Elementary Human Physiology (3 units)

*Course Description:* Introduction to physiology for non-science majors. Includes basic cell physiology and survey of major organ systems and how they function in homeostasis and human health.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 101.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## NPB 011 – Exercise & Fitness: Principles & Practice (3 units)

*Course Description:* Human movement from physiological, psychological, sociological, and historical perspectives. Biology and psychology of exercise across the human lifespan.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken EXB 010 or an upper division EXB or NPB course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## NPB 012 – The Human Brain & Disease (3 units)

*Course Description:* Normal function and diseases of the human brain and nervous system. Diseases discussed include Parkinson's, Alzheimer's, leprosy, amnesia and schizophrenia. Intended for non-science majors.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed NPB 100, NPB 101, NPB 112, or PSC 121.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## NPB 013 – Extreme Animal Athletes (3 units)

*Course Description:* Overview of biomechanics, focusing on animal locomotion. Physical principles underlying traits such as speed, maneuverability, endurance, and precision. Comparisons of animals and human athletes performing similar feats, with animals often outperforming humans by a wide margin. Biomechanical concepts through hands-on exercises, problem sets, and readings from the scientific literature.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## NPB 014 – Illusions: Fooling the Brain (3 units)

*Course Description:* Introduction to perceptual processing in the human nervous system; illusions.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## NPB 015 – The Biology & Physiology of Aging (4 units)

*Course Description:* Broad examination of age-associated changes in body functions. Includes basic cell physiology, a survey of major organ systems and the age-induced alterations in system function. Some age-associated diseases will also be examined. Intended for non-science majors.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 015V.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## NPB 015V – The Biology & Physiology of Aging (4 units)

*Course Description:* Broad examination of the biological and physiological basis of aging in animals and plants. Concepts in demographic, evolutionary, genetic, and cell aging. Major human organ systems, age-related alterations in system function, and age-related diseases. Intended for non-science majors.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 015.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## NPB 017 – The Path to Cyborgs: Introduction to Prostheses & Human Machine Interfaces (3 units)

*Course Description:* Interface of biology and technology. Mind-controlled prosthetic limbs, artificial organs, and implantable devices. Emphasis on basic physiological functions and how they can be replaced by devices. Suitable for majors and non-majors.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## NPB 018 – Biological Science for Social Justice (3 units)

*Course Description:* Broad survey of the many ways one can use the biological sciences to better the lives of others and break down barriers that have restricted social mobility.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Domestic Diversity (DD); Scientific Literacy (SL).

## NPB 068 – Biology of Drug Addiction & Abuse (3 units)

*Course Description:* Broad examination of addictive substances and their use/abuse. Topics include historical perspective, physiological effects, etiology, neurobiology of addiction and the impact of drugs on contemporary society. Intended for non-science majors.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students having completed NPB 168.

*Grade Mode:* Letter.

**NPB 090C – Current Issues in Animal Behavior (2 units)**

*Course Description:* The mechanisms and outcomes of sexual selection (mate choice and mate competition). Theory, current models and evidence that supports or refutes the models.

*Prerequisite(s):* Lower division standing.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**NPB 090F – Visual Impairment & Blindness: A World Wide Problem (2 units)**

*Course Description:* Examination of various abnormalities of the eye and the important geographic and cultural factors that influence the epidemiology of those abnormalities.

*Prerequisite(s):* Lower division standing.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

**NPB 091C – Research Conference (1 unit)**

*Course Description:* Research findings and methods in neurobiology, physiology, and/or behavior. Presentation and discussion of research by faculty and students.

*Prerequisite(s):* NPB 099 (can be concurrent); and consent of instructor; lower division standing in Neurobiology, Physiology and Behavior or related biological science; NPB 099 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to lower division students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**NPB 092 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the Department of Neurobiology, Physiology, and Behavior. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**NPB 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**NPB 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor. Lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**NPB 100 – Neurobiology (4 units)**

*Course Description:* Brains and nervous systems, neurons and neural circuits. Coordination of movement. Development of nervous systems. Vision, hearing, and feature extraction by the central nervous system. The cell biology of learning and memory. Perception, cognition, and disorders of the brain.

*Prerequisite(s):* BIS 002A; PHY 009A, PHY 009B or PHY 007A, PHY 007B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 110B, NPB 112, NPB 160, NPB 161 or NPB 162, or NSC 221 or NSC 222.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**NPB 100L – Neurobiology Laboratory (3 units)**

*Course Description:* Experimental basis of neurobiology principles discussed in NPB 100. Topics include neurophysiology, sensory systems, motor systems, cellular neuroscience, cognitive neuroscience, and quantitative data analysis and modeling techniques.

*Prerequisite(s):* NPB 100 (can be concurrent) or NPB 110B (can be concurrent).

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s), Extensive Writing/Discussion.

*Enrollment Restriction(s):* Pass One restricted to Seniors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NPB 100Q – Quantitative Foundations of Neurobiology (1 unit)**

*Course Description:* Computational methods and mathematical models used to study phenomena in neurobiology.

*Prerequisite(s):* NPB 100 (can be concurrent).

*Learning Activities:* Auto Tutorial 1.5 hour(s), Extensive Problem Solving 1.5 hour(s).

*Grade Mode:* Letter.

**NPB 101 – Systemic Physiology (5 units)**

*Course Description:* Systemic physiology with emphasis on aspects of human physiology. Functions of major organ systems, with the structure of those systems described as a basis for understanding the functions.

*Prerequisite(s):* BIS 002A; (CHE 002B or CHE 002BH); PHY 001B or PHY 007C strongly recommended.

*Learning Activities:* Lecture 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 110C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NPB 101D – Systemic Physiology Discussion (1.5 units)**

*Course Description:* Discussion and problem solving related to fundamental principles of systemic physiology as presented in NPB 101.

*Prerequisite(s):* NPB 101 (can be concurrent); consent of instructor.

*Learning Activities:* Discussion 1.50 hour(s).

*Grade Mode:* Pass/No Pass only.

**NPB 101L – Systemic Physiology Laboratory (3 units)**

*Course Description:* Selected experiments to illustrate functional characteristics of organ systems discussed in NPB 101.

*Prerequisite(s):* ANS 100 or NPB 101 or NPB 110C.

*Learning Activities:* Laboratory 3 hour(s), Discussion 2 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One restricted to seniors in BBIS, ACNU, BHUB, ANSC, and BNPB.

*Grade Mode:* Letter.

**NPB 102 – Animal Behavior (3 units)**

*Course Description:* Basic principles of behavioral organization in vertebrate and invertebrate animals. Underlying physiological and ethological mechanisms. The evolution of behavior, with special emphasis on behavior under natural conditions.

*Prerequisite(s):* (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C).

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 155. (Former NPB 155.)

*Grade Mode:* Letter.

*General Education:* Scientific Literacy (SL).

**NPB 102Q – Quantitative Topics in Animal Behavior (1 unit)**

*Course Description:* Study of the quantitative concepts and exemplar models used in animal behavior.

*Prerequisite(s):* MAT 016B; NPB 102 (can be concurrent).

*Learning Activities:* Auto Tutorial 1.50 hour(s), Extensive Problem Solving 1.50 hour(s).

*Grade Mode:* Letter.

**NPB 103 – Cellular Physiology/Neurobiology (3 units)**

*Course Description:* Cellular physiology with emphasis on membrane transport processes and neuronal physiology. Fundamental physical-chemical and biological mechanisms of membrane transport will be considered in relation to cytoplasmic homeostasis, communication between cells, and the cellular mechanisms of sensory and motor transduction.

*Prerequisite(s):* (BIS 103 or BIS 105); BIS 104; PHY 007C recommended.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 100B. (Former NPB 100B.)

*Grade Mode:* Letter.

**NPB 104L – Cellular Physiology/Neurobiology Laboratory (4 units)**

*Course Description:* Experiments in the physical and chemical processes of cells and tissues.

*Prerequisite(s):* NPB 101L; (BIS 103 or BIS 105).

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

**NPB 106 – Experiments in Neurobiology, Physiology, & Behavior: Design & Execution (3 units)**

*Course Description:* Design and execution of experiments in neurobiology, physiology, and/or behavior. Choose and design a project in consultation with the sponsoring faculty member.

*Prerequisite(s):* (NPB 110A or NPB 100 or NPB 101 or NPB 102); NPB 199; and consent of instructor.

*Learning Activities:* Laboratory 7.50 hour(s), Discussion 0.50 hour(s).

*Repeat Credit:* May be repeated 1 time(s) to complete project; with consent of instructor.

*Grade Mode:* Pass/No Pass only.

*General Education:* Oral Skills (OL); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**NPB 107 – Cell Signaling in Health & Disease (3 units)**

*Course Description:* Basics of cell signaling pathways, their disruption in disease, and their current utility and future potential as therapeutic targets. Focus is on signaling pathways specific to nervous, endocrine and immune systems, and those fundamental to all cells.

*Prerequisite(s):* BIS 102 or BIS 105.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Scientific Literacy (SL).

**NPB 108Y – Animal Behavior Laboratory (3 units)**

*Course Description:* Hybrid course, consisting of limited in-person lectures and the rest laboratory exercises. Laboratory exercises are online, and require students to view and score videos of animal behavior in order to test behavioral hypotheses.

*Learning Activities:* Lecture 3 hour(s), Web Electronic Discussion 12 hour(s).

*Grade Mode:* Letter.

**NPB 109 – Kinesiology: Analysis & Control of Human Movement (4 units)**

*Course Description:* Functional anatomy, motor control, and biomechanics of human movement understood in the context of body structures, basic principles of physics, and functional characteristics of muscle.

*Prerequisite(s):* PHY 007A; PHY 007B; NPB 101 or NPB 110C recommended; CHA 101 CHA 101L (same as EXB 106 EXB 106L) or equivalent recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NPB 110A – Foundations 1: From Molecules to Individuals (5 units)**

**Course Description:** Major concepts in cell biology with special emphasis on connections between cell biology and behavior. Includes: cellular metabolism, cellular sensing and signaling, membrane structure-function, molecular switches, electrical and chemical signaling, endocrine signaling, cell cycle and differentiation, cytoskeleton, and integrative examples. May be taught abroad.

**Prerequisite(s):** (BIS 002A, BIS 002B); (CHE 002B or CHE 003A); PHY 007A and PHY 007B recommended; BIS 002C recommended.

**Learning Activities:** Lecture 4 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Pass One restricted to majors in Neurobiology, Physiology and Behavior.

**Credit Limitation(s):** Credit limited to 3 units for students who have taken BIS 104.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **NPB 110B – Foundations 2: Neurobiology (5 units)**

**Course Description:** Core concepts of neurobiology including single-neuron biophysics, synapses and transmitters, neuronal development, motor systems, central pattern generation, neuronal circuits, intracellular signal transduction, sensory processing, multisensory integration, autonomic nervous system, neuromodulation, learning and memory, and higher cognition and disease.

**Prerequisite(s):** NPB 110A C- or better; PHY 007A and PHY 007B recommended.

**Learning Activities:** Lecture 4 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Open to declared NPB majors only.

**Credit Limitation(s):** Credit limited to 2 units for students who have taken NPB 100.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **NPB 110C – Foundations 3: Physiology (5 units)**

**Course Description:** Focuses on the structure, function, and interactions of human and other animal organ systems in homeostasis and reproduction, and the response to perturbations of homeostasis; neural and endocrine signaling; skeletal muscle and movement; cardiovascular and respiratory systems; renal, digestive, immune, and reproductive physiology.

**Prerequisite(s):** NPB 110A C- or better; PHY 007A; PHY 007B and PHY 007C recommended.

**Learning Activities:** Lecture 4 hour(s), Discussion 1 hour(s).

**Enrollment Restriction(s):** Open to declared NPB majors only.

**Credit Limitation(s):** Only 2 units for students who have taken NPB 101.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

## **NPB 111L – Advanced Systemic Physiology Laboratory (4 units)**

**Course Description:** Selected comprehensive experiments in the autonomic nervous system and the cardiovascular, respiratory, and neuromuscular systems. Emphasis on conceptual and methodological approaches in demonstrating the physiology of organ systems.

**Prerequisite(s):** NPB 101L.

**Learning Activities:** Lecture 1 hour(s), Discussion 2 hour(s), Laboratory 6 hour(s), Term Paper.

**Grade Mode:** Letter.

## **NPB 113 – Cardiovascular, Respiratory, & Renal Physiology (4 units)**

**Course Description:** Intense and advanced presentation of concepts in cardiovascular, respiratory, and renal physiology including discussion of acid-base balance.

**Prerequisite(s):** (NPB 110C or NPB 101); CHE 008B, PHY 007B and PHY 007C recommended.

**Learning Activities:** Lecture 4 hour(s).

**Grade Mode:** Letter.

## **NPB 114 – Gastrointestinal Physiology (3 units)**

**Course Description:** Gastrointestinal anatomy and physiology. Digestion, secretion, absorption, motility, comparative physiology and pathology. Strong emphasis on neural and hormonal regulation and on cellular mechanisms of secretion and absorption.

**Prerequisite(s):** (NPB 110C or NPB 101); BIS 105 or BIS 103 recommended, BIS 105 preferred.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## **NPB 116 – Stress Physiology in Health & Disease (3 units)**

**Course Description:** Adaptive and maladaptive physiological responses to acute and chronic stress in mammals, with emphasis on humans. Role of endocrine and autonomic nervous system in stress response. Prenatal and postnatal effects of stress on cognitive and affective development. Wellness interventions.

**Prerequisite(s):** BIS 002A C- or better; or consent of instructor.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## **NPB 117 – Avian Physiology (3 units)**

**Course Description:** Physiology of the various systems of birds with emphasis on digestion, respiration, excretion, and endocrine systems.

**Prerequisite(s):** (BIS 002A, BIS 002B); CHE 002B; NPB 101 or NPB 110C strongly recommended.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

## **NPB 118 – Comparative Biomechanics (3 units)**

**Course Description:** Comparative biomechanics, exploring how animals and other organisms interact with their physical environment. Animal locomotion, form and function of morphological traits, mechanical properties of biological materials, and rules for fluid flow and structural design. Biomechanical concepts through hands-on exercises, quantitative problem sets, and readings from the scientific literature.

**Prerequisite(s):** (MAT 012 or MAT 016A or MAT 017A or MAT 021A or MAT 021AH or MAT 021M); (PHY 001A or PHY 007A or PHY 009A); (BIS 002A or BIS 002B or BIS 002C or BIS 010); or consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s).

**Grade Mode:** Letter.

**NPB 119 – Physiology of Aging & Senescence (3 units)**

*Course Description:* Molecular and genetic basis of aging and senescence in various model organisms, from yeast to mammals. Organ and system level changes that take place as organisms age and their impact on their fitness and outcomes. The role of inflammation as a key contributor to aging. Mechanisms of common diseases of aging including: Alzheimer's, arthritis, atherosclerosis, osteoporosis. Theories of Aging. Ageism in modern society. Course is based on reading and evaluating primary literature.

*Prerequisite(s):* NPB 101 or NPB 110C or ANS 100.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NPB 121 – Physiology of Reproduction (4 units)**

*Course Description:* Physiological mechanisms related to reproduction, breeding efficiency and fertility, with special reference to domestic animals.

*Prerequisite(s):* NPB 101 or NPB 110C or ANS 100.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL); Scientific Literacy (SL).

**NPB 121L – Physiology of Reproduction Laboratory (1 unit)**

*Course Description:* Experiments on the reproductive systems of domestic animals including male and female gametes.

*Prerequisite(s):* NPB 121 (can be concurrent).

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

**NPB 122 – Developmental Endocrinology (3 units)**

*Course Description:* Hormonal control of development, maturation and senescence from the cellular to organismal level, with emphasis on the human. Prenatal and neonatal life, childhood and adolescence, adulthood and pregnancy, as well as the endocrinology of aging.

*Prerequisite(s):* NPB 101.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

**NPB 123 – Comparative Vertebrate Organology (4 units)**

*Course Description:* Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions.

*Prerequisite(s):* (BIS 001A, BIS 001B) or (BIS 002A, BIS 002B).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* APC 100.

*Grade Mode:* Letter.

**NPB 124 – Comparative Neuroanatomy (3 units)**

*Course Description:* Overview of the neuroanatomy in mammalian vertebrates, focusing on the cerebral cortex and experimental techniques. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations.

*Prerequisite(s):* NPB 101 or NPB 100 or NPB 110B or PSC 121.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PSC 124.

*Grade Mode:* Letter.

**NPB 124L – Comparative Neuroanatomy Laboratory (2 units)**

*Course Description:* Comparative neuroanatomy laboratory illustrating modern neuroanatomical techniques in determining neural connections within the mammalian brain. Includes experimentation and presentation of results.

*Prerequisite(s):* NPB 124 (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to PSC and NPB majors; must be concurrently enrolled in NPB 124.

*Cross Listing:* PSC 124L.

*Grade Mode:* Letter.

**NPB 126 – Comparative Physiology: Sensory Systems (3 units)**

*Course Description:* Basic physiological mechanisms involved in sensory systems. Comparative approach to considerations of mechanosensitive systems (audition, lateral lines, touch, echolocation, equilibrium), chemosensitive systems (olfaction, taste, pheromones), photosensitive systems (vision, infrared detection, UV detection), electroreception, and pain. Emphasis on receptors.

*Prerequisite(s):* NPB 100 or NPB 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**NPB 128 – Comparative Physiology: Endocrinology (3 units)**

*Course Description:* Comparison of physiological functions in the animal kingdom: animal hormones and their functions.

*Prerequisite(s):* NPB 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**NPB 130 – Physiology of the Endocrine Glands (4 units)**

*Course Description:* Advanced presentation of concepts in endocrinology with emphasis on the role of hormones in reproduction, metabolism, and disease.

*Prerequisite(s):* (ANS 100 or NPB 101 or NPB 110C).

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

**NPB 132 – Nature vs. Nurture: Physiological Interactions Among Genes, Nutrients & Health (3 units)**

*Course Description:* Biochemical, physiological, genetic, and nutritional causes of important medical problems such as obesity, anorexia, heart disease and diabetes.

*Prerequisite(s):* BIS 001A or BIS 002A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Only 1 unit of credit allowed to students who have completed NPB 131.

*Grade Mode:* Letter.

## **NPB 133 – Genes & the Brain (4 units)**

*Course Description:* Genetic contributions to brain evolution, development and disorders. Topics include evolution of genomic programs of neurodevelopment and the role of genetics in autism, intellectual disability, and schizophrenia.

*Prerequisite(s):* NPB 110B or NPB 100; or consent of instructor. BIS 101 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NPB 134 – General Immunology for Physiologists (3 units)**

*Course Description:* Immunology for undergrads interested in physiology aimed at understanding the physiological role of immune responses.

Illustrated with examples of human diseases including diabetes, allergies and asthma, and emerging diseases such as Ebola and Zika.

*Prerequisite(s):* NPB 101 C- or better or NPB 110C C- or better; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NPB 136 – Neural Networks & Machine Learning in Biology (4 units)**

*Course Description:* Neural networks as models of brain function and as powerful tools in machine learning. How neuroscience and machine learning have shaped each other. Applications of machine learning tools to biological research and health.

*Prerequisite(s):* MAT 017C C or better or MAT 021B C or better; or consent of Instructor; some background in neuroscience, cognitive science or programming (any one of the three) is recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NPB 139 – Frontiers in Physiology (3 units)**

*Course Description:* Lectures by leading authorities and discussion of the latest research in newly emerging areas in physiology. Offered every fourth year.

*Prerequisite(s):* NPB 100; NPB 101; NPB 102 (can be concurrent).

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **NPB 140 – Principles of Environmental Physiology (3 units)**

*Course Description:* Physiological aspects of interactions of organisms and environmental, cellular, system, and organismal levels. Emphasis on regulatory responses/mechanisms to thermal, pressure, gravity and light environmental variables.

*Prerequisite(s):* NPB 101 or NPB 110C; BIS 102 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NPB 148. (Former NPB 148.)

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **NPB 143 – Neurobiology & Pathophysiology of Mental Illness (3 units)**

*Course Description:* Comparison of the neurobiology and physiology of mental health to the pathophysiology of mental illness. Causative factors of mental illness (e.g., genetic, social, environmental) through a neurobiology and pathophysiology lens (e.g., neurotransmission, neuroimmunology, nervous system malfunction).

*Prerequisite(s):* NPB 100 C- or better; or NPB 110B C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NPB 150 – Advanced Animal Behavior (4 units)**

*Course Description:* Advanced integrative survey of biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free-living animals.

*Prerequisite(s):* NPB 102 or PSC 101; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* PSC 122.

*Grade Mode:* Letter.

## **NPB 152 – Hormones & Behavior (3 units)**

*Course Description:* Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress.

*Prerequisite(s):* (NPB 101 or NPB 110C); (NPB 102 or PSC 101).

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* PSC 123.

*Grade Mode:* Letter.

## **NPB 154 – Diabetes: Physiology & Management (4 units)**

*Course Description:* Normal regulation of blood glucose contrasted with dysfunction in diabetes. Types of diabetes, physiological consequences of diabetes, as well as current and future medications and treatments.

*Prerequisite(s):* NPB 110C or NPB 101.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

## **NPB 157 – Advanced Physiology of Animal/Human Disease (3 units)**

*Course Description:* Centers on fundamental mechanisms and pathophysiological basis for animal and human diseases. Case-based and uses animal and human diseases to help exemplify the physiological consequences of organ dysfunction.

*Prerequisite(s):* NPB 101 B+ or better or NPB 110C B+ or better; consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited to 35 students initially.

*Cross Listing:* HPH 157.

*Grade Mode:* Letter.

**NPB 159 – Frontiers in Behavior (3 units)**

*Course Description:* Lectures by leading authorities and discussion of the latest research in newly emerging areas in behavioral biology. Offered every fourth year.

*Prerequisite(s):* (NPB 100, NPB 101, NPB 102) or (NPB 110A, NPB 110B, NPB 110C).

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**NPB 161 – Developmental Neurobiology (3 units)**

*Course Description:* Issues, theoretical concepts, and methodologies in developmental neurobiology. Topics include prenatal and postnatal differentiation of neurons, and plasticity in the mature and aging brain. Integration of neurochemical, structural, physiological and behavioral perspectives.

*Prerequisite(s):* NPB 100 or NPB 101 or NPB 110B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NPB 162 – Neural Mechanisms of Behavior (3 units)**

*Course Description:* Relationship between brain and behavior. Identification and analysis of the relevant neural circuits involved. Examples of systems to be considered are birdsong, locomotion, echolocation.

*Prerequisite(s):* NPB 100 or NPB 101 or NPB 110B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**NPB 163 – Systems Neuroscience (4 units)**

*Course Description:* Concepts and techniques in systems neuroscience: e.g., measuring and manipulating neural activity, structure of neocortex, sensory processing, motor control, storage of information, neural codes, neural mechanisms underlying cognitive functions.

*Prerequisite(s):* NPB 100 or NPB 110B; or equivalent basic neuroscience training with consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NPB 164 – Mammalian Vision (4 units)**

*Course Description:* Structure and function of the mammalian visual system, from the formation of images on the retina through visually guided behavior and perception. Emphasis on biological mechanisms underlying vision.

*Prerequisite(s):* NPB 100 or NPB 110B or PSC 101.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**NPB 165 – Neurobiology of Speech Perception (3 units)**

*Course Description:* Interdisciplinary approach to speech perception with emphasis on functional neuroanatomy and behavior. Topics include auditory processing in time and space, intelligibility in noisy environments, visual speech, evolution of vocal communication, models of speech perception, development, and hearing impairment.

*Prerequisite(s):* NPB 110B or NPB 100 or NPB 101; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Scientific Literacy (SL).

**NPB 166 – Math Tools for Neuroscience (4 units)**

*Course Description:* Introduction to mathematics techniques used in neuroscience. Applications to neuroscience of differential equations, linear algebra, Fourier transforms, correlation and convolution, and probability theory.

*Prerequisite(s):* (NPB 100 or NPB 110B); (MAT 016A, MAT 016B, MAT 016C) or (MAT 017A, MAT 017B, MAT 017C) or (MAT 021A, MAT 021B, MAT 021C); or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**NPB 167 – Computational Neuroscience (5 units)**

*Course Description:* Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB.

*Prerequisite(s):* (NPB 100 or NPB 110B); (MAT 016A, MAT 016B, MAT 016C) or (MAT 017A, MAT 017B, MAT 017C) or (MAT 021A, MAT 021B, MAT 021C); or consent of instructor; PHY 007A, PHY 007B or equivalent recommended.

*Learning Activities:* Lecture 4 hour(s), Lecture/Lab 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NPB 168 – Neurobiology of Addictive Drugs (4 units)**

*Course Description:* Neurobiological basis for the effects and mechanisms of action of drugs with addictive potential, including opiates (morphine, heroin, methadone), amphetamines, cocaine, nicotine, marijuana (cannabinoids), alcohol, caffeine, and mind-altering drugs such as LSD and antidepressants.

*Prerequisite(s):* NPB 100 or NPB 110B or NPB 110C or NPB 101; or equivalents.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Scientific Literacy (SL); Visual Literacy (VL).

**NPB 169 – Frontiers in Neurobiology (3 units)**

*Course Description:* Lectures by leading authorities and discussion of the latest research in newly emerging areas in neurobiology. Offered every fourth year.

*Prerequisite(s):* NPB 100 or NPB 110A.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

**NPB 171 – Physiology of Neuroimmune Interactions (4 units)**

*Course Description:* Explores the complex interactions of the nervous and immune systems, and examine how the systems function together to serve homeostasis, behavior, and disease (such as Alzheimer's, autism, and multiple sclerosis).

*Prerequisite(s):* BIS 002A; (NPB 012 (can be concurrent) or NPB 100 (can be concurrent) or NPB 110B (can be concurrent)); or consent of instructor; completion of PMI 126 or MMI 188 recommended prior to this course.

*Learning Activities:* Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Scientific Literacy (SL).

**NPB 172 – Map Formation in the Brain (3 units)**

*Course Description:* Topographic map connection is a fundamental principle for establishing neural network in the brain. Provides comprehensive understanding of the current concepts of map formation in various sensory and motor nervous systems.

*Prerequisite(s):* NPB 100 C- or better or NPB 110B C- or better; or equivalent basic neuroscience training with consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**NPB 173 – Neurobiology of Brain Disorders (3 units)**

*Course Description:* Examination of brain disorders from a basic science perspective to gain insights into the mechanisms of their action. Genetic, molecular, cellular, circuit, and environmental basis of a variety of brain disorders. How insights about underlying mechanisms may lead to the development of improved therapies.

*Prerequisite(s):* NPB 110B or NPB 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**NPB 190C – Research Conference (1 unit)**

*Course Description:* Research findings and methods in neurobiology, physiology, and/or behavior. Presentation and discussion of research by faculty and students.

*Prerequisite(s):* NPB 199 (can be concurrent); and consent of instructor; upper division standing in Neurobiology, Physiology, and Behavior or related biological science; NPB 199 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**NPB 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in neurobiology, physiology, & behavior.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**NPB 194HA – Neurobiology, Physiology, & Behavior: Honors (1 unit)**

*Course Description:* Honors project in Neurobiology, Physiology, and Behavior. Laboratory research on a specific question. Project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis to be submitted upon completion of the project.

*Prerequisite(s):* Senior standing; minimum 3.500 GPA in courses counted toward major; approval by the master advisor.

*Learning Activities:* Laboratory 12 hour(s).

*Grade Mode:* Pass/No Pass only.

**NPB 194HB – Neurobiology, Physiology & Behavior: Honors (4 units)**

*Course Description:* Honors project in Neurobiology, Physiology, and Behavior. Laboratory research on a specific question. Project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis to be submitted upon completion of the project.

*Prerequisite(s):* Senior standing; minimum 3.500 GPA in courses counted toward major; approval by the master advisor.

*Learning Activities:* Laboratory 12 hour(s).

*Grade Mode:* Pass/No Pass only.

**NPB 194HC – Neurobiology, Physiology, & Behavior: Honors (2 units)**

*Course Description:* Honors project in Neurobiology, Physiology, and Behavior. Laboratory research on a specific question. Project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis to be submitted upon completion of the project.

*Prerequisite(s):* Senior standing; minimum 3.500 GPA in courses counted toward major; approval by the master advisor.

*Learning Activities:* Laboratory 12 hour(s).

*Grade Mode:* Pass/No Pass only.

**NPB 197T – Tutoring in Neurobiology, Physiology, & Behavior (1-5 units)**

*Course Description:* Assisting the instructor by tutoring students in one of the Department's regular courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Discussion 2-6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**NPB 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**NPB 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**NPB 211 – Advanced Topics in Neuroimaging (3 units)**

*Course Description:* Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG.

*Prerequisite(s):* PSC 210; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to 16 students.

*Repeat Credit:* May be repeated when topic differs.

*Cross Listing:* NSC 211, PSC 211.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NPB 212 – Light & Fluorescence Microscopy (3 units)**

*Course Description:* Theory and practical application of light and fluorescence microscopy in the biological sciences. Laboratory component focuses on an optics bench, where we build simple compound and confocal microscopes on an optical rail.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to 16 students.

*Grade Mode:* Letter.

**NPB 217 – Advanced Avian Physiology (1 unit)**

*Course Description:* Study in depth of a topic in avian physiology through development of a lecture with associated instructional materials such as lesson plan, readings, presentation, and evaluation aids.

*Prerequisite(s):* NPB 117 required concurrently; and consent of instructor; graduate standing.

*Learning Activities:* Project 1 hour(s).

*Grade Mode:* Letter.

**NPB 221 – Cellular Neuroscience (4 units)**

*Course Description:* Advanced course on cellular and subcellular organization of the nervous system. Membrane channels, sensory transduction, synaptic transmission and cellular aspects of development and learning.

*Learning Activities:* Lecture 3 hour(s), Discussion 1.50 hour(s).

*Grade Mode:* Letter.

**NPB 222 – Systems Neuroscience (5 units)**

*Course Description:* Integrative and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Cross Listing:* NSC 222.

*Grade Mode:* Letter.

**NPB 245 – Computational Models of Cellular Signaling (3 units)**

*Course Description:* Computational and mathematical techniques in modeling of regulatory and signaling phenomena in neurobiology and cell physiology, focusing on linear and nonlinear ordinary differential equation models. Applications include ion channel kinetics, electrical activity, signal transduction, calcium oscillations, and simple neural circuits.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**NPB 247 – Topics in Functional Neurogenomics (2 units)**

*Course Description:* The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Cross Listing:* NSC 247.

*Grade Mode:* Letter.

**NPB 261A – Topics in Vision: Eyes & Retinal Mechanisms (2 units)**

*Course Description:* Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing.

*Prerequisite(s):* NPB 100 or NPB 112; or the equivalent; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 261A, MCP 261A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NPB 261B – Topics in Vision: Systems, Psychophysics, Computational Models (2 units)**

*Course Description:* Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system.

*Prerequisite(s):* Consent of instructor; NPB 261A recommended.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 261B, MCP 261B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NPB 261C – Topics in Vision: Clinical Vision Science (2 units)**

*Course Description:* Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease.

*Prerequisite(s):* NPB 261A; NPB 261B; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 261C, MCP 261C.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NPB 263 – Modeling in Systems Neuroscience (4 units)**

*Course Description:* Modeling as a tool in systems neuroscience.

Mathematical techniques will be introduced and used to explore advanced topics in echolocation, sound localization, electroreception, communications, and motor systems. Other topics include transforms, modeling assumptions, scales and linearity.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Lecture/Lab 1 hour(s).

*Grade Mode:* Letter.

**NPB 267 – Computational Neuroscience (5 units)**

*Course Description:* Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single-neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB.

*Prerequisite(s):* One course in general Neuroscience at the level of NPB 100 or NPB 110B; one year college-level Calculus at the level of MAT 016A, MAT 016B, MAT 016C or higher; one year Physics at the level of PHY 007A, PHY 007B, PHY 007C recommended; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Lecture/Lab 3 hour(s).

*Cross Listing:* NSC 267.

*Grade Mode:* Letter.

## **NPB 270 – How to Write a Fundable Grant Proposal in the Biomedical Sciences (2 units)**

*Course Description:* Teaches the do's and don'ts of writing grants in the biomedical sciences and the mechanisms of the review process.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to members of the Neuroscience and BMCDB graduate groups; graduate students in other biomedical programs may enroll with instructor permission.

*Repeat Credit:* May be repeated.

*Cross Listing:* NSC 270.

*Grade Mode:* Letter.

## **NPB 271A – Core Concepts & Methods in Learning, Memory, & Plasticity (2 units)**

*Course Description:* Core concepts and methods used in studies of learning, memory and plasticity. Behavioral paradigms and measurement approaches in human and animal studies of learning and plasticity, as well as a consideration of the functional, anatomical and neuronal mechanisms underlying brain plasticity.

*Prerequisite(s):* Graduate Standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* PSC 271A, NSC 271A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NPB 271B – Core Concepts & Methods in Learning, Memory, & Plasticity (2 units)**

*Course Description:* Core concepts and detailed survey methods used in studies of learning, memory and plasticity, from the cellular and molecular level to the level of neural circuits. Areas of learning, memory, and plasticity research where recent progress has been made in linking across these levels of analysis.

*Prerequisite(s):* NPB 271A or NSC 271A or PSC 271A.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* PSC 271B, NSC 271B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NPB 271C – Translational Approaches to Learning, Memory, & Plasticity Disorders (2 units)**

*Course Description:* Neurological disorders, the effect of these disorders on learning, memory and plasticity, approved therapeutic options and current research designed to improve understanding and treatment of these diseases: (i) the clinical presentation, diagnostic criteria, and existing therapies, (ii) mechanistic studies in humans and animal models, and (iii) molecular pathways involved in the disease and approaches for drug discovery.

*Prerequisite(s):* NPB 271B or NSC 271B or PSC 271B.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* PSC 271C, NSC 271C.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NPB 285 – Literature in Visual Neuroscience (2 units)**

*Course Description:* Literature in visual Neuroscience.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* NSC 285.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NPB 287A – Topics in Theoretical Neuroscience (2 units)**

*Course Description:* In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* NSC 287A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NPB 287B – Topics in Theoretical Neuroscience (2 units)**

*Course Description:* In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* NSC 287B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NPB 291 – Auditory Neuroscience (1 unit)**

*Course Description:* Exploration of various important aspects of auditory physiology, behavior and psychophysics through review of original literature. New topic each quarter.

*Prerequisite(s):* NPB 100 or NPB 112 or NSC 222; or the equivalent.

*Learning Activities:* Seminar 0.50 hour(s), Discussion 0.50 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Neurology (NEU)**

School of Medicine

## **NEU 103 – Human Clinical Neuroanatomy (4 units)**

*Course Description:* Clinically relevant anatomy of the normal human nervous system, including external and internal anatomy of the brain, spinal cord, and cranial nerves. Blood supply to the brain and spinal cord. Functional neuroanatomy of motor, sensory, and cognitive systems. Application of neuroanatomical principles relevant to clinical problem solving for students entering health care professions.

*Prerequisite(s):* CHA 101; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to upper division students.

*Cross Listing:* CHA 103.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NEU 199 – Individual Special Study & Research (1-4 units)**

*Course Description:* Individual special study in neurophysiology and biomedical engineering is offered to qualified students. Studies on psychophysics, single-unit electrophysiology and instrumentation are offered in Davis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **NEU 298 – Group Study (1-5 units)**

*Course Description:* For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NEU 299 – Individual Special Study & Research (1-12 units)**

*Course Description:* Individual special study and research in Neurophysiology and Biomedical engineering is offered at both Davis and Sacramento Medical Center.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NEU 420 – Clinical Neurosciences (2 units)**

*Course Description:* Pathophysiology underlying neurological disorders, including disorders of development, muscle, nerve, cerebral circulation, metabolism, myelin, cortical function, movement, cerebrospinal fluid, autonomic function and special senses. Anatomical basis of clinical testing, nervous system infection, neoplasia and trauma.

*Learning Activities:* Lecture/Discussion 1 hour(s), Lecture 1.50 hour(s).

*Enrollment Restriction(s):* Restricted to Medical Students only.

*Grade Mode:* Pass/Fail only.

## **NEU 440 – Where Drugs Come From: How They are Discovered, Developed, Regulated, & Marketed (3-6 units)**

*Course Description:* Includes the following topics: Overview of the Drug Discovery Process; Drug Regulation in the United States; Patents and Other Forms of Exclusivity; Drug Targets and Pharmacology; Identification of Lead Candidates; Preclinical Assessment; ADME Including Basic Pharmacokinetic Principles; Principles of Drug Toxicity; Principles of Drug Safety; Clinical Trials; Generic Drugs; Pharmaceutical Industry; Drug Distribution and Marketing; Dietary Supplements; Controlled Substances.

*Learning Activities:* Lecture.

*Grade Mode:* Honors/Pass/Fail.

## **NEU 450 – Clinical Neurology Clerkship (3-6 units)**

*Course Description:* Critical elements of neurological clinical skills (history & exam) and basic and clinical neurological concepts expected for general residency preparation. Active, didactic, experiential and independent learning to encourage maturation of general professional competencies.

*Prerequisite(s):* Open to all fourth-year medical students; third-year medical students with consent of instructor.

*Learning Activities:* Clinical Activity 24 hour(s), Conference 12 hour(s), Seminar 4 hour(s), Independent Study 10 hour(s).

*Enrollment Restriction(s):* Restricted to six students per rotation.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **NEU 452 – Advanced Clinical Neurology (6 units)**

*Course Description:* Course teaches the principles and skills necessary to recognize and manage the neurologic diseases a general medical practitioner is most likely to encounter in practice. Students will gain clinical experience in both inpatient and outpatient settings, and learn how to interview patients and their caregivers to obtain a complete and reliable neurologic history and perform a reliable neurologic examination.

*Prerequisite(s):* Consent of instructor; completion of four-week Neurology selective.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Pass/Fail only.

## **NEU 455 – Child Neurology (1-12 units)**

*Course Description:* Exposure to children with disorders of the nervous system, both in outpatient and inpatient services. Cases presented to a member of full-time faculty who will discuss clinical findings, differential diagnosis, management and therapy. Satisfies fourth-year neuroscience requirement.

*Prerequisite(s):* IMD 430; OBG 430; PED 430; consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **NEU 460 – Externship in Neurology (3-6 units)**

*Course Description:* Externship course for Neurology rotations not meeting the qualifications to be an Acting Internship.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **NEU 462 – Externship in Advanced Neurology (3-6 units)**

*Course Description:* Away rotation in Neurology where coursework meets the standards to be counted as an Acting Internship.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **NEU 493F – Issues in Geriatric Care (6 units)**

*Course Description:* Four-week module teaches an approach to common problems in the elderly through history and exam, with an emphasis on integration of underlying anatomy, physiology, and pathophysiology in common geriatric presentations.

*Learning Activities:* Seminar.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**NEU 498NE – Group Study in Neurology (1-6 units)**

*Course Description:* Directed readings and discussions with a comprehensive written examination at the end of course.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable 3-5 hour(s).

*Grade Mode:* Pass/Fail only.

**NEU 499 – Research (1-12 units)**

*Course Description:* Approved for graduate degree credit. Laboratory investigation on selected topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 2-24 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**Neuroscience (NSC)****Graduate Studies****NSC 200LA – Laboratory Methods in Neurobiology (6 units)**

*Course Description:* Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design.

*Prerequisite(s):* Graduate standing in the Neuroscience Graduate Group.

*Learning Activities:* Laboratory 18 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 200LB – Laboratory Methods in Neurobiology (3 units)**

*Course Description:* Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design.

*Prerequisite(s):* Graduate standing in the Neuroscience Graduate Group.

*Learning Activities:* Laboratory 9 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 201 – Neuroanatomy (3 units)**

*Course Description:* Mix of lectures, demonstrations, and dissections, emphasizing functional significance of neuroanatomy from a biological perspective, with comparisons between human and non-human brains. Emphasis placed on functional anatomy of the nervous system, integrated with cellular, molecular, cognitive, and developmental concepts.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**NSC 211 – Advanced Topics in Neuroimaging (3 units)**

*Course Description:* Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG.

*Prerequisite(s):* PSC 210; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to 16 students.

*Repeat Credit:* May be repeated when topic differs.

*Cross Listing:* NPB 211, PSC 211.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 219 – Design to Data: Statistics for Modern Neuroscience (4 units)**

*Course Description:* Statistical methods and applications for neuroscience. Quantitative foundations covering key concepts, methods, and applications, from descriptive analysis through data science. Statistical considerations in experimental design, analysis and statistical testing in hypothesis and data-driven contexts, and responsible conduct of research in the acquisition, storage, analysis, and presentation of scientific data.

*Prerequisite(s):* Graduate student standing in neuroscience or related discipline or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**NSC 220 – How to Give a Scientific Seminar (3 units)**

*Course Description:* Presentation of effective seminars. Student presentations of selected neuroscience topics in seminar format. Must be taken in two consecutive quarters.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**NSC 221 – Cellular Neurophysiology (4 units)**

*Course Description:* Physiological aspects of cellular and subcellular organization of the nervous system. Neuronal cell biology, the structure and function of ion channels, electrical excitability, signaling cascades, sensory transduction and, mechanisms of synaptic transmission, and the cellular basis of learning and memory.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 4.50 hour(s).

*Grade Mode:* Letter.

**NSC 222 – Systems Neuroscience (5 units)**

*Course Description:* Integrative and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Cross Listing:* NPB 222.

*Grade Mode:* Letter.

**NSC 223 – Cognitive Neuroscience (4 units)**

*Course Description:* Graduate core course for neuroscience.

Neurobiological bases of higher mental function including attention, memory, language. One of three in three-quarter sequence.

*Prerequisite(s):* Graduate student standing in Psychology or Neuroscience or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* PSC 261.

*Grade Mode:* Letter.

## **NSC 224A – Molecular & Developmental Neurobiology (2 units)**

*Course Description:* Key issues in developmental and molecular neurobiology. Discussion emphasis on critical evaluation of the experiments and methods described in research papers. Readings of seminal, primary research papers, reviews, and book chapters. Reading materials will be distributed one week in advance.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **NSC 224B – Molecular & Developmental Neurobiology (2 units)**

*Course Description:* Continuation of NSC 224A. Key issues in developmental and molecular neurobiology, focusing on developmental topics. Discussion emphasis on critical evaluation of experiments and methods described in associated literature.

*Prerequisite(s):* NSC 224A; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **NSC 225 – Translational Research in the Neurobiology of Disease (2 units)**

*Course Description:* Provides an overview of major neuropsychiatric and neurological disorders from both the clinical and fundamental science perspectives.

*Prerequisite(s):* NSC 221 (can be concurrent); NSC 222 (can be concurrent); NSC 223 (can be concurrent); or consent of instructor; past or concurrent enrollment in NSC 221 NSC 222 NSC 223.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **NSC 226 – Molecular & Developmental Neurobiology (4 units)**

*Course Description:* Key issues in developmental and molecular neurobiology. Topics include neural induction and patterning, neurogenesis, axon guidance, synapse development and remodeling. Discussion emphasis on critical evaluation of the experiments and methods described in primary seminal research papers and current literature.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **NSC 243 – Topics in Cellular & Behavioral Neurobiology (2 units)**

*Course Description:* An advanced examination of several current problems in neurobiology. Topics vary in different years.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 247 – Topics in Functional Neurogenomics (2 units)**

*Course Description:* The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Cross Listing:* NPB 247.

*Grade Mode:* Letter.

## **NSC 250 – Biology of Neuroglia (2 units)**

*Course Description:* The properties and functions of non-neuronal or neuroglial cells in the mammalian central nervous system with relevance to neuronal development, physiology and injury response.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1.50 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 261A – Topics in Vision: Eyes & Retinal Mechanisms (2 units)**

*Course Description:* Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing.

*Prerequisite(s):* NPB 100 or NPB 112; or the equivalent; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NPB 261A, MCP 261A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 261B – Topics in Vision: Systems, Psychophysics, Computational Models (2 units)**

*Course Description:* Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system.

*Prerequisite(s):* Consent of instructor; NSC 261A recommended.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NPB 261B, MCP 261B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 261C – Topics in Vision: Clinical Vision Science (2 units)**

*Course Description:* Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease.

*Prerequisite(s):* NSC 261A; NSC 261B; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NPB 261C, MCP 261C.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 267 – Computational Neuroscience (5 units)**

*Course Description:* Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB.

*Prerequisite(s):* Consent of instructor; one course in general Neuroscience at the level of NSC 100; or NPB 110B; one year college-level Calculus at level of MAT 016A, MAT 016B, MAT 016C or higher; one year Physics at the level of PHY 007A, PHY 007B, PHY 007C, recommended; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Lecture/Lab 3 hour(s).

*Cross Listing:* NPB 267.

*Grade Mode:* Letter.

**NSC 270 – How to Write a Fundable Grant Proposal in the Biomedical Sciences (2 units)**

*Course Description:* Teaches the do's and don'ts of writing grants in the biomedical sciences and the mechanisms of the review process.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to members of the Neuroscience and BMCDB graduate groups; graduate students in other biomedical programs may enroll with instructor permission.

*Repeat Credit:* May be repeated.

*Cross Listing:* NPB 270.

*Grade Mode:* Letter.

**NSC 271A – Core Concepts & Methods in Learning, Memory, & Plasticity (2 units)**

*Course Description:* Core concepts and methods used in studies of learning, memory and plasticity. Behavioral paradigms and measurement approaches in human and animal studies of learning and plasticity, as well as a consideration of the functional, anatomical and neuronal mechanisms underlying brain plasticity.

*Prerequisite(s):* Graduate Standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* PSC 271A, NPB 271A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 271B – Core Concepts & Methods in Learning, Memory, & Plasticity (2 units)**

*Course Description:* Core concepts and detailed survey methods used in studies of learning, memory and plasticity, from the cellular and molecular level to the level of neural circuits. Areas of learning, memory, and plasticity research where recent progress has been made in linking across these levels of analysis.

*Prerequisite(s):* NSC 271A or NPB 271A or PSC 271A.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* PSC 271B, NPB 271B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 271C – Translational Approaches to Learning, Memory, & Plasticity Disorders (2 units)**

*Course Description:* Neurological disorders, the effect of these disorders on learning, memory and plasticity, approved therapeutic options and current research designed to improve understanding and treatment of these diseases: (i) the clinical presentation, diagnostic criteria, and existing therapies, (ii) mechanistic studies in humans and animal models, and (iii) molecular pathways involved in the disease and approaches for drug discovery.

*Prerequisite(s):* NSC 271B or NPB 271B or PSC 271B.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* PSC 271C, NPB 271C.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 283 – Neurobiological Literature (1 unit)**

*Course Description:* Critical presentation and analysis of recent journal articles in neurobiology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 284 – Development of Sensory Systems (1 unit)**

*Course Description:* Presentation and discussion of recent literature on the development of sensory systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 285 – Literature in Visual Neuroscience (2 units)**

*Course Description:* Critical presentation and discussion of current literature in visual neuroscience.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Cross Listing:* NPB 285.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 286 – Frontiers in Biology of Glia (1 unit)**

*Course Description:* Frontiers of glial biology. Research articles in current literature on experimental approaches, technical aspects of experimental techniques, data interpretation, and other topics.

*Prerequisite(s):* Consent of instructor

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NSC 287A – Topics in Theoretical Neuroscience (2 units)**

*Course Description:* In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* NPB 287A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 287B – Topics in Theoretical Neuroscience (2 units)**

*Course Description:* In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* NPB 287B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 289 – Topics in Molecular & Developmental Neurobiology (2 units)**

*Course Description:* Analysis and discussion of seminal and current research papers in molecular and developmental neurobiology. Different topics will be covered each quarter. In the past topics have included, "Synaptic vesicle dynamics," "Neuronal polarity," and "Glutamate receptors."

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 10 time(s) when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 290C – Research Conference in Neurobiology (1 unit)**

*Course Description:* Presentation and discussion of faculty and graduate student research in neurobiology.

*Prerequisite(s):* NSC 299 required concurrently; graduate standing in Neuroscience or consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 292 – Cortical Plasticity & Perception (2 units)**

*Course Description:* Examination of research articles on cortical plasticity and changes in perception. Examples drawn from studies of the somatosensory, visual, auditory, and motor cortex.

*Prerequisite(s):* NPB 100 or NPB 112; or equivalent or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 295 – Literature in Neuroengineering (2 units)**

*Course Description:* Critical presentation and discussion of current literature in neuroengineering.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Repeat Credit:* May be repeated.

*Cross Listing:* BIM 295.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSC 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Neurosurgery (NSU)**

### **School of Medicine**

## **NSU 199 – Special Study in Neurosurgery for Advanced Undergraduates (1-5 units)**

*Course Description:* Students may participate in ongoing neurosurgical projects or may pursue and design independent projects.

*Prerequisite(s):* Advanced undergraduate standing with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **NSU 299 – Neurosurgery Research (3-12 units)**

*Course Description:* Student may participate in ongoing neurosurgical projects or may pursue and design independent projects.

*Prerequisite(s):* Graduate student with consent of instructor.

*Learning Activities:* .

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NSU 451 – Neurosurgical Critical Care Clerkship (3 units)**

*Course Description:* Students participate in the care of neurosurgical patients in the NSICU and in the admission and surgical management of patients admitted through the Emergency Room.

*Prerequisite(s):* Third- or fourth-year medical student having completed a neurosurgical clerkship or consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **NSU 455 – Clinical Pediatric Neurosurgery (6 units)**

*Course Description:* Admission and follow-up of pediatric patients.

Neurological history, examination, and diagnostic procedures are emphasized. Students will participate in surgical procedures and are required to attend all pediatric neurosurgery conferences.

*Prerequisite(s):* NSU 460; consent of instructor; third- or fourth-year medical students.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **NSU 460 – Clinical Neurosurgery (3-18 units)**

*Course Description:* Approved for graduate degree credit. Admission and follow-up of patients. Neurological history, examination, and further diagnostic procedures emphasized. Participate in meaningful aspects of surgical procedures and attend listed conferences, rounds, and seminars.

*Prerequisite(s):* Consent of instructor; third- and fourth-year medical students.

*Learning Activities:* Variable, Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**NSU 464 – Externship (3-9 units)**

*Course Description:* Clerkship in neurosurgery to be arranged at another institution with accredited residency program in neurosurgery under proper supervision.

*Prerequisite(s):* Fourth-year medical student having completed a neurosurgical clerkship or consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**NSU 465 – Neurocritical Care (6-18 units)**

*Course Description:* In this Acting Internship, learn and practice how to safely assess and manage acutely ill patients with life-threatening neurologic and neurosurgical disease or life-threatening neurologic manifestations of systemic disease as part of our multidisciplinary neurocritical care team.

*Learning Activities:* Internship.

*Grade Mode:* Honors/Pass/Fail.

**NSU 466 – Neurocritical Care (NSICU) (3-8 units)**

*Course Description:* Participate in the care of neurosurgical patients in the NSICU and in the admission and surgical management of patients admitted through the Emergency Room.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail Only.

**NSU 470 – Advanced Clinical Neurosurgery (6-18 units)**

*Course Description:* Student will function as acting intern on neurosurgery service. Admission and management of patients. Neurological history, examination, diagnostic procedures, and surgical management are emphasized. Students participate in meaningful aspects of surgical procedures and attend required conferences and rounds.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**NSU 474 – Away Acting Internship in Neurosurgery (6-18 units)**

*Course Description:* Away acting internship in Neurosurgery.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**NSU 480 – Insights in Neurosurgery (1-3 units)**

*Course Description:* Observation of neurosurgical care in emergency room, operating room and hospital floors, including manner of treatment of a variety of chronic and acute neurological diseases.

*Prerequisite(s):* Consent of instructor; first- and second-year medical students in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**NSU 499 – Neurosurgery Research (1-18 units)**

*Course Description:* Student may participate in ongoing neurosurgical projects or may pursue and design independent projects.

*Prerequisite(s):* Medical student with consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**Nursing (NRS)****Graduate Studies****NRS 200AY – Quantitative Design & Data Collection in Nursing & Healthcare (3 units)**

*Course Description:* Introduction to quantitative study designs, common methods for sampling, data collection, and instrument selection.

Implications of various design and methods choices on causal inference, internal and external validity, and ethical considerations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s); Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 200BY – Quantitative Research Methods in Nursing & Healthcare (3 units)**

*Course Description:* Foundational approaches to describing and analyzing quantitative data. Assumptions and appropriate selection of basic descriptive and inferential statistics, and interpreting and communicating the results.

*Prerequisite(s):* NRS 200AY B- or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s); Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 200CY – Applied Quantitative Analysis in Nursing & Healthcare (3 units)**

*Course Description:* Practice of quantitative data analysis. Develop research questions using quantitative methods, identify appropriate datasets, prepare data, conduct secondary analysis, and report results.

*Prerequisite(s):* NRS 200BY B- or better; or consent of Instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s); Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 201 – Health Status & Care Systems (4 units)**

*Course Description:* Comparative health status data, major current health issues globally, nationally, regionally. Theoretical perspectives on social, political, economic determinants of health. Health-care systems examined, linked to data, and evaluated in regards to outcomes. Aging, rural, ethnic minority populations highlighted.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory, Project.

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 202 – Implementation Science (4 units)**

*Course Description:* Change processes in health care from political, historic, economic and sociologic frameworks. Historic and current examples of transformative change in the health-care system. Skills for system transformation through health policy, practice, research and education are emphasized.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 203 – Leadership in Health Care (4 units)**

*Course Description:* Critical examination of leadership from a variety of theoretical and philosophical perspectives and focuses on specific challenges in health care and leadership at various levels, e.g., patient, organizational, and policy levels.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork.

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 204 – Research Skills for Nursing Science & Health-Care Leadership (4 units)**

*Course Description:* Foundation for analyzing research, health, and systems data to answer clinical, systems, or policy questions. Use and examine multiple sources of data and information as a basis for planned change and transformation in health care.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 205 – Research Design in Nursing & Health Care (4 units)**

*Course Description:* Major types of quantitative and qualitative research design and their application to nursing and health-care research.

Implications of choosing alternative research designs and critical analysis of philosophical underpinnings. Evaluation of control and validity, sampling, instruments to measure health concepts.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 205A – Overview of Research in Nursing Science & Health Care (2 units)**

*Course Description:* Provides an overview of quantitative and qualitative paradigms in scientific inquiry and the major designs related to each paradigm. First of a three-course series on research design and methods in nursing science and healthcare research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 205B – Quantitative Research in Nursing Science & Health Care (4 units)**

*Course Description:* Introduces principles of quantitative data collection and analysis as applied to major study designs in nursing and health-care research. Provides a basic foundation for producing, interpreting, and applying quantitative research findings to answer clinical, system, and policy questions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 205C – Qualitative Research in Nursing Science & Health Care (4 units)**

*Course Description:* Introduces principles of qualitative data collection and analysis as applied to major study designs in nursing and health-care research. Provides a basic foundation for producing, interpreting, and applying qualitative research findings to answer clinical, system, and policy questions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 206 – Community Connections (2-5 units)**

*Course Description:* Community-based learning and experiences including community participation, assessment, data collection and analysis using multiple approaches, community health improvement projects, collaborative leadership practice, all with the guidance of community members and nursing faculty.

*Learning Activities:* Variable 6 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**NRS 207AY – Introduction to Qualitative Design in Nursing & Healthcare (3 units)**

*Course Description:* Introduction to qualitative principles, epistemology, grounded theory, ethnography, and phenomenology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s); Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 207BY – Intermediate Qualitative Research Methods in Nursing & Healthcare (3 units)**

*Course Description:* Ways to frame qualitative research questions. Data to address important knowledge gaps in the health sciences. Interactive exercises for considering independent research.

*Prerequisite(s):* NRS 207AY B- or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s); Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in Nursing Science & Health-Care Leadership graduate program; or consent of instructor.

*Grade Mode:* Letter.

## **NRS 207CY – Advanced Qualitative Research Methods in Nursing & Healthcare (3 units)**

*Course Description:* Practice of qualitative research. Select design, data collection and analytical techniques.

*Prerequisite(s):* NRS 207BY B- or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s); Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 208AY – Philosophy of Science & History of PhD/Nursing Science (3 units)**

*Course Description:* Introduction to thinking like a scientist, history of nursing research and philosophy of science. Debates about scientific research that coincided with the founding of Nursing Science in the middle of the 20th century.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 208BY – Logic & Scientific Inference (3 units)**

*Course Description:* Concepts used in scientific research, critical thinking skills to examine the association between concepts and empirical evidence. Identifying new concepts that can be the analytic foundations of new research questions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 208CY – Theoretical & Conceptual Frameworks in Nursing & Healthcare (3 units)**

*Course Description:* Applied approach to introduce common theoretical and conceptual frameworks used in nursing and health sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 209Y – Research Methods in Health Informatics (3 units)**

*Course Description:* Introduction to empirical methods applicable to health informatics. Delineates planning, development and evaluation in health informatics research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 210Y – Applied Health Informatics (4 units)**

*Course Description:* Within the conceptual framework of the Foundation of Knowledge model, integrates nursing science, information science, computer science and cognitive science to acquire, process, generate and disseminate knowledge.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Web Virtual Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 211Y – Rural Health (2-3 units)**

*Course Description:* Interprofessional graduate course provides an introduction to rural health theory, research, policy, and practice, with an emphasis on rural health assets and disparities.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 212 – Technology & Innovations in Health Care (2 units)**

*Course Description:* Multidisciplinary approach to stimulate new thinking in the practice, process, and delivery of health care. Focus on improving overall health outcomes.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 213 – Race & Health in the United States (3 units)**

*Course Description:* Race as a social construct and unequal health care distribution in the United States. Practical health care leadership to end racial inequalities in health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 7.50 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 220 – Social, Cultural, & Behavioral Determinants of Health (3 units)**

*Course Description:* Effects of globalization, political systems, local and global economies, culture, race, class, gender, and sexuality on population health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 221 – Biophysical Concepts in Nursing (3 units)**

*Course Description:* Pathophysiological processes that contribute to different disease states across the lifespan; case studies; selective clinical decisions using current, reliable sources of pathophysiology information.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 222A – Research Quality Improvement & Evidence Based Practice (2 units)**

*Course Description:* Introduction to providing safe, competent and compassionate care in a highly technical and digital environment. Emphasis on safety, quality and research to clinical practice. Accessing and analyzing reliable sources of evidence for integration in care-plan.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 222B – Research Quality Improvement & Evidence Based Practice (2 units)**

*Course Description:* Introduction to providing safe, competent and compassionate care in a highly technical and digital environment. Emphasis on safety, quality and research to clinical practice. Accessing and analyzing reliable sources of evidence for integration in care-plan.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 223 – Quality & Safety Education in Health Care (3 units)**

*Course Description:* Implementing best practices alongside technological tools and continuous quality improvement. Providing safe, competent care in a highly technical and digital environment. Building capacity to apply concepts related to safety, quality and research to clinical practice.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 224 – Developing Future Nurse Leaders (3 units)**

*Course Description:* Effective decision-making, fiscal and environmental stewardship, initiating and maintaining effective working relationships, mutually respectful communication and collaboration, care coordination, delegation and supervision. Conflict resolution, leadership and interprofessional teamwork.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 225 – Professional Nursing Role Formation (3 units)**

*Course Description:* Transition from nursing student to professional nurse. Focus on ethical comportment, professional values of social justice, autonomy, advocacy, altruism, human dignity, and integrity. Students must pass a mastery exit examination and complete a capstone project.

*Prerequisite(s):* NRS 202; NRS 203; NRS 212; NRS 220; NRS 221; NRS 222A; NRS 222B; NRS 223; NRS 224; NRS 272; NRS 273; NRS 420; NRS 421; NRS 422; NRS 423; NRS 424; NRS 425; NRS 426; NRS 427; NRS 429A; NRS 429B; NRS 429C; NRS 429D; NRS 429E; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 233V – Leadership & Innovation in Healthcare (3 units)**

*Course Description:* Critical examination of leadership from a variety of theoretical and philosophical perspectives. Specific challenges in health care and leadership at various levels; e.g., patient, organizational, and policy levels.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Credit Limitation(s):* No credit to students who have previously completed NRS 203.

*Grade Mode:* Letter.

## **NRS 234V – Research & Evidence-Based Practice for Healthcare (3 units)**

*Course Description:* Foundation for doctoral-level RNs to analyze research, health, and systems data to answer clinical, systems, or policy questions. Use and examine multiple sources of data and information as a basis for planned change and transformation in health care.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Credit Limitation(s):* No credit to students who have previously completed NRS 204.

*Grade Mode:* Letter.

**NRS 240V – Applied Health Informatics (3 units)**

*Course Description:* Foundational knowledge about the health informatics field and practical applications that health professionals are likely to encounter in practice or in development and management of health programs.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Credit Limitation(s):* No credit to students who have previously completed NRS 210Y.

*Grade Mode:* Letter.

**NRS 242A – Implementation Science for Clinicians (2 units)**

*Course Description:* Focuses on identification of relevant research or improvement questions specific to patient care and evaluating the pertinent research literature related to the implementation of evidence based care. First of a three-course series.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 242B – Implementation Science for Clinicians (2 units)**

*Course Description:* Continuation of NRS 242A. Implementation Science for Clinicians, with a focus on implementing and evaluating a change.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 242C – Implementation Science for Clinicians (2 units)**

*Course Description:* Advanced skills in application of implementation science into systems based practice and incorporating quality improvement and patient safety knowledge with particular focus on prevention of medical errors.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 243A – Leadership in Professional Practice (2 units)**

*Course Description:* Critical examination of leadership using theoretical and philosophical perspectives with an applied approach applicable to clinical practice. Three-course series conducted across the first, third and eighth quarters.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 243B – Leadership in Professional Practice (1 unit)**

*Course Description:* Introduces professional role topics including history of the profession, the role in interprofessional teams and the health care system, transitioning to the role from other health professions, scope of practice, certification and licensure and professional organizations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 243C – Leadership in Professional Practice (1 unit)**

*Course Description:* Expands upon the leadership role as it relates to their clinical practice and professional role. Professional role topics including: transitioning from student to practicing professional, scope of practice, the physician relationship, and more advanced concepts in ethics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 250 – Foundations of Primary Health Care (7 units)**

*Course Description:* Designed to promote the understanding and clinical application of human anatomy, physiology, histology, immunology and pathology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 6 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 251A – Primary Health Care (8 units)**

*Course Description:* Introduction to primary health care concepts essential to the care of common medical problems seen in primary care settings.

Module content will focus on various organ systems and specialty areas.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 8 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 251B – Foundations of Primary Health Care (8 units)**

*Course Description:* Introduction to primary health care concepts essential to the care of common medical problems seen in primary care settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 8 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 251C – Primary Health Care (8 units)**

*Course Description:* Introduction to primary health care concepts essential to the care of common medical problems seen in primary care settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 8 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 251D – Primary Health Care (6 units)**

*Course Description:* Introduction to primary health care concepts essential to the care of common medical problems seen in primary care settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 6 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 260 – Foundations of Behavioral Health (1 unit)**

*Course Description:* Focuses on the spectrum of normal psychological development over the lifespan for children, adults and elders. Theories of stress and coping mechanism are presented as a framework for the assessment of individuals.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 270 – Foundations of Pharmacology (2 units)**

*Course Description:* Introduction to the major concepts in pharmacology and relevant human physiology related to pharmacotherapeutics and toxicology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 271A – Pharmacology (2 units)**

*Course Description:* Systems based pharmacology focused on classes of drugs used to treat disorders in specialty systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 271B – Pharmacology (2 units)**

*Course Description:* Systems based pharmacology focused on classes of drugs used to treat disorders in specialty systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 271C – Pharmacology (2 units)**

*Course Description:* Systems based pharmacology focused on classes of drugs used to treat disorders in specialty systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor.

*Grade Mode:* Letter.

**NRS 272 – Foundations of Pharmacology (2 units)**

*Course Description:* Theoretical background to providing safe and effective care related to drugs and natural products.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 273 – Pharmacology Concepts in Nursing (2 units)**

*Course Description:* Application of principles for safe and effective use of medications and natural products; use of current, reliable information to make clinical decisions.

*Prerequisite(s):* NRS 221; NRS 272; NRS 420; NRS 421; consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 275V – Advanced Pharmacology I (3 units)**

*Course Description:* Principles of pharmacokinetics, pharmacodynamics, molecular pharmacology, and antimicrobial therapy. Scientific foundation for the courses that follow in pharmacology/pharmacotherapy.

*Prerequisite(s):* NRS 279V C or better; consent of instructor.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 276V – Advanced Pharmacology II (3 units)**

*Course Description:* Pharmacotherapeutics for common, acute and chronic health conditions across the lifespan according to specialty areas of practice. Treatments for a variety of behavioral disorders, pediatrics, and women's health to monitor the physical and behavioral approaches to pharmacological interventions.

*Prerequisite(s):* NRS 275V C or better; NRS 277V C or better; NRS 278V C or better; consent of instructor.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 277V – Advanced Assessment Across the Lifespan (3 units)**

*Course Description:* Advanced physical assessment skills and concepts necessary to care for patients in the context of family and community. Thorough health history and performing a complete head to toe physical exam. Instruction and practice utilize cognitive, effective, and behavioral objectives based on five domains: patient care, clinical knowledge, communication skills, professionalism, and life-long learning.

*Prerequisite(s):* NRS 279V C or better; consent of instructor.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 278V – Advanced Pathophysiology (4 units)**

*Course Description:* Understanding and clinical application of human anatomy, physiology and pathophysiology. General pathophysiological concepts: cell injury, necrosis, inflammation, immunity, infection, tissue and healing processes, stress response, and neoplasia. System-based approach to human anatomy and investigated based on underlying biochemical, cellular and molecular genetic perturbations in homeostasis that result in human disease.

*Prerequisite(s):* NRS 279V C or better; consent of instructor.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 279V – Concepts of Behavioral Health (2 units)**

*Course Description:* Fundamentals of social and behavioral science, with a focus on theoretical underpinnings of evidence-based communication skills and interventions. Health behaviors through the lens of human development and health behavior change theory, using theories of stress and coping mechanisms and the bio-psychological model as a framework for the assessment of individual, and including the impact of social determinants of health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 280V – Professional Practice in Health Care (2 units)**

*Course Description:* Transitions to the advanced practice health care provider role with emphasis on developing and enacting new functions; interpreting legal and professional requirements and regulations; exerting leadership; and examining the ethics, values, beliefs, and norms of decision-making in an interdisciplinary, collaborative practice.

*Prerequisite(s):* NRS 281DV C or better; NRS 282DY C or better; NRS 283DV C or better.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 281AV – APRN Family Practice A (3 units)**

*Course Description:* Primary care services to individuals and families across populations. Advanced health assessment skills to manage common patient-reported problems or conditions. Course series varies by quarter to include different populations across the lifespan.

*Prerequisite(s):* NRS 276V C or better; NRS 409Y C or better; NRS 355V C or better; consent of Instructor.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 281BV – APRN Family Practice B (3 units)**

*Course Description:* Primary care services to individuals and families across populations. Advanced health assessment skills to manage common patient-reported problems or conditions. Course series varies by quarter to include different populations across the lifespan.

*Prerequisite(s):* NRS 281AV C or better; NRS 282AY C or better; NRS 283AV C or better; consent of instructor.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 281CV – APRN Family Practice C (3 units)**

*Course Description:* Primary care services to individuals and families across populations. Advanced health assessment skills to manage common patient-reported problems or conditions. Course series varies by quarter to include different populations across the lifespan.

*Prerequisite(s):* NRS 281BV C or better; NRS 282BY C or better; NRS 283BV C or better; consent of Instructor.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 282AY – Clinical A (5 units)**

*Course Description:* Advanced health assessment skills to manage common patient-reported problems or conditions. Integrating health maintenance and promotion along with assessment, diagnosis, and management of frequently encountered acute and chronic conditions in primary care. Course series will vary by quarter to prepare family nurse practitioners (FNPs) to deliver primary care services to individuals and families and across the lifespan.

*Prerequisite(s):* NRS 276V C or better; NRS 279V C or better; NRS 409Y C or better.

*Learning Activities:* Clinical Activity 14 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 282BY – Clinical B (5 units)**

*Course Description:* Advanced health assessment skills to manage common patient-reported problems or conditions. Integrating health maintenance and promotion along with assessment, diagnosis, and management of frequently encountered acute and chronic conditions in primary care. Course series will vary by quarter to prepare family nurse practitioners (FNPs) to deliver primary care services to individuals and families and across the lifespan.

*Prerequisite(s):* NRS 281AV C or better; NRS 282AY C or better; NRS 283AV C or better.

*Learning Activities:* Clinical Activity 14 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

### **NRS 282CY – Clinical C (5 units)**

*Course Description:* Advanced health assessment skills to manage common patient-reported problems or conditions. Integrating health maintenance and promotion along with assessment, diagnosis, and management of frequently encountered acute and chronic conditions in primary care. Course series will vary by quarter to prepare family nurse practitioners (FNPs) to deliver primary care services to individuals and families and across the lifespan.

*Prerequisite(s):* NRS 281BV C or better; NRS 282BY C or better; NRS 283BV C or better.

*Learning Activities:* Clinical Activity 14 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

### **NRS 282DY – Clinical D (5 units)**

*Course Description:* Advanced health assessment skills to manage common patient-reported problems or conditions. Integrating health maintenance and promotion along with assessment, diagnosis, and management of frequently encountered acute and chronic conditions in primary care. Course series will vary by quarter to prepare family nurse practitioners (FNPs) to deliver primary care services to individuals and families and across the lifespan.

*Prerequisite(s):* NRS 281CV C or better; NRS 282CY C or better; NRS 283CV C or better.

*Learning Activities:* Clinical Activity 14 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

### **NRS 283AV – Diagnostic Reasoning A (1 unit)**

*Course Description:* Diagnosis and provide appropriate and safe treatment. Synthesize clinical data across practice environments to effectively enhance clinical reasoning. Clinical cases vary by quarter.

*Prerequisite(s):* NRS 276V C or better; NRS 409Y C or better; NRS 355V C or better; consent of instructor.

*Learning Activities:* Web Virtual Lecture 0.5 hour(s), Web Electronic Discussion 1.5 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

### **NRS 283BV – Diagnostic Reasoning B (1 unit)**

*Course Description:* Diagnosis and provide appropriate and safe treatment. Synthesize clinical data across practice environments to effectively enhance clinical reasoning. Clinical cases vary by quarter.

*Prerequisite(s):* NRS 281AV C or better; NRS 282AY C or better; NRS 283AV C or better; consent of Instructor.

*Learning Activities:* Web Virtual Lecture 0.5 hour(s), Web Electronic Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

### **NRS 283CV – Diagnostic Reasoning C (1 unit)**

*Course Description:* Diagnosis and provide appropriate and safe treatment. Synthesize clinical data across practice environments to effectively enhance clinical reasoning. Clinical cases vary by quarter.

*Prerequisite(s):* NRS 281BV C or better; NRS 282BY C or better; NRS 283BV C or better; consent of instructor.

*Learning Activities:* Web Virtual Lecture 0.5 hour(s), Web Electronic Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

### **NRS 290 – Master's Seminar (2 units)**

*Course Description:* Subject varies from quarter to quarter. Current knowledge and issues relevant to one of two fields of emphasis: population health or health systems.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 10 time(s).

*Grade Mode:* Letter.

### **NRS 291 – Doctoral Seminar (2 units)**

*Course Description:* Focus on the theory, research and knowledge relevant to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 10 time(s).

*Grade Mode:* Letter.

### **NRS 291D – Doctoral Seminar (2 units)**

*Course Description:* Focus on the theory, research and knowledge relevant to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor. Enrollment Restriction(s) Open to graduate students in School of Nursing programs, or consent of instructor:

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated 10 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **NRS 293Y – Proposal Development Seminar (1 unit)**

*Course Description:* Reading, critique and synthesis of classic and cutting-edge research in nursing and health care.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 0.5 hour(s), Web Virtual Lecture 0.5 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* Students are expected to take this course every quarter in year one and two in this PhD program. The topics will vary by quarter.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NRS 298 – Special Topics in Nursing Science & Health-Care Leadership (1-4 units)**

*Course Description:* In-depth study of topics in Nursing Science and Health-Care Leadership, selected from: policy and politics in health care, health-care disparities, current issues in health care, approaches to the conduct of science, or other related areas, with year to year variation.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Lecture/Discussion 1-2 hour(s), Variable 1-3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **NRS 298V – Online Special Topics in Nursing Science & Health-Care Leadership (1-4 units)**

*Course Description:* In-depth study of topics in Nursing Science and Health-Care Leadership, selected from: policy and politics in health care, health-care disparities, current issues in health care, approaches to the conduct of science, or other related areas, with year to year variation.

*Prerequisite(s):* Current enrollment in the Nursing Science and Health-Care Leadership graduate program or consent of instructor.

*Learning Activities:* Web Virtual Lecture 1-4 hour(s), Web Electronic Discussion 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **NRS 299 – Research & Writing (1-12 units)**

*Course Description:* Students in the Nursing Science and Health-Care Leadership graduate programs conduct research and writing under the supervision of a faculty member.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Extensive Writing/Discussion 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NRS 299D – Dissertation Research & Writing (1-12 units)**

*Course Description:* Students in the Nursing Science and Health-Care Leadership graduate programs conduct dissertation research and writing under the supervision of a faculty member.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Extensive Writing/Discussion 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NRS 301 – Learner Centered Teaching (3-4 units)**

*Course Description:* Students will explore best practices in learner-centered teaching, performance-based curriculum models, instructional design, and assessing/evaluating student learning. Students will have experience in planning learner-centered activities that are engaging and effective in achieving desired student performance.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Practice 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 302 – Teaching Methods–Use of Emerging Technologies to Improve Student Learning (4 units)**

*Course Description:* Students will examine, design and develop instructional strategies that use innovative and emerging technologies to promote motivation, performance and learning in health professions education. Research findings associated with use of various emerging technologies will be examined.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Practice 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 303 – Professional Role Formation (2-4 units)**

*Course Description:* Exploration of the educator role. Topics include Role Expectations, Legal and Regulatory Issues, Professional Ethics, Educational Scholarship, Individual Differences, Learning Environments, and Lifelong Learning. Placements for the optional practicum are arranged in a wide variety of settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 305AY – DNP Immersion A (2 units)**

*Course Description:* Three-course immersion series designed to augment the DNP student's online education in face to face sessions conducted at the Betty Irene Moore School of Nursing in Sacramento. Constructed to provide insight into the health system and the challenges faced by underserved populations thereby contributing to the student's ability to become a leader in clinical practice.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 305BY – DNP Immersion B (2 units)**

*Course Description:* Three-course immersion series designed to augment the DNP student's online education in face to face sessions conducted at the Betty Irene Moore School of Nursing in Sacramento. Constructed to provide insight into the health system and the challenges faced by underserved populations thereby contributing to the student's ability to become a leader in clinical practice.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 305CY – DNP Immersion C (2 units)**

*Course Description:* Three-course immersion series designed to augment the DNP student's online education in face to face sessions conducted at the Betty Irene Moore School of Nursing in Sacramento. Constructed to provide insight into the health system and the challenges faced by underserved populations thereby contributing to the student's ability to become a leader in clinical practice.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 306 – Nature of Caregiving (4 units)**

*Course Description:* Explores theoretical and conceptual frameworks to enable clinicians to understand the nature of family caregiving. Students examine and apply frameworks in order to conduct comprehensive person and family based assessments and interventions incorporating various dimensions of family caregiving.

*Prerequisite(s):* Consent of instructor. *Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.:

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**NRS 307 – Family Centered Communication & Shared Decision Making (4 units)**

*Course Description:* Incorporates shared decision-making principles and group communication to address family centered care planning and challenging clinical discussions. Targets competencies needed by health professionals to partner effectively to enhance the caregiving experience and reduce negative sequelae over the caregiving trajectory.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 308 – Patient & Family Centered Care Plan Development (4 units)**

*Course Description:* Synthesizes assessment data and analyzes impact of technology, individual, family, sociocultural, health care system, and illness-related variables in specific family care-giving situations. Co-create comprehensive evidence based plan to facilitate the health and well-being of the family unit through shared decision-making.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 309V – Political Determinants of Health & Health Equity (4 units)**

*Course Description:* Introduction to historical and current laws and policies contributing to inequities in population health. Emphasis on theoretical models, strategies, and practices used to advance health equity.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor. Priority given to students enrolled in the Advancing Health Equity Series (AHES) Graduate Academic Unit Certificate (GAUC).

*Grade Mode:* Letter.

**NRS 310V – Race & Health in the United States (4 units)**

*Course Description:* Race as a social construct and unequal health care distribution in the United States. Practical health care leadership to end racial inequalities in health.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor. Priority given to students in the Advancing Health Equity Series (AHES) Graduate Academic Unit Certificate (GAUC).

*Grade Mode:* Letter.

**NRS 311V – Trauma Informed Practice (4 units)**

*Course Description:* Introduction to manifestations of trauma and their impact on health and educational outcomes. Emphasis on trauma assessment and trauma-informed approaches in clinical practice, teaching and research.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor. Priority given to students in the Advancing Health Equity Series (AHES) Graduate Academic Unit Certificate (GAUC).

*Grade Mode:* Letter.

**NRS 351V – Health Policy for Health-Care Professionals (3 units)**

*Course Description:* Addresses current major health policy issues and the institutions, processes and forces that shape them. Discusses health care policy in terms of legislative and executive processes at the state and federal levels; key forces involved in policy-making, including economic, social, ethical and political factors; and the central players involved in policy-making, including elected officials, interest groups, the press and legislative staff.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 352V – Organizational & System Change Through Leadership, Research, & Practice (3 units)**

*Course Description:* Deepens the critical understanding and analysis of leadership theory as related to healthcare systems. Apply leadership principles and theory within the context of building successful organizations and engaging in health policy, practice, research and education arenas. Address change processes in healthcare from political, historic, economic and sociological frameworks, learning from both historic and current examples of transformative change.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 353V – Improving Patient & Population Health (3 units)**

*Course Description:* Highlights the health outcomes of groups with a focus on reducing health inequities among populations by exploring factors such as the environment, social structures, and resource distribution. Introduces the principles of public health as well as epidemiology and evidence-based public health.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 354V – Ensuring Quality and Safety in Healthcare (4 units)**

*Course Description:* Provides the knowledge and skills necessary for students to understand the fundamentals of conducting research and quality improvement. Explore the relationship and be able to differentiate between quality improvement and research and the appropriate application of both processes. Specific attention paid to different types of data, research levels of evidence, quality improvement techniques, and basics of measurement.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 355V – Health Promotion & Disease Prevention Across the Lifespan (2 units)**

*Course Description:* Health promotion and disease prevention examined using population-based and multidisciplinary approaches. Focuses on developing increased knowledge, skills and appreciation for the promotion of health and prevention of disease among culturally diverse communities. Epidemiological, psychosocial and environmental principles discussed as a basis for focusing upon factors related to the reduction of health disparities among vulnerable populations.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 356V – Clinical Ethics (2 units)**

*Course Description:* Emphasis on exploration of ethical knowledge development with a focus on clarification, analysis and justification relevant to advanced nursing practice; examination and development of learners' moral understanding; and distinguishing between moral and other professional responsibilities. Includes pertinent topics on how ethical and legal standards intersect and how this impacts health professionals and health care systems.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 357V – Business Essentials for Health Care (3 units)**

*Course Description:* Interprofessional online course on business essentials in healthcare establishes a foundational understanding of healthcare business basics including finance, human resources, management and physical resources. Develop leadership-level thinking to provide quality cost-effective care and to participate in the implementation of care.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 358AV – Applied Nursing Biostatistics (1 unit)**

*Course Description:* Principles of statistical reasoning and quantitative skills for analyzing health data. Descriptive and inferential statistics. Multivariate parametric and non-parametric statistical methods to answer nursing-related questions. Interpretation of statistical results in advanced practice nursing clinical decision making rather than computation.

*Learning Activities:* Web Virtual Lecture 0.5 hour(s), Web Electronic Discussion 0.5 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 358BV – Applied Biostatistics in Healthcare (2 units)**

*Course Description:* Epidemiologic methods and techniques. Epidemiological study designs in clinical nursing scenarios. Causality and risk in clinical nursing situations. Screening and diagnostic tests used in advanced practice. Common mistakes and pitfalls in the interpretation of the scientific literature impacting patient outcomes.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 400 – Basic Clinical Skills (1-4 units)

*Course Description:* Instruction and practice of the fundamental clinical skills necessary for patient care comprise this course with a primary focus on principles of effective communication in establishing the therapeutic provider-patient relationship.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 401 – Basic Clinical Skills (1-4 units)

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 402V – Introduction to the Scholarly Project (1 unit)

*Course Description:* Introduces DNP students to the Scholarly Project to assist them in developing an outline for their project in preparation for the course series NRS 411A-C. Potential clinical rotation sites discussed, and the requirements of a scholarly project delineated.

*Learning Activities:* Web Virtual Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 409Y – FNP Skills Assessment (3 units)

This version has ended; see updated course, below.

*Course Description:* Clinically focused course conducted at the Betty Irene Moore School of Nursing in Sacramento. Serves as a comprehensive clinical application of advanced health assessment skills, advanced clinical procedures, and critical-decision scenarios through on-site simulation and interactive-case based learning. Safe learning environment allows for student remediation and faculty one-on-one mentorship to prepare for clinical rotations in the following quarter.

*Prerequisite(s):* NRS 275V C or better; NRS 277V C or better; NRS 278V C or better.

*Learning Activities:* Clinical Activity 9 hour(s).

*Enrollment Restriction(s):* Current enrollment in the Nursing Science & Health-Care Leadership graduate program or consent of instructor.

*Grade Mode:* Letter.

## NRS 409Y – Advanced Health Assessment & Clinical Skills (3 units)

*Course Description:* Comprehensive clinical application of advanced health assessment skills, advanced clinical procedures, and critical-decision scenarios through on-site simulation and interactive-case based learning. Student remediation and faculty one-on-one mentorship to prepare for clinical rotations the following quarter.

*Prerequisite(s):* NRS 275V C or better; NRS 277V C or better; NRS 278V C or better; consent of instructor.

*Learning Activities:* Clinical Activity 6 hour(s), Web Virtual Lecture 1 hour(s).

*Enrollment Restrictions:* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

## NRS 410A – Advanced Clinical Skills (1-4 units)

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 410B – Advanced Clinical Skills (1-4 units)

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 410C – Advanced Clinical Skills (1-4 units)

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 410D – Advanced Clinical Skills (1-4 units)

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 410E – Advanced Clinical Skills (1-4 units)

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## NRS 410F – Advanced Clinical Skills (1-4 units)

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified specialty systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 410G – Advanced Clinical Skills (1-4 units)**

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified specialty systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 411AV – Scholarly Project A (2 units)**

*Course Description:* Three-course series must be taken in sequence.

Seminar provides the opportunity to discuss and conceptualize the conduct of the scholarly project with student colleagues and the seminar course professor. Independent scholarly project involves a systematic, evidence-based approach to enhance identified, health-related outcomes to be completed over the course of three quarters.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 411BV – Scholarly Project B (2 units)**

*Course Description:* Three-course series must be taken in sequence.

Seminar provides the opportunity to discuss and conceptualize the conduct of the scholarly project with student colleagues and the seminar course professor. Independent scholarly project involves a systematic, evidence-based approach to enhance identified, health-related outcomes to be completed over the course of three quarters.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 411CV – Scholarly Project C (2 units)**

*Course Description:* Three-course series must be taken in sequence.

Seminar provides the opportunity to discuss and conceptualize the conduct of the scholarly project with student colleagues and the seminar course professor. Independent scholarly project involves a systematic, evidence-based approach to enhance identified, health-related outcomes to be completed over the course of three quarters.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 412AY – Applied Project Practicum A (7 units)**

*Course Description:* Doctor of Nursing Practice supervised clinical practice course focuses on enhancing clinical leadership skills within the role of an Advanced Practice Nurse and integrates advanced practice with the scholarly project. Collaborate with a course professor and clinical preceptor to meet individualized learning objectives.

*Learning Activities:* Clinical Activity 21 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 412BY – Applied Project Practicum B (7 units)**

*Course Description:* Doctor of Nursing Practice supervised clinical practice course focuses on enhancing clinical leadership skills within the role of an Advanced Practice Nurse and integrates advanced practice with the scholarly project. Collaborate with a course professor and clinical preceptor to meet individualized learning objectives.

*Learning Activities:* Clinical Activity 21 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 420 – Foundations of Clinical Nursing Practice (5 units)**

*Course Description:* Foundational course introduction to core concepts of clinical nursing, including clinical reasoning, professional ethics, therapeutic communication and activities of daily living. Develop skills for the provision of safe, high quality, culturally-sensitive, person-centered care across the lifespan.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 4 hour(s), Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 421 – Health Assessment Across the Lifespan (3 units)**

*Course Description:* Preparation to conduct a health history assessment using developmentally and culturally appropriate approaches for individuals across the lifespan. Acquire the knowledge, understanding, and skills needed to perform, interpret and communicate a health history.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Clinical Activity 6 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 422 – Care of Adults with Chronic Conditions (6 units)**

*Course Description:* Learn concepts central to the effective management of a variety of common chronic illness and disabling conditions across the lifespan in a variety of different settings. Practice conducting in-depth health assessments of individuals with chronic conditions.

*Prerequisite(s):* NRS 221; NRS 272; NRS 420; NRS 421; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Clinical Activity 9 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 423 – Psychosocial Wellness & Illness (5 units)**

*Course Description:* Explore the biological, psychological, cultural, societal, and environmental factors that affect psychological wellness and illness. Practice providing care to individuals and families experiencing disruptions in mental health secondary to physical or psychiatric illness, trauma or loss.

*Prerequisite(s):* NRS 221; NRS 272; NRS 420; NRS 421; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Clinical Activity 6 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 424 – Nursing Care of Older Adults (3 units)**

*Course Description:* Build skills for situations involving older adults, such as in the management of complex clinical and administering and interpreting standardized assessment tools. Develop plans of care for older adults experiencing a variety of geriatric syndromes.

*Prerequisite(s):* NRS 221; NRS 223; NRS 272; NRS 273; NRS 420; NRS 421; NRS 422; NRS 423; NRS 425; NRS 426; consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 425 – Family Focused Nursing (9 units)**

*Course Description:* Focuses on family as the unit of nursing and interprofessional care. Includes influences of family on health and illness, reproductive and gender/sexuality issues, pregnancy, birth and child-rearing, and the health and illness in children and youth.

*Prerequisite(s):* NRS 221; NRS 272; NRS 273; NRS 420; NRS 421; NRS 422; NRS 423; consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s), Clinical Activity 12 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 426 – Nursing Care of Adults with Complex Illness or Injury (8 units)**

*Course Description:* Prepares students to provide comprehensive, patient-centered nursing care for patients with acute or complex illness and injury. Theory portion focuses on concepts associated with complex physiological alterations.

*Prerequisite(s):* NRS 221; NRS 272; NRS 273; NRS 420; NRS 421; NRS 422; NRS 423; NRS 425; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Clinical Activity 12 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 427 – Fostering Healthy Communities (7 units)**

*Course Description:* Focuses on populations & communities, and emphasizes working with diverse communities in providing health promotion, chronic disease management, transitional support and crisis intervention. Develop skills to critically analyze and shape health policy and develop accessible community resources.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Clinical Activity 9 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 428 – Capstone Clinical Nursing Practicum (9 units)**

This version has ended; see updated course, below.

*Course Description:* Practicum experience to facilitate transition to professional practice. Assignment of clinical practice area of interest and to work with a preceptor with expertise in that area.

*Prerequisite(s):* NRS 424 C or better; NRS 427 C or better; NRS 429E C or better.

*Learning Activities:* Clinical Activity 24 hour(s), Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to grad students in Nursing Sci Health-Care (DNP, PHD) Nursing (MSN); Nursing Sci-FNP (MS); Phys Asst Stdy (MHS), or consent of instructor.

*Grade Mode:* Letter.

**NRS 428 – Capstone Clinical Nursing Practicum (9 units)**

*Course Description:* Practicum experience to facilitate transition to professional practice. Assignment of clinical practice area of interest and to work with a preceptor with expertise in that area.

*Prerequisite(s):* NRS 424 C or better; NRS 427 C or better; NRS 429E C or better.

*Learning Activities:* Clinical Activity 24 hour(s), Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to grad students in Nursing Sci Health-Care (DNP, PHD) Nursing (MSN); Nursing Sci-FNP (MS); Phys Asst Stdy (MHS), or consent of instructor.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**NRS 429A – Collaborative Practice A (1 unit)**

*Course Description:* Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 429B – Collaborative Practice B (1 unit)**

*Course Description:* Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 429C – Collaborative Practice C (1 unit)**

*Course Description:* Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 429D – Collaborative Practice D (1 unit)**

*Course Description:* Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 429E – Collaborative Practice E (1 unit)**

*Course Description:* Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 429F – Collaborative Practice F (1 unit)**

This version has ended; see updated course, below.

*Course Description:* Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor.

*Grade Mode:* Letter.

**NRS 429F – Collaborative Practice F (1 units)**

*Course Description:* Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**NRS 440 – Preparation for Clinical Practice (1-3 units)**

*Course Description:* Students are placed in clinical settings and/or clinical simulation laboratories to observe and practice the integration of clinical skills with direct supervision by faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**NRS 450A – Supervised Clinical Practice-Primary Health Care (1-16 units)**

*Course Description:* Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 450B – Supervised Clinical Practice-Primary Health Care (1-16 units)**

*Course Description:* Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 450C – Supervised Clinical Practice-Primary Health Care (1-16 units)**

*Course Description:* Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 450D – Supervised Clinical Practice-Primary Health Care (1-16 units)**

*Course Description:* Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 450E – Supervised Clinical Practice-Primary Health Care (1-16 units)**

*Course Description:* Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 451 – Supervised Clinical Practice-Pediatrics (1-16 units)**

*Course Description:* Four-week clinical rotation under the supervision of an appropriate community-based Pediatric Medicine provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 452 – Supervised Clinical Practice-Women's Health (1-16 units)**

*Course Description:* Four-week clinical rotation under the supervision of an appropriate community-based women's health and prenatal care provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 453 – Supervised Clinical Practice-Mental Health (1-16 units)**

*Course Description:* Four-week clinical rotation under the supervision of an appropriate community-based psychiatrist, psychiatric/mental health provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 454 – Supervised Clinical Practice-Emergency Medicine (1-16 units)**

*Course Description:* Four-week clinical rotation under the supervision of an appropriate Emergency Medicine provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 455 – Supervised Clinical Practice-Inpatient Surgery (1-16 units)**

*Course Description:* Four-week clinical experience under the supervision of an appropriate surgical provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 456 – Supervised Clinical Practice-Inpatient Medicine (1-16 units)**

*Course Description:* Four-week clinical rotation under the supervision of an appropriate inpatient provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 459 – Supervised Clinical Practice-Other Specialties (1-16 units)**

*Course Description:* Two four-week selective rotations are available to accommodate student interest and/or accommodate a student's clinical deficits identified by the program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 470 – Health Care Ethics (3-9 units)**

*Course Description:* Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Participation in ethics rounds.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Cross Listing:* GMD 470.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NRS 471 – Supervised Clinical Practice-Geriatrics (1-16 units)**

*Course Description:* Four-week clinical rotation under the supervision of an appropriate community-based Geriatric Medicine provider per accreditation requirements.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 475 – Supervised Clinical Practice-Acute Care (1-16 units)**

*Course Description:* Two- to four-week rotation focus on providing acute care in inpatient settings. Students will work directly with specific inpatient units.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 480 – Supervised Clinical Practice-Rural Health (1-16 units)**

*Course Description:* Rural health rotations focus on providing care in medically underserved rural sites. Students will experience care across the continuum in ambulatory, inpatient, and community based settings.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 490 – Supervised Clinical Practice: Quality & Safety (1-16 units)**

*Course Description:* Clinical rotation that allow students to work directly with patient safety and quality improvement committees in various organizations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 48 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## **NRS 493A – Improving Quality in Health Care (4 units)**

*Course Description:* Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 493B – Improving Quality in Health Care (4 units)**

*Course Description:* Working in interdisciplinary teams, will explore advanced theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience.

*Prerequisite(s):* NRS 493A; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 493C – Enhancing Patient Safety in Health Care (4 units)**

*Course Description:* Inter-professional module is designed to explore the theory and practical methods being employed to improve patient safety in health care while providing an opportunity for inter-professional educational experience.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **NRS 494AV – Enhancing Patient Safety Systems (4 units)**

*Course Description:* Patient safety systems in healthcare. Problem identification, root cause analysis, human factor examination, and systems level intervention development to reduce harm.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Priority given to current DNP-FNP, PhD, MEPN or PA programs within the Nursing Science & Health-Care Leadership Graduate Group at Betty Irene Moore School of Nursing who are enrolled in the EPSQIH-GAUC; students enrolled in other graduate degree programs or other UC Davis health-related programs and are interested in quality and safety may be accepted on a space available basis and only by consent of the EPSQIH-GAUC chair; students enrolled in the EPSQIH-GAUC must take all courses in the NRS 494AV-NRS 494CY series in sequence; students not enrolled in the EPSQIH-GAUC may take courses (based on availability) NRS 494AV & NRS 494BV individually and do not need to be taken in sequence.

*Grade Mode:* Letter.

## **NRS 494BV – Improving Healthcare Quality Through Teamwork (4 units)**

*Course Description:* Healthcare quality improvement, theory and practical application methods. Healthcare systems improvement and patient care outcomes.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Priority given to current DNP-FNP, PhD, MEPN or PA programs within the Nursing Science & Health-Care Leadership Graduate Group at Betty Irene Moore School of Nursing who are enrolled in the EPSQIH-GAUC; students enrolled in other graduate degree programs or other UC Davis health-related programs and are interested in quality and safety may be accepted on a space available basis and only by consent of the EPSQIH-GAUC chair; students enrolled in the EPSQIH-GAUC must take all courses in the NRS 494AV-NRS 494CY series in sequence; students not enrolled in the EPSQIH-GAUC may take courses (based on availability) NRS 494AV & NRS 494BV individually and do not need to be taken in sequence.

*Grade Mode:* Letter.

## **NRS 494CY – Quality & Safety Practicum (4 units)**

*Course Description:* Application of quality improvement knowledge and skills in real healthcare settings. One quarter-long practicum experience required.

*Learning Activities:* Practice 3 hour(s), Web Virtual Lecture 3 hour(s).

*Credit Limitation(s):* Priority given to current DNP-FNP, PhD, MEPN or PA programs within the Nursing Science & Health-Care Leadership Graduate Group at Betty Irene Moore School of Nursing who are enrolled in the EPSQIH-GAUC; students enrolled in other graduate degree programs or other UC Davis health-related programs and are interested in quality and safety may be accepted on a space available basis and only by consent of the EPSQIH-GAUC chair; students enrolled in the EPSQIH-GAUC must take all courses in the NRS 494AV-NRS 494CY series in sequence; students not enrolled in the EPSQIH-GAUC may take courses (based on availability) NRS 494AV & NRS 494BV individually and do not need to be taken in sequence.

*Grade Mode:* Letter.

# **Nutrition (NUT)**

## **NUT 010 – Discoveries & Concepts in Nutrition (3 units)**

*Course Description:* Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods.

*Learning Activities:* Lecture 3 hour(s), Project.

*Credit Limitation(s):* No credit will be granted to students who have completed NUT 010Y or NUT 010V or an upper division Nutrition (NUT) course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **NUT 010V – Discoveries & Concepts in Nutrition (3 units)**

*Course Description:* Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Project.

*Credit Limitation(s):* No credit will be granted to students who have completed NUT 010 or NUT 010Y or an upper division Nutrition (NUT) course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **NUT 010Y – Discoveries & Concepts in Nutrition (3 units)**

*Course Description:* Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Project.

*Credit Limitation(s):* No credit granted to students who have completed NUT 010 or NUT 010V or an upper division Nutrition (NUT) course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **NUT 011 – Current Topics & Controversies in Nutrition (2 units)**

*Course Description:* Exploration of current applications and controversies in nutrition. Read scientific journal articles and write summaries, as well as give brief oral presentations. Topics change to reflect current interests and issues.

*Learning Activities:* Discussion 1.50 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

## **NUT 099 – Individual Study for Undergraduates (1-5 units)**

*Course Description:* Individual study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **NUT 104 – Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants (4 units)**

*Course Description:* Cellular regulation from nutritional/toxicological perspective. Emphasis: role of biofactors on modulation of signal transduction pathways, role of specific organelles in organization/regulation of metabolic transformations, major cofactor functions, principles of pharmacology/toxicology important to understanding nutrient/toxicant metabolism.

*Prerequisite(s):* BIS 101; (BIS 103 or ABI 103).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ETX 104.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL).

## **NUT 105 – Nutrition through the Life Cycle (3 units)**

*Course Description:* Unique nutrient needs of people in different stages of the life cycle, including pregnant and lactating women, infants, children, adolescents, adults and the elderly. Physiological changes and conditions that influence nutrient needs, factors that influence food choices and appropriate dietary recommendations, and recent research are discussed.

*Prerequisite(s):* (BIS 103 or ABI 103); NUT 111AY; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NUT 106 – Food Chemistry for Clinical Nutrition (5 units)**

*Course Description:* Chemical and physical principles that influence functional properties, nutrient content, safety, and sensory aspects of food. Emphasis on the application of these concepts in clinical nutrition.

*Prerequisite(s):* CHE 008B C- or better or CHE 118B C- or better or CHE 128B C- or better; concurrent with FST 100A recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Only open to Clinical Nutrition majors.

*Credit Limitation(s):* Not open to students who have completed FST 101A and/or FST 101B.

*Cross Listing:* FST 106.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **NUT 111AY – Introduction to Nutrition & Metabolism (3 units)**

*Course Description:* Introduction to metabolism of protein, fat and carbohydrate; the biological role of vitamins and minerals; nutrient requirements during the life cycle; assessment of dietary intake and nutritional status.

*Prerequisite(s):* CHE 008B; NPB 101; or the equivalent of NPB 101.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to upper division or graduate level students only.

*Credit Limitation(s):* Not open for credit to students who have completed NUT 101 or NUT 111AV.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NUT 111B – Recommendations & Standards for Human Nutrition (2 units)**

*Course Description:* Critical analysis of the development of nutritional recommendations for humans. Topics include: history of modern recommendations, development of the Recommended Dietary Allowance (RDA) and other food guides; the Dietary Reference Intakes (DRI); administrative structure of regulatory agencies pertinent to nutrition recommendations; introduction to scientific methods used to determine the recommendations; food labeling laws; nutrition recommendations in other countries and cultures.

*Prerequisite(s):* (CHE 008B or CHE 118B or CHE 128B); NUT 111AY; NPB 101 recommended.

*Learning Activities:* Lecture 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed NUT 111.

*Grade Mode:* Letter.

## **NUT 112 – Nutritional Assessment (4 units)**

*Course Description:* Methods of human nutritional assessment, including dietary, anthropometric, biochemical methods. Principles of precision, accuracy, and interpretation of results for individuals and populations.

*Prerequisite(s):* ((ABI 102, ABI 103) or (BIS 102, BIS 103)); NUT 111AY; (STA 013 or STA 013Y or PLS 120).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division or graduate level Nutrition students only.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **NUT 113 – Principles of Epidemiology in Nutrition (4 units)**

*Course Description:* Introduction to epidemiology as it relates to the field of nutrition, including study design, principles of epidemiologic inference, criteria for causality, and interpreting measures of disease risk.

*Prerequisite(s):* STA 013 or STA 013Y or PLS 120 or STA 100.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **NUT 114 – Developmental Nutrition (4 units)**

*Course Description:* Role of nutritional factors in embryonic and postnatal development.

*Prerequisite(s):* (ABI 102 or BIS 102); (ABI 103 or BIS 103); NUT 111AY; NUT 111B.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NUT 115 – Animal Nutrition (4 units)**

*Course Description:* Comparative differences among animals in digestion and metabolism of nutrients. Nutrient composition of feeds, digestive systems, digestion, absorption, feeding strategies.

*Prerequisite(s):* CHE 008B or CHE 118B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL);

Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL);

Writing Experience (WE).

**NUT 116A – Clinical Nutrition (3 units)**

**Course Description:** Biochemical and physiological bases for therapeutic diets. Problems in planning diets for normal and pathological conditions.

**Prerequisite(s):** (NUT 111AV or NUT 111AY); NUT 111B; NUT 112; NPB 101; or the equivalent to NPB 101.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**NUT 116AL – Clinical Nutrition Practicum (3 units)**

**Course Description:** Fundamental principles of planning and evaluating therapeutic diets and patient education for pathological conditions covered in 116A.

**Prerequisite(s):** NUT 116A (can be concurrent).

**Learning Activities:** Lecture 1 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**NUT 116B – Clinical Nutrition (3 units)**

**Course Description:** Biochemical and physiological bases for therapeutic diets. Problems in planning diets for normal and pathological conditions.

**Prerequisite(s):** (NUT 111AV or NUT 111AY); NUT 111B; NUT 112; NPB 101; or the equivalent to NPB 101.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**NUT 116BL – Clinical Nutrition Practicum (3 units)**

**Course Description:** Fundamental principles of planning and evaluating therapeutic diets and patient education for pathological conditions covered in NUT 116B. Continuation of NUT 116AL.

**Prerequisite(s):** NUT 116AL; NUT 116B (can be concurrent).

**Learning Activities:** Lecture 1 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**NUT 117 – Experimental Nutrition (6 units)**

**Course Description:** Methods of assessing nutritional status. Application of chemical, microbiological, chromatographic and enzymatic techniques to current problems in nutrition.

**Prerequisite(s):** (NUT 111AV or NUT 111AY); NUT 111B; NUT 112; BIS 102; BIS 103; MCB 120L or other laboratory course in biochemistry is recommended.

**Learning Activities:** Lecture 3 hour(s), Laboratory 6 hour(s), Extensive Writing.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

**NUT 118 – Community Nutrition (4 units)**

**Course Description:** Nutrition problems in contemporary communities and of selected target groups in the United States and in developing countries. Nutrition programs and policy, principles of nutrition education.

**Prerequisite(s):** NUT 116A; (NUT 111AV or NUT 111AY); NUT 111B.

**Learning Activities:** Lecture 4 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

**NUT 119A – Global Nutrition (3 units)**

**Course Description:** Global prevalence, etiology, and consequences of nutrition problems, ranging from under nutrition and food insecurity to overweight and associated chronic diseases; underlying social, environmental, and behavioral factors that contribute to malnutrition; strategies to improve nutritional status, with emphasis on low- and middle-income countries.

**Prerequisite(s):** NUT 111AY; NUT 111B; or consent of instructor.

**Learning Activities:** Lecture/Discussion 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

**NUT 119B – International, Community-Based Nutritional Assessment (6 units)**

**Course Description:** A six-week summer course in Peru. Implementation of a community-based nutritional assessment survey, including development of the survey instrument, selection. Taught abroad.

**Prerequisite(s):** NUT 119A; and consent of instructor.

**Learning Activities:** Lecture 2 hour(s), Fieldwork 12 hour(s).

**Enrollment Restriction(s):** Restricted to upper division students in Clinical Nutrition, Community Nutrition, Dietetics, and Nutrition Science.

**Grade Mode:** Letter.

**NUT 120AN – Nutritional Anthropology (4 units)**

**Course Description:** Nutritional anthropology from historical and contemporary perspectives; the anthropological approach to food and diet; field work methods; case histories that explore food patterns and their nutritional implications.

**Prerequisite(s):** (NUT 010 or NUT 010Y or NUT 010V); (ANT 002 or SOC 001 or SOC 003); upper-division standing.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE) or Social Sciences (SS).

**NUT 120BN – Nutritional Geography (4 units)**

**Course Description:** Nutritional geography from historical and contemporary perspectives; the geographical approach to food and diet; cultural and environmental factors that influence dietary practices; food-related landscapes and patterns.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE) or Social Sciences (SS).

**NUT 124 – Nutrition & Feeding of Finfishes (3 units)**

**Course Description:** Principles of nutrition and feeding of fishes under commercial situations; implication of fish nutrition to the environment and conservation of endangered species.

**Prerequisite(s):** BIS 103 or ABI 103.

**Learning Activities:** Lecture 3 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **NUT 127 – Environmental Stress & Development in Marine Organisms (10 units)**

*Course Description:* Taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods.

*Prerequisite(s):* ETX 101 or BIS 102 or BIS 104; or equivalent course; ETX 114A or NUT 114 recommended.

*Learning Activities:* Lecture 4 hour(s), Laboratory 12 hour(s), Discussion 2 hour(s).

*Cross Listing:* ETX 127.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **NUT 129 – Journalistic Practicum in Nutrition (3 units)**

*Course Description:* Critical analysis and discussion of current, controversial issues in nutrition; use of journalistic techniques to interpret scientific findings for the lay public. Students required to write several articles for campus media.

*Prerequisite(s):* (NUT 111AV or NUT 111AY); NUT 111B; or consent of instructor; a course in written or oral expression.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL); Writing Experience (WE).

## **NUT 130 – Experiments in Nutrition: Design & Execution (2 units)**

*Course Description:* Experiments in current nutritional problems.

Experimental design: students choose project and, independently or in groups of two-three, design a protocol, complete the project, and report findings.

*Prerequisite(s):* Consent of instructor; NUT 111AV, NUT 111AY, NUT 111B or NUT 114 recommended.

*Learning Activities:* Laboratory 6 hour(s).

*Repeat Credit:* May be repeated 6 time(s) with consent of instructor (limit of three times per instructor).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **NUT 141 – Comparative Animal Nutrition & Metabolism (4 units)**

*Course Description:* Foundational principles of nutrition, nutrient composition of feed ingredients, digestive systems of domestic and exotic animals, nutrient digestibility and absorption, nutrient metabolism.

*Prerequisite(s):* ABI 103; (NUT 115 or NUT 116A or NUT 116B); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **NUT 142 – Companion Animal Nutrition (4 units)**

*Course Description:* Applied companion animal nutrition, focused primarily on dogs and cats. Nutritional considerations specifically related to health and longevity of companion animals. Evaluation of commercial and prescription-type diets with an emphasis on functional ingredients. Impact of physiological status and disease on nutrient requirements of the animal and nutrient utilization in the body.

*Prerequisite(s):* ABI 102; NUT 115; recommend ANS 042.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **NUT 190 – Proseminar in Nutrition (1 unit)**

*Course Description:* Discussion of human nutrition problems. Each term will involve a different emphasis among experimental, clinical, and dietetic problems of community, national and international scope.

*Prerequisite(s):* (NUT 111AV or NUT 111AY); NUT 111B.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to senior standing.

*Repeat Credit:* May be repeated 2 time(s) with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Visual Literacy (VL).

## **NUT 190C – Nutrition Research Conference (1 unit)**

*Course Description:* Introduction to research findings and methods in nutrition. Presentation and discussion of research by faculty and students.

*Prerequisite(s):* Consent of instructor; upper division standing in Nutrition or related biological science.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **NUT 192 – Internship (1-12 units)**

*Course Description:* Work experience on or off campus in practical application of nutrition, supervised by a faculty member.

*Prerequisite(s):* Consent of instructor; one upper division course in nutrition.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **NUT 197T – Tutoring in Nutrition (1-2 units)**

*Course Description:* Tutoring of students in nutrition courses, assistance with discussion groups or laboratory sections, weekly conference with instructor in charge of course: written evaluations.

*Prerequisite(s):* Consent of instructor; Nutrition Science, Clinical Nutrition or related major.

*Learning Activities:* Discussion/Laboratory 3-6 hour(s).

*Repeat Credit:* May be repeated when tutoring a different course.

*Grade Mode:* Pass/No Pass only.

## **NUT 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **NUT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **NUT 219A – International Nutrition (3 units)**

*Course Description:* Epidemiology, etiology, and consequences of undernutrition, with particular focus on the nutritional problems of children and women in low income populations.

*Prerequisite(s):* NUT 111AV; NUT 111AY; graduate standing; undergraduates only admitted with consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **NUT 219B – International Nutrition (3 units)**

*Course Description:* Intervention programs to prevent or ameliorate nutritional problems in low-income populations. Planning, implementing, and evaluating nutrition intervention programs.

*Prerequisite(s):* NUT 219A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **NUT 230 – Experiments in Nutrition: Design & Execution (2 units)**

*Course Description:* Student-selected projects to enhance laboratory skills. Independently, or in groups of two-three students, design a protocol, carry out the project, analyze the results and report the findings.

*Prerequisite(s):* Consent of instructor; NUT 201, NUT 202, NUT 203, NUT 204, or the equivalent recommended.

*Learning Activities:* Laboratory 6 hour(s).

*Repeat Credit:* May be repeated 6 time(s) with consent of instructor (limit of three times per instructor).

*Grade Mode:* Letter.

## **NUT 250 – Metabolic Homeostasis (3 units)**

*Course Description:* Regulatory mechanisms of carbohydrate, lipid, and protein homeostasis; mechanisms of metabolic enzyme regulation and of the metabolic hormones; homeostatic mechanisms and interactions; fuel-fuel interactions; nutrition-energy balance.

*Prerequisite(s):* Passing the Nutrition Graduate Group Preliminary Examination or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1.50 hour(s).

*Enrollment Restriction(s):* Preference given to students in advanced standing in the Nutrition Graduate Group.

*Grade Mode:* Letter.

## **NUT 251 – Nutrition & Immunity (2 units)**

*Course Description:* Cellular and molecular mechanisms underlying interactions of nutrition and immune function, including modulation of immunocompetence by diet and effects of immune responses on nutritional needs. Lectures and discussion explore implications for resistance to infection, autoimmunity and cancer.

*Prerequisite(s):* PMI 126; ABI 102; MMI 107; or the equivalent to MMI 107.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **NUT 252 – Nutrition & Development (3 units)**

*Course Description:* Relationship of nutrition to prenatal and early postnatal development.

*Prerequisite(s):* NUB 210A, NUB 210B, and NUB 210C recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **NUT 253 – Control of Energy Balance & Body Weight (3 units)**

*Course Description:* Comprehensive study of the biochemical, nutritional and physiological mechanisms controlling food intake, body composition and energy expenditure. Subject matter will be approached through lectures and discussions where students and staff will critically evaluate the literature.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **NUT 254 – Applications of Systems Analysis in Nutrition (3 units)**

*Course Description:* Quantitative aspects of digestion and metabolism; principles of systems analysis. Evolution of models of energy metabolism as applied in current feeding systems. Critical evaluations of mechanistic models used analytically in support of nutritional research.

*Prerequisite(s):* NUT 202; or the equivalent.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **NUT 258 – Field Research Methods in International Nutrition (3 units)**

*Course Description:* Issues and problems related to implementation of nutrition field research in less-developed countries, including ethics; relationships with local governments, communities, and scientists; data collection techniques and quality assurance; field logistics; research budgets; and other administrative and personal issues.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **NUT 259 – Nutrition & Aging (2 units)**

*Course Description:* Interaction between nutrition and aging. Topics include physiological/biochemical basis of aging, age-related changes affecting nutritional requirements, nutrition and mortality rate, assessment of nutritional status in the elderly, and relationship between developmental nutrition and the rate of aging.

*Prerequisite(s):* NUT 201; NUT 202; NUT 203; NUT 204; three of the four courses.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

## **NUT 270 – Scientific Ethics in Biomedical Studies: Emphasis on Nutrition (3 units)**

*Course Description:* Scientific ethics in biomedical studies, especially nutrition. Discussion and case study presentations on scientific integrity, fraud, misconduct, conflict of interest, human and animal research protections.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate standing or consent of instructor.

*Credit Limitation(s):* Not open for credit to students who have completed NUT 492B.

*Grade Mode:* Letter.

## **NUT 290 – Beginning Nutrition Seminar (2 units)**

*Course Description:* Discussion and critical evaluation of topics in nutrition with emphasis on literature review and evaluation in this field. Students give oral presentations on relevant topics.

*Prerequisite(s):* First-year graduate standing.

*Learning Activities:* Lecture/Discussion 1 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

## **NUT 290C – Research Conference (1 unit)**

*Course Description:* Major professors lead research discussions with their graduate students. Research papers are reviewed and project proposals presented and evaluated. Format will combine seminar and discussion style.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NUT 291 – Advanced Nutrition Seminar (1 unit)**

*Course Description:* Advanced topics in nutrition research. Multiple sections may be taken concurrently for credit.

*Prerequisite(s):* Second-year graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NUT 293A – Current Topics in Obesity, Food Intake & Energy Balance (3 units)**

*Course Description:* Current research and its evaluation. Principles of experimental design and scientific background for given article. Articles summarized for posting on Internet for use by healthcare professionals.

*Prerequisite(s):* NUT 129; or graduate standing; undergraduates with upper division standing with at least one writing course may enroll with consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Seminar 1 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **NUT 293B – Current Topics in Obesity, Food Intake, & Energy Balance with Special Topics (3 units)**

*Course Description:* Undergraduates with upper division standing with at least one writing course may enroll with consent of instructor. A continuation of NUT 293A, with additional special topics.

*Prerequisite(s):* NUT 129; Graduate standing.

*Learning Activities:* Lecture 1 hour(s), Seminar 1 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s) with consent of instructor.

*Grade Mode:* Letter.

## **NUT 294A – Current Topics in Developmental Nutrition (2 units)**

*Course Description:* Effects of nutrition on embryology, morphogenesis, and developmental mechanisms.

*Prerequisite(s):* NUT 114 or NUT 252; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing or consent of instructor.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **NUT 297T – Supervised Teaching in Nutrition (1-3 units)**

*Course Description:* Practical experience in teaching nutrition at the university level; curriculum design and evaluation; preparation and presentation of material. Assistance in laboratories, discussion sections, and evaluation of student work.

*Prerequisite(s):* Graduate standing in nutrition or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NUT 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **NUT 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NUT 492A – Professionalism: An Academic Perspective (2 units)**

*Course Description:* For graduate students in their initial quarter of residence. Professionalism topics are presented and examples drawn from both the biological and social sciences.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **NUT 492C – Grant Writing (3 units)**

*Course Description:* Preparation of grants for governmental agencies (particularly NIH and USDA) and private foundations. Students will write a research grant or fellowship application.

*Prerequisite(s):* Graduate standing in Nutrition or consent of instructor.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s).

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Letter.

## **Nutritional Biology (NUB)**

Graduate Studies

## **NUB 210A – Advanced Nutrition I: Nutrition & Metabolism, Macronutrients (5 units)**

*Course Description:* Advanced general nutritional concepts. Integrating nutrition with biological systems, population nutrition issues, and research approaches. Advanced concepts on lipid and protein metabolism.

*Prerequisite(s):* Admission to the Nutritional Biology Graduate Group or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

## **NUB 210B – Advanced Nutrition II: Nutrition & Cell Biology, Micronutrients (5 units)**

*Course Description:* Effects of nutrients at the cellular level. Principles of cell signaling and signaling modulation by nutrients. Advanced concepts of mineral and vitamin metabolism. Mineral and vitamin deficiencies and associated pathologies.

*Prerequisite(s):* Admission to the Nutritional Biology Graduate Group or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

## **NUB 210C – Advanced Nutrition III: Nutrition in Health & Disease (5 units)**

*Course Description:* Integration of biochemical, physiological, and genetic aspects of nutrition in the context of clinical and epidemiological observations related to health and disease, including obesity and diabetes, cancer, vascular and neurodegenerative diseases, osteoporosis, and birth defects. Review and consideration of governmental.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **NUB 290C – Research Group Conference (1 unit)**

*Course Description:* Weekly conference on research problems, progress and techniques in animal sciences.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **NUB 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Graduate standing in Nutritional Biology Graduate Group or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 3 time(s) when topics differs and consent of instructor.

*Grade Mode:* Letter.

## **NUB 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Obstetrics & Gynecology (OBG)**

## **OBG 192 – Shifa Clinic Student Volunteer (1 unit)**

*Course Description:* Supervised work experience in Obstetrics & Gynecology.

*Learning Activities:* Conference 2 hour(s), Clinical Activity 8 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to undergraduates only.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

## **OBG 194 – Shifa Clinic Student Volunteer (1 unit)**

*Course Description:* Attend clinic every third Sunday performing duties of receptionist, intake, translation, monitor. Students attend a meeting immediately after end of clinic. There is a mandatory Monday meeting with Clinic co-directors. Students are expected to participate on various committees.

*Prerequisite(s):* Consent of instructor; applications will be available for students; selection of students will be made by selection committee of medical students coordinators and the instructor of record.

*Learning Activities:* Conference 1 hour(s), Clinical Activity 6 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

## **OBG 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **OBG 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **OBG 220 – Genetics of Reproduction (3 units)**

*Course Description:* Introduction to genetics of mammalian reproduction for domestic species, species used in research, and the human. Mendelian and non-Mendelian modes of inheritance. Research paper.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **OBG 290 – Current Topics in Research (1 unit)**

*Course Description:* Selected topics in reproductive biology.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **OBG 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

## **OBG 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **OBG 430 – Obstetrics & Gynecology Clerkship (3-12 units)**

*Course Description:* Obstetrics, gynecologic and gynecological oncology experience in the delivery room, operating room, clinics and wards at UCDMC and affiliated sites. Rounds, conferences, interactive student presentations and seminars ongoing.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 430F – SJVP OBGYN Clerkship at UCSF (6-12 units)**

*Course Description:* Obstetrics, gynecologic and gynecological oncology experience in the delivery room, operating room, clinics and wards at UCSF Fresno. Rounds, conferences, interactive student presentations and seminars ongoing.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 430R – Rural PRIME OBGYN Longitudinal Clerkship (2 units)**

*Course Description:* Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 430RA – Rural PRIME OBGYN Longitudinal Clerkship (3 units)**

*Course Description:* Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 430RB – Rural PRIME OBGYN Longitudinal Clerkship (3 units)**

*Course Description:* Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 430RC – Rural PRIME OBGYN Longitudinal Clerkship (3 units)**

*Course Description:* Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 430RD – Rural PRIME OBGYN Longitudinal Clerkship (1 unit)**

*Course Description:* Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 439D – Directed Clinical Studies in OBGYN (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **OBG 439R – Directed Studies in OBGYN (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Independent Study 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **OBG 460 – Away Clinical Elective in OBGYN (3-18 units)**

*Course Description:* Active participation in inpatient and outpatient care. Attendance at specified conferences; student-faculty member informal conferences.

*Prerequisite(s):* OBG 430; or the equivalent, and consent of instructor; third- or fourth-year medical student.

*Learning Activities:* Clinical Activity 30 hour(s), Variable 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **OBG 465 – Away Acting Internship in OBGYN (3-18 units)**

*Course Description:* Work at the level of a sub intern in Inpatient and/ or Outpatient settings. Students are expected to provide direct patient management.

*Prerequisite(s):* OBG 430; and consent of instructor; other third-year core clerkships.

*Learning Activities:* Clinical Activity 40 hour(s), Variable 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 470 – Gynecologic Oncology Acting Internship (3-18 units)**

*Course Description:* Four week elective primarily involves direct inpatient management of women on the UCDMC Gyn/Onc service. Students will be acting at the level of a sub-intern and will work under the supervision of house staff, fellows, and attendings.

*Prerequisite(s):* OBG 430; consent of instructor; the third-year core clerkships.

*Learning Activities:* Clinical Activity 40 hour(s), Variable 10 hour(s).

*Repeat Credit:* May be repeated 99 unit(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 471 – Ambulatory Gynecology & Obstetrics Elective (3-18 units)**

*Course Description:* Conduct examinations, present patients and discuss treatment regimens at the following ambulatory clinics: General Obstetrics & Gynecology, New and Return Obstetrics (including Post-Partum), High-Risk Obstetrics, Pre-Operative Clinic, and other subspecialty clinics as assigned.

*Prerequisite(s):* OBG 430; and consent of instructor. Third- or fourth-year Medical Student.

*Learning Activities:* Clinical Activity 35 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **OBG 472 – Family Planning & Reproductive Health (1-9 units)**

*Course Description:* Elective focuses on the Gynecologic Subspecialty of Family Planning. Counseling and provision of contraceptive methods, experience with pelvic ultrasounds, management of spontaneous, inevitable and induced abortion and post-abortion care by both surgical and medical techniques are included.

*Prerequisite(s):* OBG 430; consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Seminar 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **OBG 475 – Labor & Delivery Acting Internship (3-18 units)**

*Course Description:* Four week elective primarily involves direct inpatient management of women on the UCDMC L&D unit. Students will be acting at the level of a sub-intern and will work under the supervision of house staff, fellows, and attendings.

*Prerequisite(s):* OBG 430; consent of instructor; the third-year core clerkships.

*Learning Activities:* Clinical Activity 40 hour(s), Variable 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **OBG 480 – The Birthing Process (1 unit)**

*Course Description:* Open only to UC Davis medical students. Training to assist in the birthing process as a Doula. Topics not covered in the summer course.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **OBG 493 – Gender Specific Medicine SSM (6 units)**

*Course Description:* Special Studies Module, a four-week course on the topic: Basic Science Principles Relating to Gender Specific Medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Cross Listing:* CAR 493.

*Grade Mode:* Honors/Pass/Fail.

## **OBG 494 – Shifa Clinic (1-12 units)**

*Course Description:* Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary care issues in a diverse mixed population.

*Prerequisite(s):* Medical student in good standing.

*Learning Activities:* Clinical Activity 8 hour(s).

*Enrollment Restriction(s):* Restricted to Medical student only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **OBG 494A – Shifa Clinic (1 unit)**

*Course Description:* Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary care issues in a diverse mixed population.

*Prerequisite(s):* Consent of instructor; medical student in good standing.

*Learning Activities:* Clinical Activity 8 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 494B – Shifa Clinic (1 unit)**

*Course Description:* Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary care issues in a diverse mixed population.

*Prerequisite(s):* Consent of instructor; medical student in good standing.

*Learning Activities:* Clinical Activity 8 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 494C – Shifa Clinic (1 unit)**

*Course Description:* Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women's health issues and primary care issues in a diverse mixed population.

*Prerequisite(s):* Consent of instructor; medical student in good standing.

*Learning Activities:* Clinical Activity 8 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OBG 498 – Group Study (1-5 units)**

*Course Description:* Explore particular topics in-depth in Obstetrics and Gynecology. Extensive contact with and oversight by instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **OBG 499 – Research in Obstetrics & Gynecology (2-12 units)**

*Course Description:* Research in Obstetrics and Gynecology arranged with instructor.

*Prerequisite(s):* Consent of instructor; fourth-year medical student.

*Learning Activities:* Clinical Activity, Variable.

*Repeat Credit:* May be repeated 8 time(s).

*Grade Mode:* Honors/Pass/Fail.

# **Ophthalmology (OPT)**

School of Medicine

**OPT 192 – Research Internship (1-12 units)**

*Course Description:* Supervised work experience in ophthalmology research. Research staff in Ophthalmology have programs in cell biology, electron microscopy, biochemistry, immunology and visual psychophysics.

*Prerequisite(s):* Upper division standing; approval of project prior to period of internship by preceptor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**OPT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**OPT 299 – Basic Research in Visual Science (1-12 units)**

*Course Description:* Basic research in visual science.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**OPT 442 – Introduction to Ophthalmology (3 units)**

*Course Description:* Ocular disease diagnosis and management relevant to the clinical practice of future primary care physicians and others.

*Prerequisite(s):* Third- or fourth-year Medical Student with consent of instructor; consent of advisor; completion of third-year clerkships in Medicine and Surgery; consult Course Coordinator.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**OPT 465 – Advanced Subspecialty Ophthalmology (3-6 units)**

*Course Description:* Participation in disciplines of neuro-ophthalmology/pediatric ophthalmology, diseases of the cornea and external eye, glaucoma and retina.

*Prerequisite(s):* IMD 430; consent of instructor; medical students in third or fourth year.

*Learning Activities:* Clinical Activity 40 hour(s), Variable 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**OPT 498 – Group Study (1-3 units)**

*Course Description:* Directed reading and discussion.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

**OPT 499 – Research in Ophthalmology (1-12 units)**

*Course Description:* Individual research on selected topics in optics and visual physiology, cornea and external disease.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**OSU 099 – Special Studies for Undergraduates (1-5 units)**

*Course Description:* Special studies for undergraduates.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**OSU 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**OSU 421 – The Musculoskeletal System (2.5 units)**

*Course Description:* Basic and clinical science of orthopaedic surgery and rheumatology.

*Prerequisite(s):* Consent of committee on student progress.

*Learning Activities:* Lecture/Discussion 4 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/No Pass only.

**OSU 428 – Ambulatory & Emergency Room Orthopaedics (3-6 units)**

*Course Description:* Introduction to general orthopaedic problems and trauma and their management in an outpatient environment, including the emergency room. Conduct orthopaedic examinations, present patients to staff rotating through trauma, hand, pediatrics, adult and foot clinics.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

**OSU 462 – Community Preceptorship (3-6 units)**

*Course Description:* Acquaints student with private practice of orthopaedics in the community setting. Opportunity to observe and assist private practitioners in office, emergency room, operating room and inpatient environment. Student must provide own transportation.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing; consent of instructor.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**OSU 464 – Acting Internship (6 units)**

*Course Description:* Rotation designed to increase basic knowledge of musculoskeletal abnormalities at clinical level. Attention focused on selective case material. For those students who demonstrate proficiency, responsibility will be similar to that of intern.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# Orthopaedic Surgery (OSU)

School of Medicine

## **OSU 465 – Externship in Advanced Orthopaedics (3-6 units)**

*Course Description:* Advanced Orthopaedic rotation done at an approved institution. Topics may include Trauma, Sports, Spine, Pediatrics, Joint and/or Foot/Ankle. Students are expected to perform at the level of an Intern.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **OSU 466 – Away Clerkship in Orthopaedics (3-9 units)**

*Course Description:* Orthopaedic advanced clerkship at an approved institution.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OSU 480 – Insights in Orthopaedic Surgery (1-3 units)**

*Course Description:* Exposure to aims, methods and procedures in orthopaedic surgery via attendance at grand rounds, patient care conferences, and group discussions.

*Prerequisite(s):* Consent of instructor; first- and second-year medical students in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OSU 481 – History of Medicine for Medical Students (1.5 units)**

*Course Description:* Overview of the history of medicine throughout the world to introduce medical students to landmark accomplishments and key figures in the development of health care and to provide an expanded philosophical perspective on the everchanging field of modern medicine.

*Prerequisite(s):* Third- or fourth-year students in the School of Medicine or second-year students with consent of instructor.

*Learning Activities:* Lecture/Discussion 2.50 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **OSU 499 – Orthopaedics Research (1-12 units)**

*Course Description:* Laboratory or clinical investigation on selected topics.

*Prerequisite(s):* Consent of instructor; third- or fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Otolaryngology (OTO)**

School of Medicine

## **OTO 192 – Internship in Otolaryngology (1-12 units)**

*Course Description:* Supervised work experience in otolaryngology and related fields. Final project report.

*Prerequisite(s):* Upper division standing; approval of project prior to period of internship by preceptor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **OTO 199 – Special Study in Otolaryngology for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study in Otolaryngology for advanced undergraduates.

*Prerequisite(s):* Advanced undergraduate with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **OTO 290C – Research Conference in Otolaryngology (1 unit)**

*Course Description:* Presentation and discussion of faculty and student research in otolaryngology.

*Prerequisite(s):* Graduate students; medical students; advanced undergraduates with consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **OTO 291 – Principles of Speech, Hearing & Equilibrium (3 units)**

*Course Description:* Presentations by faculty and guest lecturers on anatomy, physiology, and behaviors involved in speech production, hearing, and equilibrium. Each student expected to make one class presentation.

*Prerequisite(s):* Graduate students; medical students; advanced undergraduates with consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **OTO 299 – Individual Study in Otolaryngology for Advanced Graduate Students (1-12 units)**

*Course Description:* Individual study in Otolaryngology for advanced graduate students.

*Prerequisite(s):* Advanced graduate student with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **OTO 403 – Basic Principles of Reconstructive Surgery (1 unit)**

*Course Description:* Formal presentations covering basic principles of reconstructive surgery, including wound healing, treatment of lacerations, skin and bone grafts, flaps, Z-plasties and revision of scars. Laboratory session utilizing animal tissues.

*Prerequisite(s):* Third- or fourth-year medical student with consent of instructor.

*Learning Activities:* Lecture.

*Grade Mode:* Letter.

## **OTO 440 – Otolaryngology Required Clerkship (3-9 units)**

*Course Description:* Provide fundamental knowledge of otorhinolaryngologic diagnosis and principles, develop facility with basic ENT instruments, provide an understanding of treatment for ear, nose and throat problems and provide knowledge of what patients should be referred for otorhinolaryngologic care.

*Prerequisite(s):* Consent by Committee on Student Evaluation and Promotion.

*Learning Activities:* Clinical Activity 30 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**OTO 450 – Fourth Year Otolaryngology Elective (6 units)**

*Course Description:* Participation in Otolaryngology Clinic and operating room. Evaluation and management of common Otolaryngologic diseases.  
*Prerequisite(s):* Consent of instructor; third- or fourth-year Medical Students.

*Learning Activities:* Clinical Activity 35 hour(s), Lecture 2 hour(s), Film Viewing 0.25 hour(s), Discussion 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**OTO 460 – Clinical Otolaryngology Elective (3-18 units)**

*Course Description:* Approved for graduate degree credit. Total involvement in clinical activities of the department.

*Prerequisite(s):* Third- and fourth-year medical students with consent of instructor; open to graduate students.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**OTO 465 – Away Acting Internship in Otolaryngology (3-6 units)**

*Course Description:* Externship rotation for Acting Internships in Otolaryngology.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**OTO 490 – Journal Seminar (1 unit)**

*Course Description:* Approved for graduate degree credit. Monthly review of current otolaryngologic and related literature and recent advances.

*Prerequisite(s):* Fourth-year medical students with consent of instructor; open to graduate students.

*Learning Activities:* Lecture/Discussion 10 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**OTO 498 – Individual or Group Study (1-5 units)**

*Course Description:* Introduction to basic research in Otolaryngology.

Lectures, discussion and laboratory study of sensory and motor systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-2 hour(s), Laboratory 1-4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**OTO 499 – Research (1-12 units)**

*Course Description:* Approved for graduate degree credit. Participation in ongoing projects.

*Prerequisite(s):* Medical students with consent of instructor; open to graduate students.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## Pathology (PMD)

### School of Law

**PMD 192 – Internship in Human Pathology (1-12 units)**

*Course Description:* Supervised work experience in pathology and related fields.

*Prerequisite(s):* Upper division standing; approval of project prior to period of internship by preceptor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**PMD 199 – Special Study in Pathology for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study in Pathology for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PMD 290C – Research Group Conferences (1 unit)**

*Course Description:* Focused around the mechanisms of function of the central nervous system under normal and pathogenic conditions. Seminars lead by various speakers from UC Davis and other Institutions, both domestic and international.

*Prerequisite(s):* Graduate level standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PMD 296 – Neurodevelopment Group Study (1-6 units)**

*Course Description:* Explore mechanisms that impact perinatal development of the cerebral cortex, and other cortical structures, under normal and pathological conditions.

*Learning Activities:* Variable 1-6 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PMD 298 – Advanced Group Study (1-5 units)**

*Course Description:* Group Study provides the opportunity for a faculty member to work with students in a focused manner.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PMD 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PMD 405 – Brain Cutting Conference (1-4 units)**

*Course Description:* Current specimens are sectioned, discussed, and clinical correlations proposed.

*Prerequisite(s):* Third- and fourth-year medical students or consent of instructor.

*Learning Activities:* Seminar 1-4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**PMD 407 – Advanced Neuropathology (3-18 units)**

*Course Description:* Presents an integrated introduction to mechanisms of the central and peripheral nervous system injury. Gain an understanding of pathological mechanisms underlying disease, the anatomic and molecular manifestations of pathologic processes of the CNS and PNS.

*Prerequisite(s):* Consent of instructor; third- or fourth-year medical student.

*Learning Activities:* Lecture/Discussion 40 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Honors/Pass/Fail.

**PMD 410A – General & Endocrine Pathology (2.5 units)**

*Course Description:* Pathologic mechanisms of human disease. Concepts of general pathologic processes, i.e., cell death, inflammation and neoplasia. Endocrine pathology in the context of clinical human disease. Emphasis on integration of clinical practice with gross and histologic images emphasizing team-based learning.

*Learning Activities:* Lecture 4 hour(s), Discussion/Laboratory 4.50 hour(s).

*Enrollment Restriction(s):* Restricted to medical students only.

*Grade Mode:* Pass/Fail only.

**PMD 410B – Systemic Pathology (1 unit)**

*Course Description:* Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include hematopathology and neuropathology.

*Prerequisite(s):* Approval by SOM Committee on Student progress.

*Learning Activities:* Lecture 1 hour(s), Discussion/Laboratory 0.50 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

**PMD 410C – Systemic Pathology (2 units)**

*Course Description:* Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include pulmonary pathology, cardiovascular pathology,

hematopathology, oncologic pathology, and nephropathology.

*Prerequisite(s):* Approval by SOM Committee on Student progress.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

**PMD 410D – Systemic Pathology (2.5 units)**

*Course Description:* Anatomic and clinical pathology of organ system human disease with emphasis on integration with clinical medicine.

Content parallels concurrent clinical courses with integration of lectures and discussions. Topics include gastrointestinal and gynecologic pathology, hepatopathology, oncologic pathology and musculoskeletal pathology.

*Prerequisite(s):* Approval by SOM Committee on Student progress.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

**PMD 435 – Clinical Patient Care in Pathology (3-9 units)**

*Course Description:* Four-week course is designed to give the third-year medical student an exposure to the diverse roles that pathologists have in clinical patient care.

*Prerequisite(s):* Consent of instructor; completed one of the following 3rd year clerkships: Family Medicine, Internal Medicine, Surgery, OBGYN or Pediatrics.

*Learning Activities:* Clinical Activity 24 hour(s), Independent Study 7 hour(s), Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**PMD 440 – Surgery-Pathology-Radiology (SPR) Research Laboratory (2 units)**

*Course Description:* Provide future clinicians and scientists with basic clinical and bioengineering laboratory skills to prepare for careers in translational research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Pass/Fail only.

**PMD 460 – Diagnostic Medicine: Pathology in Practice (3 units)**

*Course Description:* Asynchronous learning course bridges the gap between foundational pathophysiology learned in pre-clerkship curriculum and the utilization of pathology and laboratory medicine studies in clinical practice.

*Learning Activities:* Lecture.

*Grade Mode:* Pass/Fail only.

**PMD 464 – Anatomic Pathology (3-6 units)**

*Course Description:* Anatomic pathology with an emphasis on autopsy and surgical pathology with application to clinical practice. Specimen grossing, frozen sections, microscopic sign-out and conferences.

Exposure to cytopathology, hematopathology, and clinical pathology is available.

*Prerequisite(s):* Consent of instructor; fourth-year medical students.

*Learning Activities:* Clinical Activity 40 hour(s), Variable.

*Enrollment Restriction(s):* Restricted to Medical Students only.

*Grade Mode:* Honors/Pass/Fail.

**PMD 465 – Applied Clinical Laboratory Medicine (3-6 units)**

*Course Description:* Emphasis upon laboratory techniques, procedures, and interpretation of laboratory results. Students will be expected to participate fully and in all laboratory operations including bench techniques, laboratory management, and quality control.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**PMD 470 – Sub-Specialty in Didactic Pathology (3-16 units)**

*Course Description:* Externship provides in-depth exposure to one of a variety of sub-specialties in Pathology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 25 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PMD 474 – Anatomic Pathology Acting Internship (3-9 units)**

*Course Description:* Anatomic Pathology AI will permit students to gain skills needed for first year Pathology Residency. Students will perform autopsies and take full responsibility for a variety of surgical pathology cases. A mix of outpatient and inpatient cases is expected.

*Prerequisite(s):* Fourth-year medical student or consent of instructor.

*Learning Activities:* Clinical Activity 40-80 hour(s).

*Enrollment Restriction(s):* Restricted to medical students only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PMD 475 – Anatomic Pathology Acting Internship (3-9 units)**

*Course Description:* Year four level course designed to provide a concentrated experience in Surgical Pathology and Cytopathology. Rotate on the surgical and cytopathology sub-specialty teams and assume responsibility for patient cases.

*Prerequisite(s):* PMD 410A; PMD 410B; PMD 410C; PMD 410D; or equivalent, and consent of instructor. Successful completion of third-year clinical rotations.

*Learning Activities:* Clinical Activity 40-80 hour(s).

*Enrollment Restriction(s):* Restricted to Medical Students only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PMD 493 – Interdisciplinary Study of Gastrointestinal Cancer (6 units)**

*Course Description:* In-depth study of gastrointestinal, hepatic and pancreatic cancer. Emphasis on an integration of basic science and clinical medicine. Participating departments include pathology, surgical oncology, medical oncology, gastroenterology, radiology and radiotherapy.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Clinical Activity 12 hour(s), Laboratory 3 hour(s), Discussion/Laboratory 20 hour(s).

*Cross Listing:* SUR 493D.

*Grade Mode:* Honors/Pass/Fail.

## **PMD 497T – Tutoring in Pathology (1-5 units)**

*Course Description:* Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine.

*Prerequisite(s):* Advanced standing or consent of instructor.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PMD 498 – Advanced Group Study (1-5 units)**

*Course Description:* Group study in variety of advanced topics in general, special, experimental, or comparative pathology.

*Prerequisite(s):* Consent of instructor; medical student.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **PMD 499 – Research (1-18 units)**

*Course Description:* Research in experimental, molecular, comparative, and applied pathology.

*Prerequisite(s):* Medical student with consent of instructor.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **Pathology, Microbiology, & Immunology (PMI)**

### **School of Veterinary Medicine**

## **PMI 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **PMI 126 – Fundamentals of Immunology (3 units)**

*Course Description:* Overview of immunology including components of the immune system, initiation and regulation of the immune response, infection and immunity, hypersensitivity and immune dysfunction. Clinical immunologic techniques, immunodeficiency, and vaccinology.

*Prerequisite(s):* BIS 102; or equivalent, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **PMI 126L – Immunology Laboratory (2 units)**

*Course Description:* Laboratory procedures in clinical immunology.

Cells of the innate and adaptive systems. Quantitative and qualitative characterization of the immune response.

*Prerequisite(s):* PMI 126 (can be concurrent); or equivalent.

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

## **PMI 127 – Medical Bacteria & Fungi (3 units)**

*Course Description:* Introduction to the bacterial and mycotic pathogens of man and animals, with emphasis on pathogenic mechanisms and ecologic aspects of infectious disease.

*Prerequisite(s):* Any Microbiology course with lab; Immunology strongly recommended.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Microbiology majors.

*Grade Mode:* Letter.

## **PMI 128 – Biology of Animal Viruses (3 units)**

*Course Description:* Fundamental physical and chemical properties of animal viruses; methods of propagation, purification and assay.

Mechanisms of viral replication and pathogenesis of viral infections in man and animals. Immunity to virus diseases and oncogenic properties of animal viruses.

*Prerequisite(s):* BIS 102.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Only 2 units of credit given if completed MIC 162.

*Grade Mode:* Letter.

## **PMI 129Y – One Health: Human, Animal & Environment Interfaces (3 units)**

**Course Description:** Introduction to fundamentals, challenges, and opportunities in One Health using local and global health case studies. Animal, human, and environmental health problems, along with tools and transdisciplinary approaches, will be introduced to foster innovative thinking that addresses complex issues.

**Learning Activities:** Lecture/Discussion 3 hour(s), Web Electronic Discussion.

**Enrollment Restriction(s):** Limited to upper division undergraduate students in good standing and who fulfill the course prerequisites; limited to 100 students/term.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Scientific Literacy (SL).

## **PMI 198 – Directed Group Study (1-5 units)**

**Course Description:** Directed group study.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Independent Study 3-5 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

## **PMI 199 – Special Study for Advanced Undergraduates (1-5 units)**

**Course Description:** Special study for advanced undergraduates.

**Learning Activities:** Variable 3-15 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

## **PMI 200 – Research Foundations (1 unit)**

**Course Description:** Introduction to key components of graduate school success including mentor/mentee relationship issues, avoiding plagiarism, hypothesis development and experimental design, demystifying the grant writing process, understanding the NIH administrative structure, preparing for a non-academic career, and strategies to maintain a work-life balance.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Seminar 1 hour(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

## **PMI 201 – Integrative Pathobiology Core I (5 units)**

**Course Description:** Overview of molecular biology techniques, tissue structure and function, cell membrane pathology and cellular mechanisms of disease including cellular responses and adaptations to stress, cell cycle, cell death, cell biomechanics, vascular disturbances, and mechanisms of neoplasia and tumorigenesis.

**Learning Activities:** Lecture 3 hour(s), Discussion 2 hour(s).

**Grade Mode:** Letter.

## **PMI 202 – Integrative Pathobiology Core II (4 units)**

**Course Description:** The second required core course in the graduate group with topics in inflammation, host-pathogen interaction, regenerative medicine, integrative pathology and population and ecosystem health.

**Learning Activities:** Lecture 2 hour(s), Discussion 2 hour(s).

**Grade Mode:** Letter.

## **PMI 203 – Experimental Design & Data Analysis in Pathobiology (2 units)**

**Course Description:** Follows two required core courses, PMI 201 & PMI 202, for Ph.D. and M.S. students. Goal is to bridge gap between statistics and real-world pathobiology to increase students' skills and independence in experiment design and data analysis.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Lecture 1 hour(s), Lecture/Lab 2 hour(s).

**Grade Mode:** Letter.

## **PMI 206 – Mentored Scientific Writing (1 unit)**

Starting Fall Quarter 2023, this course is no longer offered.

**Course Description:** Drafting a scientific manuscript for publication based on research results. Students engage in collaborative peer review and learn effective writing, including how to convey a persuasive message and write clearly and succinctly.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Discussion 1.50 hour(s).

**Enrollment Restriction(s):** Enrollment limited to 12 students.

**Repeat Credit:** May be repeated 1 time(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

## **PMI 214 – Vector-borne Infectious Diseases: Changing Patterns (2 units)**

This version has ended; see updated course, below.

**Course Description:** Vector-borne infectious diseases especially as they relate to changing patterns associated with climatic changes, trade and population movement.

**Prerequisite(s):** Open to graduate students, MPVM and MPH students, DVM and medical students with second- or third-year standing; open to upper division undergraduate students with consent of instructor(s).

**Learning Activities:** Lecture/Discussion 2 hour(s).

**Cross Listing:** ENT 214.

**Grade Mode:** Letter.

## **PMI 214 – Vector-borne Infectious Diseases: Changing Patterns (2 units)**

**Course Description:** Vector-borne infectious diseases especially as they relate to changing patterns associated with climatic changes, trade and population movement.

**Prerequisite(s):** Open to graduate students, MPVM and MPH students, DVM and medical students with second- or third-year standing; open to upper division undergraduate students with consent of instructor(s).

**Learning Activities:** Lecture/Discussion 2 hour(s).

**Grade Mode:** Letter.

This course version is effective from, and including: Winter Quarter 2024.

## **PMI 221 – Topics in Virus Research (1 unit)**

**Course Description:** Discussion-based seminar covering graduate student virology research. Informal presentations and discussion of technical problems in research design and experimentation are encouraged.

Current stage of the research project is not important.

**Prerequisite(s):** Graduate student standing (Ph.D. or M.S.).

**Learning Activities:** Discussion 1 hour(s).

**Enrollment Restriction(s):** Restricted to 10 students.

**Repeat Credit:** May be repeated 4 time(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

**PMI 270 – Advanced Immunology (3 units)**

*Course Description:* Current concepts of immunology with an emphasis on interactions between the host, the environment and the pathogen. These interactions will include those that are protective and successful for the host as well as those that are deleterious.

*Prerequisite(s):* Introductory course in Immunology.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate student status in the Comparative Pathology Graduate Group; all other students require consent of instructor.

*Grade Mode:* Letter.

**PMI 290 – Seminar (1 unit)**

*Course Description:* Topics in pathology, microbiology or immunology.

*Prerequisite(s):* Graduate level standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PMI 293A – Seminar in Infectious Diseases (1 unit)**

*Course Description:* Discussion of current topics and cases of infectious diseases.

*Prerequisite(s):* Current enrollment in health science professional school or graduate standing in biological sciences.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PMI 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PMI 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Pediatrics (PED)**

School of Medicine

**PED 199 – Special Study in Pediatric Research (1-5 units)**

*Course Description:* Special study for Pediatric research.

*Prerequisite(s):* Undergraduate student with consent of instructor based upon adequate preparation as determined by instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PED 299 – Pediatric Research (1-12 units)**

*Course Description:* Pediatric research.

*Prerequisite(s):* Consent of instructor. Graduate students who are candidates for a degree in some area of biology or behavioral sciences.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PED 401 – Preceptorship in Pediatrics (2 units)**

*Course Description:* Opportunity to observe and participate in primary medical care in a practicing pediatricians office. Participation in history-taking and physical examination will be at discretion of preceptor and dependent on students experience. Evaluation by student.

*Prerequisite(s):* Second-year medical student or first-year medical student with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

**PED 402 – Clinical Experience in Private Practice (1-18 units)**

*Course Description:* Opportunity to participate in practice of preceptor, performing such tasks as history taking, physical examination, and patient management.

*Prerequisite(s):* PED 430; third-or fourth-year medical student; consent of preceptor and Chairperson.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**PED 405 – Pediatrics Lecture Series (0.5 units)**

*Course Description:* Lecture series covers major topics in pediatrics with case presentations and panels from pediatric subspecialists. Topics include, but are not limited to: cardiology, pulmonology, nephrology, gastroenterology, critical care, and primary care pediatrics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

**PED 415 – Fetal & Neonatal Physiology (1 unit)**

*Course Description:* Elective is designed to combine for study a variety of aspects of the physiology, anatomy and biochemistry of the fetus and newborn with relevant clinical examples of disorders in each of the 10 topics that will be discussed.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Independent Study 4 hour(s).

*Grade Mode:* Pass/Fail only.

**PED 430 – Pediatric Clerkship (3-12 units)**

*Course Description:* Eight week clinical clerkship providing students with the opportunity to learn fundamentals of caring for the pediatric patient by participating in nursery, ambulatory and inpatient services at UCDMC and affiliated clinical sites. Rounds, conferences, student presentations ongoing.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Enrollment Restriction(s):* Restricted to Medical students only.

*Grade Mode:* Pass/Fail only.

## PED 430F – SJVP Pediatric Clerkship at UCSF (12 units)

**Course Description:** Eight-week clinical clerkship providing students with the opportunity to learn fundamentals of caring for the pediatric patient by participating in nursery, ambulatory and inpatient services at UCSF Fresno. Rounds, conferences, student presentations ongoing.

**Prerequisite(s):** Approval by School of Medicine Committee on Student Progress.

**Learning Activities:** Clinical Activity 45 hour(s).

**Enrollment Restriction(s):** Restricted to Medical students only.

**Grade Mode:** Honors/Pass/Fail.

## PED 430FA – SJVP Longitudinal Pediatrics Clerkship (1.5-6 units)

**Course Description:** Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 40-60 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430FB – SJVP Longitudinal Pediatrics Clerkship (1.5-6 units)

**Course Description:** Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 40-60 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430FC – SJVP Longitudinal Pediatrics Clerkship (1.5-6 units)

**Course Description:** Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 40-60 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430FD – SJVP Longitudinal Pediatrics Clerkship (1.5-6 units)

**Course Description:** Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 40-60 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430R – Rural PRIME Pediatrics Longitudinal Clerkship (2 units)

**Course Description:** Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 45 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430RA – Rural PRIME Pediatrics Longitudinal Clerkship (3 units)

**Course Description:** Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 45 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430RB – Rural PRIME Pediatrics Longitudinal Clerkship (3 units)

**Course Description:** Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 45 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430RC – Rural PRIME Pediatrics Longitudinal Clerkship (3 units)

**Course Description:** Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 45 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430RD – Rural PRIME Pediatrics Longitudinal Clerkship (1 unit)

**Course Description:** Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 45 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430TA – TeachMS Longitudinal Pediatrics Clerkship (A) (4 units)

**Course Description:** Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 45 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 430TB – TeachMS Longitudinal Pediatrics Clerkship (B) (6 units)

**Course Description:** Longitudinal clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 45 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## **PED 430TC – TeachMS Longitudinal Pediatrics Clerkship (C) (2 units)**

*Course Description:* Longitudinal clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PED 439D – Directed Clinical Studies in Pediatrics (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **PED 439R – Directed Studies in Pediatrics (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Independent Study 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **PED 440 – Pediatrics for the Differentiated Student (3-6 units)**

*Course Description:* One goal is to facilitate the development and reinforcement of the knowledge, skills and attitudes needed as an intern caring for children. Provides a bridge between student experiences in the pre-clerkship phase, the Pediatric clerkship, their Pediatric acting internships and varied Pediatric electives and the Transition to Residency course.

*Learning Activities:* Lecture/Discussion 20 hour(s).

*Grade Mode:* Pass/Fail only.

## **PED 460A – General Inpatient Pediatric Acting Internship (3-18 units)**

*Course Description:* The Ward Acting Intern functions in a manner similar to that of a pediatric intern. The Acting Intern takes admissions in the regular sequence and is expected to take night call.

*Prerequisite(s):* PED 430 B or better; and consent of instructor; letter of recommendation from Pediatrics faculty member.

*Learning Activities:* Internship.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

## **PED 460B – Acting Internship: Outpatient Pediatrics (3-18 units)**

*Course Description:* Supervised experience in pediatric care on outpatient service at UCDMC. Student functions as Acting Intern with appropriate supervision by residents and attending faculty.

*Prerequisite(s):* PED 430 B or better; and consent of instructor; letter of recommendation from Pediatrics faculty member.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

## **PED 461 – Pediatric Inpatient AI in Hematology/Oncology (6 units)**

*Course Description:* Inpatient and outpatient experience in diagnosis and management of oncologic and hematologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged.

*Prerequisite(s):* PED 430; consent of instructor; satisfactory completed.

*Learning Activities:* Clinical Activity 37.50 hour(s), Lecture 7.50 hour(s).

*Enrollment Restriction(s):* Limited Enrollment.

*Grade Mode:* Honors/Pass/Fail.

## **PED 462 – Elective in Pediatric Endocrinology (3-18 units)**

*Course Description:* Inpatient and outpatient experience in diagnosis and management of endocrine disorders in children. Laboratory experience and participation in clinical investigation may be arranged.

*Prerequisite(s):* Consent of instructor; completion of second-year study or the equivalent.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

## **PED 463 – Medical & Mental Health Evaluation of Children at Risk for Maltreatment (3-9 units)**

*Course Description:* Elective for fourth-year medical students covers basic areas of knowledge needed for child abuse prevention and consultation. Rotation includes legal cases, abuse exams, child and parent interactive therapy and visits to community organizations.

*Learning Activities:* Clinical Activity 30 hour(s), Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PED 464 – Acting Internship in Neonatology (3-12 units)**

*Course Description:* Diagnostic and therapeutic aspect of the medical and surgical high-risk neonate. Student expected to take night call.

*Prerequisite(s):* PED 430 B or better; consent of instructor; letter of recommendation from Pediatrics faculty member.

*Learning Activities:* Clinical Activity 60 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**PED 465 – Pediatrics Specialty Elective (3-18 units)**

*Course Description:* Supervised experience in a variety of pediatric subspecialties at a local or away site.

*Prerequisite(s):* PED 430; consent of instructor.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

**PED 466 – Elective in Pediatric Cardiology (3-18 units)**

*Course Description:* Inpatient and outpatient experience in diagnosis and management of cardiologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged.

*Prerequisite(s):* PED 430; satisfactory completed.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**PED 467 – Elective in Pulmonary Medicine (3-18 units)**

*Course Description:* Inpatient and outpatient management of pediatric patients with pulmonary diseases. These will include but will not be limited to cystic fibrosis, asthma, and other forms of chronic pulmonary diseases as well as congenital abnormalities.

*Prerequisite(s):* Pediatric clerkship.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**PED 468 – Elective in Pediatrics Nephrology (3-18 units)**

*Course Description:* Inpatient and outpatient experience in diagnosis and management of renal disorders in children. Laboratory experience and participation in clinical investigation may be arranged.

*Prerequisite(s):* PED 430; consent of instructor; satisfactory completed.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

**PED 469 – Elective in Pediatric Infectious Disease (3-18 units)**

*Course Description:* Inpatient and outpatient experience in diagnosis and treatment of infectious disease of infants and children. Laboratory and clinical investigation may be arranged.

*Prerequisite(s):* PED 430; consent of instructor; satisfactory completed.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

**PED 470 – Elective in Pediatric Neurology (3-18 units)**

*Course Description:* Inpatient and outpatient experience in diagnosis and management of neurological disorders in children. Students will also participate in other pediatric subspecialty clinics which serve children with neurological disorders. Does not satisfy the fourth-year neurology requirement.

*Prerequisite(s):* PED 430; IMD 430; OBG 430; consent of instructor; all courses satisfactory completed.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

**PED 471 – Elective in Pediatric Gastroenterology (3-18 units)**

*Course Description:* Inpatient and outpatient experience in diagnosis and management of gastroenterology disorders in children. Laboratory experience and participation in clinical investigation may be arranged.

*Prerequisite(s):* PED 430; consent of instructor; satisfactory completed.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

**PED 472 – Clinical Rotation in Adolescent Medicine (3-9 units)**

*Course Description:* Under supervision, students will see patients in the UC Davis clinic and at a number of community-based sites. Emphasis on the socially-mediated problems that face adolescents, including substance abuse, STD's, pregnancy, depression and suicide. One hour of lecture each week.

*Prerequisite(s):* Consent of instructor; fourth-year Medical Student.

*Learning Activities:* Clinical Activity 39 hour(s), Lecture 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**PED 473 – Away Acting Internship in Pediatrics (6-18 units)**

*Course Description:* Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management.

*Prerequisite(s):* Consent of instructor; satisfactory completion of Pediatrics Clerkship.

*Learning Activities:* Clinical Activity 40 hour(s), Lecture 6 hour(s), Variable.

*Grade Mode:* Honors/Pass/Fail.

**PED 474 – Neonatal (ICU) (4-8 units)**

*Course Description:* The Pediatric ICU at UC Davis Children's Hospital is a 24 bed ICU on Davis 10 that provides care for critically ill pediatric patients. These patients are usually younger than 18 years of age and can have either primary medical or surgical issues.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail Only.

**PED 476 – Acting Internship in Pediatric Intensive Care (3-18 units)**

*Course Description:* Evaluation and support of critically ill infants and children. In general, student expected to take night call every third night during rotation.

*Prerequisite(s):* PED 430 A is required; or consent of instructor; letter of recommendation from Pediatrics faculty member.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**PED 477 – Pediatric Intensive Care Unit (4-8 units)**

*Course Description:* Evaluation and support of critically ill infants and children. In general, student expected to take night call every third night during rotation.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail.

## PED 493 – Ethical, Legal & Social Issues in Clinical Genetics (6 units)

**Course Description:** Develop advanced knowledge, communication skills and attitudes necessary to provide compassionate, knowledgeable, and expert care to patients who may be at increased genetic risk for disease. Seminars cover ethical and legal principles, epidemiology, and genetics.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Seminar 12 hour(s), Clinical Activity 18 hour(s), Auto Tutorial 8 hour(s), Independent Study 2 hour(s).

**Enrollment Restriction(s):** Restricted to UC Davis School of Medicine students only.

**Grade Mode:** Honors/Pass/Fail.

## PED 493B – Living with Intellectual & Developmental Disability in the Community (1-6 units)

**Course Description:** In-depth experience with Intellectual & Developmental Disability across the lifespan.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 4 hour(s), Lecture 10 hour(s), Fieldwork 4 hour(s), Seminar 4 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 493C – Fetal & Neonatal Physiology SSM (6 units)

**Course Description:** Elective is available for students interested in exploring the fascinating world of the fetus and neonate. Designed to combine the basic sciences with relevant clinical examples of disorders.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Lecture/Discussion 24 hour(s), Clinical Activity 8 hour(s).

**Grade Mode:** Honors/Pass/Fail.

## PED 494 – Intellectual & Developmental Disability in the Community (3-6 units)

**Course Description:** In-depth experience with Intellectual & Developmental Disability across the lifespan.

**Learning Activities:** Variable.

**Grade Mode:** Pass/Fail only.

## PED 495 – Fetal & Neonatal Physiology (3-6 units)

**Course Description:** Didactic is available for students interested in exploring the fascinating world of the fetus and neonate. Designed to combine the basic sciences with relevant clinical examples of disorders.

**Learning Activities:** Independent Study; Discussion 1-3 hour(s).

**Grade Mode:** Pass/Fail only.

## PED 498 – Directed Group Study (1-5 units)

**Course Description:** Explore in-depth various topics in Pediatrics. Extensive contact with and oversight by instructor.

**Learning Activities:** Variable 3-15 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## PED 499 – Research Topics in Pediatrics (1-18 units)

**Course Description:** Individual research project in pediatric subspecialty areas (cardiology, endocrinology, hematology, metabolism, newborn physiology and others) may be arranged with faculty member. Independent research by student will be emphasized and long-term projects are possible.

**Prerequisite(s):** Student in Medical School with consent of instructor.

**Learning Activities:** Variable.

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## Performance Studies (PFS)

### Graduate Studies

## PFS 200 – Methods & Materials in Theatre Research (4 units)

**Course Description:** Essential research tools in theatre and related fields; bibliographies, primary sources; methods of evaluating and presenting evidence; delineating research areas in the field.

**Learning Activities:** Seminar 3 hour(s), Term Paper.

**Grade Mode:** Letter.

## PFS 259 – Topics in Contemporary Theatre & Performance (4 units)

**Course Description:** Special topics designed to study in depth aspects of contemporary performance including performance analysis, cultural and historical context, modes of production, theoretical and political entailments, and issues of spectatorship; e.g., "Brecht and After," "British Theater," "Race and Gender in Performance."

**Learning Activities:** Seminar 3 hour(s), Term Paper.

**Repeat Credit:** May be repeated 5 time(s).

**Grade Mode:** Letter.

## PFS 265A – Performance Studies: Modes of Production (4 units)

**Course Description:** Introduction to the literature of performance production in a variety of media: theatre, dance, film, video, computer-based, looking at cultural, aesthetic, rhetorical and political theory.

**Learning Activities:** Seminar 3 hour(s), Term Paper.

**Repeat Credit:** May be repeated 3 time(s) when topic differs.

**Grade Mode:** Letter.

## PFS 265B – Performance Studies: Signification & the Body (4 units)

**Course Description:** Introduction to analysis of the body in performance, drawing on theoretical models from several fields.

**Learning Activities:** Seminar 3 hour(s), Term Paper.

**Repeat Credit:** May be repeated 3 time(s) when topic differs.

**Grade Mode:** Letter.

## PFS 265C – Performance Studies: Performance & Society (4 units)

**Course Description:** Introduction to the role of performance (broadly defined), in everyday life, sociopolitical negotiation, identity, social movements, the media, and the state.

**Learning Activities:** Seminar 3 hour(s), Term Paper.

**Repeat Credit:** May be repeated 3 time(s) when topic differs.

**Grade Mode:** Letter.

## PFS 265D – Performance Studies: Theory, History, Criticism (4 units)

*Course Description:* Introduction to the theory, history and criticism, informing performance studies.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

## PFS 270A – Individually Guided Research in Performance Studies (4 units)

*Course Description:* Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.

*Prerequisite(s):* PFS 200; (PFS 265A or PFS 265B or PFS 265C or PFS 265D); and consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Independent Study, Extensive Writing.

*Enrollment Restriction(s):* Restricted to students in the Graduate Group Ph.D. in Performance Studies.

*Grade Mode:* Letter.

## PFS 270B – Individually Guided Research in Performance Studies (4 units)

*Course Description:* Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student's proposed dissertation project, to produce a dissertation prospectus.

*Prerequisite(s):* PFS 200; (PFS 265A or PFS 265B or PFS 265C or PFS 265D); and consent of instructor.

*Learning Activities:* Discussion 1 hour(s), Independent Study, Extensive Writing.

*Enrollment Restriction(s):* Restricted to students in the Graduate Group Ph.D. in Performance Studies.

*Grade Mode:* Letter.

## PFS 270C – Individually Guided Research in Performance Studies (4 units)

*Course Description:* Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus.

*Prerequisite(s):* PFS 200; (PFS 265A or PFS 265B or PFS 265C or PFS 265D); and consent of instructor.

*Learning Activities:* Discussion/Laboratory 2 hour(s), Fieldwork 2 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to students in the Graduate Group Ph.D. in Performance Studies.

*Grade Mode:* Letter.

## PFS 290 – Colloquia in Performance Studies (4 units)

*Course Description:* Designed to provide cohort identity and faculty exchange. Opportunity to present papers, hear guest lecturers, and see faculty presentations, gather for organizational and administrative new, exchange of information and make announcements. Must be taken every year that a Performance Studies graduate is registered, prior to taking the Qualifying Examination.

*Prerequisite(s):* Registration in Performance Studies Graduate Group and prior to Qualifying Examination.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion/Laboratory 1 hour(s), Term Paper.

*Credit Limitation(s):* Limited to 4 units per year.

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PFS 298 – Group Study (1-5 units)

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 1-5 hour(s).

*Grade Mode:* Letter.

## PFS 299 – Individual Study (1-12 units)

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PFS 299D – Dissertation Research (1-12 units)

*Course Description:* Dissertation research.

*Prerequisite(s):* Consent of instructor; advancement to Candidacy.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PFS 459 – Approaches to Theatre & Dance (4 units)

*Course Description:* Work on approaches to theatre, dance, film/video, design and performance, with a focus on methodology and professional development.

*Prerequisite(s):* Consent of instructor; advanced graduate students.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Letter.

## Persian (PER)

College of Letters & Science

### PER 001 – Elementary Persian (5 units)

*Course Description:* Introduction to listening, speaking, reading and writing skills in Persian and to Persian culture.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

### PER 002 – Elementary Persian (5 units)

*Course Description:* Continuation of PER 001. Introduction to listening, speaking, reading and writing skills in Persian and to Persian culture.

*Prerequisite(s):* PER 001; or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 003 – Elementary Persian (5 units)**

*Course Description:* Continuation of PER 002. Introduction to listening, speaking, reading and writing skills in Persian and to Persian culture.

*Prerequisite(s):* PER 002; or consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 021 – Intermediate Persian (4 units)**

*Course Description:* Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in intermediate Persian.

*Prerequisite(s):* PER 003; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 022 – Intermediate Persian (4 units)**

*Course Description:* Integrated presentation of listening, speaking, reading and writing as well as cultural topics in Intermediate Persian.

*Prerequisite(s):* PER 021; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 023 – Intermediate Persian (4 units)**

*Course Description:* Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in Intermediate Persian.

*Prerequisite(s):* PER 022; or equivalent knowledge of Persian.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**PER 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**PER 101 – Advanced Persian: Topics in Modern Persian Culture 1900-Present (4 units)**

*Course Description:* Integrated work on reading, listening, discussion and writing about modern Persian cultural production using fiction and poetry as well as cinema and theory.

*Prerequisite(s):* PER 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**PER 103 – Advanced Persian: Topics in Medieval Persian Culture 900-1500 (4 units)**

*Course Description:* Integrated work on reading, listening, discussion, writing about medieval Persian culture with a focus on lyric and narrative poetry and representative selections of literary prose, rhetoric, biography, history, religious and philosophical discourse.

*Prerequisite(s):* PER 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**PER 121 – Advanced Persian (4 units)**

*Course Description:* Review, refinement, and development of skills learned in intermediate Persian through work with texts, video, and audio on cultural and social issues. Integrated approach to reading, writing, listening, speaking Persian.

*Prerequisite(s):* PER 023; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 122 – Advanced Persian (4 units)**

*Course Description:* Continuation of PER 121. Further development of advanced skills in reading, listening, writing, and speaking modern Persian through work with texts, video, and audio on cultural and social issues.

*Prerequisite(s):* PER 121; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 123 – Advanced Persian (4 units)**

*Course Description:* Continuation of PER 122. Further development of advanced skills in reading, listening, writing, and speaking modern Persian through work with texts, video, and audio on cultural and social issues.

*Prerequisite(s):* PER 122; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PER 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching practicum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 18 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Pharmacology & Toxicology (PTX)**

College of Agricultural & Environmental Sciences

## **PTX 201 – Principles of Pharmacology & Toxicology I (5 units)**

*Course Description:* First of three courses presenting fundamental principles of pharmacology and toxicology. Introductory overview of basic concepts in pharmacology/toxicology, followed by in-depth blocks on fate processes of chemicals in the body, fate processes in tissue selective responses, selective toxicity employed therapeutically.

*Prerequisite(s):* BIS 102; NPB 101.

*Learning Activities:* Lecture 5 hour(s).

*Grade Mode:* Letter.

## **PTX 202 – Principles of Pharmacology & Toxicology II (4 units)**

*Course Description:* Second of three courses presenting fundamental principles of pharmacology and toxicology. Principles of pharmacodynamics and mechanisms of drug/toxicant actions.

*Prerequisite(s):* PTX 201.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **PTX 203 – Principles of Pharmacology & Toxicology III (4 units)**

*Course Description:* Integrated physiological systems, cardiovascular and nervous systems and how drugs and toxicants act to perturb function.

*Prerequisite(s):* PTX 201; PTX 202.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **PTX 215 – Electrophysiology Techniques & Applications (3 units)**

*Course Description:* Broad scope of topics in electrophysiology techniques and applications.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s).

*Cross Listing:* MCP 215.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **PTX 230 – Advanced Topics in Pharmacology & Toxicology (1-3 units)**

*Course Description:* In-depth coverage of selected topics for graduate students in Pharmacology-Toxicology and related disciplines. Topics determined by instructor in charge for each quarter.

*Prerequisite(s):* PTX 201; and consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

## **PTX 277 – Molecular Mechanisms in Cancer & other Diseases (3 units)**

*Course Description:* Exploration of cutting edge investigations on the underlying mechanisms of cancer biology, cancer therapy and other diseases. Current medical research in cancer and other diseases, as it spans the bench to bedside.

*Prerequisite(s):* MCB 121 or MCB 122; undergraduate or graduate introductory course in cell biology (such as BIS 104), and general biochemistry (MCB 121 or MCB 122) required; PTX 202 recommended.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project.

*Enrollment Restriction(s):* Restricted to graduate standing or consent of instructor.

*Grade Mode:* Letter.

## **PTX 290 – Seminar (1 unit)**

*Course Description:* Current topics in pharmacology and toxicology.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **PTX 290C – Advanced Research Conference (1 unit)**

*Course Description:* Provide credit for participation in and attendance at research conferences.

*Learning Activities:* Lecture/Discussion.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **PTX 299 – Research (1-12 units)**

*Course Description:* Research with a faculty member in the Pharmacology & Toxicology Graduate Group.

*Learning Activities:* .

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **Philosophy (PHI)**

College of Letters & Science

### **PHI 001 – Introduction to Philosophy (4 units)**

*Course Description:* Problems of philosophy through major writings from various periods. Problems are drawn from political, aesthetic, religious, metaphysical, and epistemological concerns of philosophy.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

### **PHI 005 – Critical Reasoning (4 units)**

*Course Description:* Criteria of good reasoning in everyday life and in science. Topics to be covered may include basic principles of deduction and induction; fallacies in reasoning; techniques and aids to reasoning; principles of scientific investigation; aids to clarity.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PHI 006.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

### **PHI 007 – Philosophical Perspectives on Sexuality (3 units)**

*Course Description:* Philosophical issues related to sexuality, including, but not limited to, ethical and social issues regarding sexual practice, orientation, classification and identity.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

### **PHI 007Y – Philosophical Perspectives on Sexuality (3 units)**

*Course Description:* Philosophical issues related to sexuality, including, but not limited to, ethical and social issues regarding sexual practice, orientation, classification and identity.

*Learning Activities:* Web Virtual Lecture 1.50 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PHI 007.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

**PHI 010 – Introduction to Cognitive Science (4 units)**

*Course Description:* Introduction to the interdisciplinary cognitive scientific approach to the study of mind, drawing concepts and methods from psychology, philosophy, linguistics, artificial intelligence, and other disciplines.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Cognitive Science majors only.

*Cross Listing:* CGS 001.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**PHI 011 – Asian Philosophy (4 units)**

*Course Description:* Survey of the main philosophical systems of south and east Asia: Hinduism, Buddhism, Confucianism, and Taoism. Topics include the nature of reality, including God, the universe and the human self, human knowledge, and the proper conduct of human life.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**PHI 012 – Introduction to Symbolic Logic (4 units)**

*Course Description:* Syntax and semantics of the symbolic language sentence logic. Symbols of sentence logic. Translation between sentence logic and English. Truth table interpretation of sentence logic. Proof techniques. Application of truth tables and proof techniques to arguments in English.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken PHI 112, PHI 113, PHI 134, or PHI 135 and passed with a grade of C or better.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**PHI 013 – Minds, Brains, & Computers (3 units)**

*Course Description:* Computational theories of the nature of the mind. Mind as a computer process. Possibility of machine intelligence, consciousness, and mentality.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed PHI 013G.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

**PHI 013G – Minds, Brains, & Computers with Discussion (4 units)**

*Course Description:* Computational theories of the nature of the mind. Mind as a computer process. Possibility of machine intelligence, consciousness, and mentality.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed PHI 013.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**PHI 014 – Ethical & Social Problems in Contemporary Society (4 units)**

*Course Description:* Philosophical issues and positions involved in contemporary moral and social problems. Possible topics include civil disobedience and revolution, racial and sex discrimination, environment, population control, technology and human values, sexual morality, freedom in society.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 015 – Introduction to Bioethics (4 units)**

*Course Description:* Critical analysis of normative issues raised by contemporary medicine and biology. Possible topics include euthanasia, reproductive technologies, genetic engineering, informed consent and patient autonomy, experimentation on human subjects and non-human animals.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 016 – Philosophical Foundations of American Democracy (4 units)**

*Course Description:* The philosophical underpinnings of democratic government and the tension between the goals of providing security and of preserving democracy and civil liberties. Illustration of the tension through focus on issues related to war and terrorism.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**PHI 017 – Language, Thought, & World (4 units)**

*Course Description:* Puzzles in the philosophy of language, such as what language is, how language conveys thoughts, whether we each speak our own private language, and what we can learn about the world by studying language.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**PHI 021 – Philosophical Classics of the Ancient Era (4 units)**

*Course Description:* Survey of ancient Western philosophy with special attention to the Pre-Socratics, Plato, Aristotle, and the Sceptics.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 022 – Philosophical Classics of the Modern Era (4 units)**

*Course Description:* Survey of modern Western philosophy, including Descartes, Locke, Hume, and Kant.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 024 – Introduction to Ethics (4 units)**

*Course Description:* Reading of historical and contemporary philosophical works in ethics. Topics include the nature of morality, the justification of moral claims, and major ethical theories, such as consequentialist, deontological, and virtue theories.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 030 – Introduction to Philosophy of Science (4 units)**

*Course Description:* Basic problems in the philosophy of science, common to the physical, biological, and social sciences. Analysis of explanation, confirmation theory, observational and theoretical terms, the nature of theories, operationalism and behaviorism, realism, reduction.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**PHI 031 – Appraising Scientific Reasoning (4 units)**

*Course Description:* Introduction to scientific hypotheses and the kinds of reasoning used to justify such hypotheses. Emphasis on adequate justification, criteria, and strategies for distinguishing scientific from pseudoscientific theories. Concrete historical and contemporary cases.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**PHI 032 – Understanding Scientific Change (4 units)**

*Course Description:* Concepts of scientific change in historical and philosophical perspective. Survey of models of growth of knowledge, 17th century to present. Relationship between logic of theories and theory choice. Kuhns revolution model. Examples from various sciences.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Writing Experience (WE).

**PHI 038 – Introduction to Philosophy of Biology (4 units)**

*Course Description:* Non-technical introduction to philosophical, social, and scientific ideas, methods and technologies in contemporary biological fields such as evolution, genetics, molecular biology, ecology, behavior. Philosophical consideration of determinism, reductionism, explanation, theory, modeling, observation, experimentation. Evaluation of scientific explanations of human nature.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**PHI 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PHI 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PHI 101 – Metaphysics (4 units)**

*Course Description:* Theories of being. Such topics as reality, substance, universals, space, time, causality, becoming, body, experience, persons, freedom, and determinism. Views of the nature and method of metaphysics. Anti-metaphysical arguments.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 102 – Theory of Knowledge (4 units)**

*Course Description:* Analysis of the concept of knowledge. The relation between knowledge, belief and truth. Development of foundationalist, coherentist and externalist theories of justified belief. Examination of skepticism.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing, Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 103 – Philosophy on Mind (4 units)**

*Course Description:* The relation between mind and body, our knowledge of other minds, and the explanation of mental acts. Discussion of such concepts as action, intention, and causation.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 104 – The Evolution of Mind (4 units)**

*Course Description:* Interpretation of human thought and behavior through the lens of evolutionary theory. Topics include the nature/nurture debate concerning cognitive and other mental capacities and traits, and the interaction between evolution, learning and development.

*Prerequisite(s):* One previous course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**PHI 105 – Philosophy of Religion (4 units)**

*Course Description:* Logical, metaphysical, epistemological, and existential aspects of selected religious concepts and problems.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 107 – Philosophy of the Physical Sciences (4 units)**

*Course Description:* Nature of testability and confirmation of scientific hypotheses; nature of scientific laws, theories, explanations, and models. Problems of causality, determinism, induction, and probability; the structure of scientific revolutions.

*Prerequisite(s):* One Philosophy course or a science background recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Writing Experience (WE).

**PHI 108 – Philosophy of the Biological Sciences (4 units)**

*Course Description:* Scientific method in biology. Nature of biological theories, explanations, and models. Problems of evolutionary theory, ecology, genetics, and sociobiology. Science and human values.

*Prerequisite(s):* One course in Biology or one course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**PHI 109 – Philosophy of the Social Sciences (4 units)**

*Course Description:* The nature of the social sciences, their subject matter and methods. Similarities to and differences from natural and life sciences. Predicting and explaining human behavior. Behaviorism. Reduction, holism, and individualism. Related moral issues. The social sciences and philosophy.

*Prerequisite(s):* One course in Philosophy or a social science recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**PHI 111 – Philosophy of Space & Time (4 units)**

*Course Description:* Philosophical problems of space and time.

Philosophical implications of space-time theories, such as those of Newton and Einstein. Topics may include the nature of geometry, conventionalism, absolutist versus relationist views of space and time, philosophical impact of relativity theory.

*Prerequisite(s):* One upper division Philosophy course recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 112 – Intermediate Symbolic Logic (4 units)**

*Course Description:* Predicate logic syntax and semantics. Transcription between predicate logic and English. Models, truth-trees, and derivations. Identity, functions, and definite descriptions. Introduction to concepts of metatheory.

*Prerequisite(s):* PHI 012 C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**PHI 113 – Metalogic (4 units)**

*Course Description:* The metalogic of classical propositional and first-order predicate logic. Consistency, soundness and completeness of both propositional and predicate logic. The Löwenheim-Skolem theorem for predicate logic. Undecidability of predicate logic.

*Prerequisite(s):* PHI 112; MAT 108; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**PHI 114 – History of Ethics (4 units)**

*Course Description:* Study of some classic texts from the history of philosophical writing on central problems of ethics, taking the form either of a survey or concentrated examination of selected historical figures. Readings from such philosophers as Aristotle, Butler, Hume, Kant, Mill.

*Prerequisite(s):* One previous Philosophy course recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 115 – Problems in Normative Ethics (4 units)**

*Course Description:* Moral philosophy studied through examination of moral problems and the moral principles and common sense intuitions that bear on them. Problems discussed may include: animal rights, fetal rights, euthanasia, justice and health care, war, nuclear deterrence, world hunger, environmental protection.

*Prerequisite(s):* One previous course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 116 – Ethical Theories (4 units)**

*Course Description:* Study of fundamental concepts and problems in ethical theory through an examination of classical and contemporary philosophical theories of ethics. Among the theories that may be discussed are utilitarianism, virtue theory, theories of natural rights, Kantian ethical theory, and contractarianism.

*Prerequisite(s):* One course in ethics recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 117 – Foundations of Ethics (4 units)**

*Course Description:* Advanced investigation of questions about the nature and foundations of morality. Among the topics that may be discussed are moral realism and anti-realism, cognitivism and non-cognitivism, types of relativism, moral skepticism, normative language and normative belief.

*Prerequisite(s):* PHI 114, 115, 116, 101, or 137 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 118 – Political Philosophy (4 units)**

*Course Description:* Intensive examination of some central concepts of political thought such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**PHI 119 – Philosophy of Law (4 units)**

*Course Description:* Philosophical theories of the nature of law, legal obligation, the relation of law and morals. Problems for law involving liberty and justice: freedom of expression, privacy, rights, discrimination and fairness, responsibility, and punishment.

*Prerequisite(s):* Consent of instructor; one course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**PHI 120 – Environmental Ethics (4 units)**

*Course Description:* Conceptual and ethical issues concerning the environment. Extension of ethical theory to animals, all life, and ecosystem wholes. Topics may include contemporary environmental issues such as global warming, sustainability and biodiversity.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit for students who have completed PHI 115 prior to fall 2011.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 121 – Bioethics (4 units)**

*Course Description:* In-depth coverage of topics in bioethics including resource allocation, measures of health and disease/disability, public health, and ethical issues related to research on human subjects and emerging technologies.

*Prerequisite(s):* PHI 015 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 122 – Philosophy of Race (4 units)**

*Course Description:* Core issues in the philosophy of race, including investigation of the nature and reality of race, use of race in science and medicine, nature of racial identity, and ethical responses to racial injustice.

*Prerequisite(s):* One previous course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 123 – Aesthetics (4 units)**

*Course Description:* Nature of art, of artistic creation, of the work of art, and of aesthetic experience; nature and validity of criticism; relations of art to its environment.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 125 – Theory of Action (4 units)**

*Course Description:* Survey of prominent contemporary approaches to leading problems in action theory. Problems include issues about the nature of intentional action and the conceptual character of explanations of actions in terms of the agent's reasons.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 128 – Rationality (4 units)**

*Course Description:* Philosophical issues concerning rationality in its various forms. Focus is on theoretical and practical reasoning and conditions for rational belief, choice, and action. Possible additional topics include rationality and human limitations; paradoxes of rationality; varieties of irrationality; rationality and objectivity.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**PHI 129 – Knowledge & the A Priori (4 units)**

*Course Description:* Self-evidence, intuition, the (in)fallibility and (in)defeasibility of a priori methods. Analytic, formalist and Kantian accounts of how knowledge can be acquired through reasoning and intuition alone, without recourse to empirical methods.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 131 – Philosophy of Logic & Mathematics (4 units)**

*Course Description:* Nature of formal systems and mathematical theories. Selected topics include logical and semantical paradoxes; foundations of mathematics; set theory, type theory, and intuitionistic theory; philosophy of geometry; philosophical implications of Gödels incompleteness results.

*Prerequisite(s):* PHI 012 or one course for credit in mathematics.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 133 – Logic, Probability, & Artificial Intelligence (4 units)**

*Course Description:* Introduction to theoretical artificial intelligence with a focus on nonmonotonic logic, Bayesian networks, and learning theory.

*Prerequisite(s):* PHI 012; (PHI 112 or STA 013).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## **PHI 134 – Modal Logic (4 units)**

*Course Description:* Survey of the main systems of modal logic, including Lewis systems S4 and S5. Possible worlds semantics and formal proofs. Applications to epistemology, ethics, or temporality.

*Prerequisite(s):* PHI 112 or MAT 108; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **PHI 135 – Alternative Logics (4 units)**

*Course Description:* Alternatives to standard truth-functional logic, including many-valued logics, intuitionist logics, relevance logics, and non-monotonic logics.

*Prerequisite(s):* PHI 012 or MAT 108; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **PHI 136 – Formal Epistemology (4 units)**

*Course Description:* Formal (mathematical) approaches to belief revision, knowledge and deduction, meta-knowledge, (multi-agent) epistemic logic, Bayesian confirmation, Bayes nets, epistemic and probabilistic paradoxes.

*Prerequisite(s):* PHI 012.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **PHI 137A – Philosophy of Language: Theory of Reference (4 units)**

*Course Description:* Survey of issues and views concerning reference, or how words refer to things. Topics include names and descriptions, the distinction between sense and reference, the puzzle of non-referring terms, causal theories of reference, and possibility and necessity.

*Prerequisite(s):* One course in Philosophy or Linguistics recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 137B – Philosophy of Language: Truth & Meaning (4 units)**

*Course Description:* Comparative treatment of theories about the relationship between truth and meaning. Topics include: the identification of meaning with truth conditions, the nature of propositions, theories of linguistic understanding, the roles of mind and world in determining meaning.

*Prerequisite(s):* One course in Philosophy or Linguistics recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 137C – Philosophy of Language: Semantics & Pragmatics (4 units)**

*Course Description:* Philosophical issues and positions concerning the meaning and use of language. Topics include the distinction between meaning and implication, the roles of context and convention in language use, speaker meaning versus linguistic meaning and speech act theory.

*Prerequisite(s):* One course in Philosophy or Linguistics recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 141 – Socrates & the Socratic Dialogue (4 units)**

*Course Description:* Philosophy of Socrates as found in the Socratic dialogues of Plato. Topics include the Socratic practice of refutation, its method, epistemological foundation, and moral purpose; Socratic eudaimonism and Socratic virtue theory; the paradoxes of Socratic intellectualism.

*Prerequisite(s):* PHI 021 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 143 – Hellenistic Philosophy (4 units)**

*Course Description:* Positions and arguments of the major philosophical schools of the Hellenistic period: Stoicism, Epicureanism, and Scepticism. Focus is on ethical, epistemological and metaphysical questions and their interconnectedness.

*Prerequisite(s):* PHI 021 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 145 – Christian, Islamic, & Jewish Philosophers of the Middle Ages (4 units)**

*Course Description:* Major Christian, Islamic, and Jewish philosophers of the Middle Ages.

*Prerequisite(s):* PHI 021 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **PHI 151 – 19th-Century European Philosophy (4 units)**

*Course Description:* Survey of the main movements in 19th-century philosophy on the European continent. Idealism in Schopenhauer and Hegel, dialectical materialism in Marx, irrationalism in Kierkegaard, Nietzsche and Dostoevsky.

*Prerequisite(s):* PHI 022 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 156 – Contemporary Analytic Philosophy (4 units)**

*Course Description:* Consideration of central issues such as meaning/reference, analytic/synthetic, reductionism, formal and ordinary language, essential properties, ontological commitment, possible world semantics; influential works by philosophers such as Russell, Moore, Wittgenstein, Austin, Carnap, Quine, Putnam, Kripke, van Fraassen.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 157 – 20th-Century European Philosophy (4 units)**

*Course Description:* Survey of the main movements in 20th-century philosophy on the European continent, including phenomenology, existentialism, post-structuralism and post-modernism. Philosophers covered are Husserl, Heidegger, Sartre, Foucault, Derrida.

*Prerequisite(s):* One course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 160 – Pre-Socratics (4 units)**

*Course Description:* Study of the metaphysical views of such pre-Socratic figures as the Milesians, the Pythagoreans, Heraclitus, Parmenides, Empedocles, Anaxagoras, and the atomists.

*Prerequisite(s):* PHI 021 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 161 – Plato (4 units)**

*Course Description:* Examines Platos most important contributions in metaphysics, epistemology, psychology, cosmology, ethics and political philosophy. Dialogues will be selected from Platos middle and later writings.

*Prerequisite(s):* PHI 021 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 162 – Aristotle (4 units)**

*Course Description:* Overview of Aristotles most central and influential writings. Topics selected from fields such as metaphysics, physics, ethics, logic, and psychology.

*Prerequisite(s):* PHI 021 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 168 – Descartes (4 units)**

*Course Description:* Philosophical writings of René Descartes. Topics include the refutation of skepticism, the nature and existence of mind and body, the existence of God, and the foundations of science.

*Prerequisite(s):* PHI 022 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 170 – Spinoza & Leibniz (4 units)**

*Course Description:* Philosophical writings of Spinoza and Leibniz in the 17th century. Topics drawn from both philosophers include: the nature and existence of God, the nature of mind, the relation between mind and body, human freedom, metaphysical monism vs. pluralism.

*Prerequisite(s):* PHI 022 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 171 – Reimagining Early Modern Philosophy (4 units)**

*Course Description:* Historically underrepresented figures and topics in early modern philosophy. Early modern women philosophers, such as Margaret Cavendish, Elisabeth of Bohemia, and Anne Conway. African philosophers or freed slaves such as Anton Wilhelm Amo and Olaudah Equiano. Topics may include the relation between the mind and the body, human nature, human diversity, equality, the ethics of slavery, and the nature of race and gender.

*Prerequisite(s):* PHI 022 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s); Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 172 – Locke & Berkeley (4 units)**

*Course Description:* Principal metaphysical works of John Locke and George Berkeley. Topics include abstract ideas, existence of matter, primary and secondary qualities, essence, substance, the existence of God, and the nature of scientific knowledge.

*Prerequisite(s):* PHI 022 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 174 – Hume (4 units)**

*Course Description:* David Hume's Treatise of Human Nature and related writings. Topics include empiricism, space, causality, belief, skepticism, the passions, and morality.

*Prerequisite(s):* PHI 022 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 175 – Kant (4 units)**

*Course Description:* Immanuel Kant's Critique of Pure Reason and related writings. Topics include the nature of human cognition, space and time, a priori concepts, substance, causality, human freedom, and the existence of God.

*Prerequisite(s):* PHI 022 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 178 – Frege (4 units)**

*Course Description:* Development of Gottlob Frege's views about language and logic. Formulation of his grand mathematical idea known as logicism and how it led to the philosophy of language.

*Prerequisite(s):* Consent of instructor; one upper division course in Philosophy recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 189A – Special Topics in Philosophy: History of Philosophy (4 units)**

*Course Description:* Special topics in History of Philosophy.

*Prerequisite(s):* One course in the area of the special topic recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PHI 189B – Special Topics in Philosophy: Metaphysics (4 units)**

*Course Description:* Special topics in Metaphysics.

*Prerequisite(s):* One course in the area of the special topic recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 189C – Special Topics in Philosophy: Theory of Knowledge (4 units)**

*Course Description:* Special topics in Theory of Knowledge.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Writing Experience (WE).

## **PHI 189D – Special Topics in Philosophy: Ethics (4 units)**

*Course Description:* Special topics in Ethics.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 189E – Special Topics in Philosophy: Political Philosophy (4 units)**

*Course Description:* Special topics in Political Philosophy.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 189F – Special Topics in Philosophy: Philosophy of Law (4 units)**

*Course Description:* Special topics in Philosophy of Law.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 189G – Special Topics in Philosophy: Aesthetics (4 units)**

*Course Description:* Special topics in Aesthetics.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 189H – Special Topics in Philosophy: Philosophy of Mind (4 units)**

*Course Description:* Special topics in Philosophy of Mind.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **PHI 189I – Special Topics in Philosophy: Philosophy of Science (4 units)**

*Course Description:* Special Topics in Philosophy of Science.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Writing Experience (WE).

## **PHI 189J – Special Topics in Philosophy: Philosophy of Language (4 units)**

*Course Description:* Special topics in Philosophy of Language.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH).

## **PHI 189K – Special Topics in Philosophy: Logic (4 units)**

*Course Description:* Special topics in Logic.  
*Prerequisite(s):* One course in the area of the special topic recommended.  
*Learning Activities:* Lecture/Discussion 4 hour(s).  
*Repeat Credit:* May be repeated 8 unit(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH).

## **PHI 194HA – Honors Research Project (4 units)**

*Course Description:* Completion of honors research project under direction of an instructor. Consult departmental major advisor for list of instructors available in a given quarter.  
*Prerequisite(s):* Consent of instructor; open to students who are members of the honors program in Philosophy.  
*Learning Activities:* Tutorial 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

## **PHI 194HB – Research Project (4 units)**

*Course Description:* Completion of honors research project under direction of an instructor. Consult departmental major advisor for list of instructors available in a given quarter.  
*Prerequisite(s):* Consent of instructor; open to students who are members of the honors program in Philosophy.  
*Learning Activities:* Tutorial 3 hour(s), Term Paper.  
*Grade Mode:* Letter.

## **PHI 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.

## **PHI 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.  
*Prerequisite(s):* Consent of instructor.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.

**PHI 200A – Proseminar I (4 units)**

*Course Description:* Intensive study of core works in a selected area of philosophy. Intensive experience in philosophical writing, discussion, and presentation of written work.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open only to students in their first quarter of the Philosophy Ph.D. program.

*Grade Mode:* Letter.

**PHI 200B – Proseminar II (4 units)**

*Course Description:* Intensive study of core works in a selected area of philosophy. Intensive experience in philosophical writing, discussion, and presentation of written work.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open only to students in their first quarter of the Philosophy Ph.D. program.

*Grade Mode:* Letter.

**PHI 201 – Metaphysics (4 units)**

*Course Description:* Topics vary from quarter to quarter and may include the following: What are things? Do names refer to things? If so, how? Do things have essential properties? What is the nature of necessity?

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated when topic differs and with consent of instructor.

*Grade Mode:* Letter.

**PHI 202 – Theory of Knowledge (4 units)**

*Course Description:* Topics vary from quarter to quarter. Sample topics include belief, skepticism, justification, externalism, naturalized epistemology.

*Prerequisite(s):* Graduate standing in Philosophy or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated when topic differs and with consent of instructor.

*Grade Mode:* Letter.

**PHI 203 – Philosophy of Mind (4 units)**

*Course Description:* Topics in the philosophy of mind, such as the mind-body problem, mental representation, consciousness, intentionality.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**PHI 203P – Philosophy of Mind Practicum (4 units)**

*Course Description:* Specific research conducted and prepared for publication by advanced students in a team setting. Topics include knowledge representation and learning in neural networks, the nature and formal properties of mental representation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Practice 12 hour(s).

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHI 207 – Philosophy of Physics (4 units)**

*Course Description:* Intensive treatment of one (or more) topic(s) in the philosophy of physics, such as foundations of spacetime theories, the interpretation of quantum mechanics, or foundations of statistical mechanics.

*Prerequisite(s):* Graduate standing in Philosophy or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Letter.

**PHI 208 – Philosophy of Biology (4 units)**

*Course Description:* Intensive treatment of one (or more) topic(s) in the philosophy of biology, such as foundations of evolutionary theories, reductionism in biology, sociobiology and cultural evolution.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Letter.

**PHI 210 – Philosophy of Science (4 units)**

*Course Description:* Treatment of one or more general topics of current interest in philosophy of science. Topics may include scientific explanation, theories of confirmation, scientific realism, reduction in physics and biology.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Letter.

**PHI 212 – Philosophy of Logic & Mathematics (4 units)**

*Course Description:* Philosophical issues in logic and math. Topics may include nature of logical and mathematical truth or knowledge, correctness of logical systems, foundations of mathematics, metaphysical and epistemological presuppositions, applications to philosophical problems and formalization of philosophical theories.

*Prerequisite(s):* PHI 112 or PHI 113 or MAT 108; or MAT 125 or the equivalent.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Letter.

**PHI 213 – Advanced Logic for Graduate Students (4 units)**

*Course Description:* Intensive study of advanced logic, including set theory, metatheory of predicate logic, and modal logic.

*Prerequisite(s):* Graduate standing in Philosophy.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Problem Solving.

*Enrollment Restriction(s):* Enrollment in the Philosophy Ph.D. program.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

**PHI 214 – Ethics (4 units)**

*Course Description:* Topics may include morality and motivation, objectivity in ethics, the relationship between the factual and the moral. Topics vary from quarter to quarter.

*Prerequisite(s):* Graduate standing in Philosophy or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Letter.

**PHI 217 – Political Philosophy (4 units)**

*Course Description:* Advanced studies in political philosophy. Topics vary but may include distributive justice, enforcement of morality by the state, equality, obligation to obey the law, social contract theory.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Letter.

**PHI 220 – Environmental Ethics (4 units)**

*Course Description:* Intensive treatment of one or more topic(s) in environmental ethics, such as biodiversity, sustainability, composition of the moral community, invasive species, endangered species, applications of ethical theories to contemporary environmental issues.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PHI 237 – Philosophy of Language (4 units)**

*Course Description:* Study of philosophical issues raised by language, such as the nature of semantic content, proper semantics for verbs of propositional attitude, feasibility and limitations of formal semantics and pragmatics for natural languages.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated when topic differs and consent of instructor.

*Grade Mode:* Letter.

**PHI 238 – Philosophy of Language Workshop (4 units)**

*Course Description:* Discussion of recently published, unpublished and in-progress research in philosophy of language, including work on the relation of language and mind, of language and logic, and linguistic theory.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to graduate students only.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**PHI 261 – Plato (4 units)**

*Course Description:* Advanced seminar designed for analysis of arguments, doctrines, and texts from Plato's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**PHI 262 – Aristotle (4 units)**

*Course Description:* Advanced seminar designed for analysis of arguments, doctrines, and texts from Aristotle's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**PHI 275 – Kant (4 units)**

*Course Description:* Intensive study of a topic in the philosophy of Kant, in such areas as metaphysics, theory of knowledge, ethics.

*Prerequisite(s):* Graduate standing in Philosophy or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**PHI 290 – History of Philosophy (4 units)**

*Course Description:* Topics in the history of philosophy. Topics vary according to instructor from quarter to quarter.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs and with consent of instructor.

*Grade Mode:* Letter.

**PHI 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**PHI 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHI 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Physical Medicine & Rehabilitation (PMR)**

School of Medicine

## **PMR 100 – Research Approaches to Disability & Rehabilitation (2 units)**

*Course Description:* Discussion and evaluation of research approaches to medical rehabilitation, community integration, and quality of life of disabled persons, with a focus on the progressive disabilities associated with neuromuscular diseases. Intent is to encourage interest in professions that serve the disabled community and increase awareness of rehabilitation goals.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **PMR 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; advanced standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **PMR 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; advanced standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **PMR 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **PMR 405 – Healthy Living: Leading by Example (1.5 units)**

*Course Description:* Improve the physical and mental health of participating students while supplementing their medical education with specific concepts.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 2 hour(s), Laboratory 4 hour(s), Clinical Activity 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **PMR 405A – Healthy Living: Leading by Example (1 unit)**

*Course Description:* Improve the physical and mental health of participating students while supplementing their medical education with specific concepts.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 2 hour(s), Laboratory 4 hour(s), Clinical Activity 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **PMR 405B – Healthy Living: Leading by Example (0.5 units)**

*Course Description:* Improve the physical and mental health of participating students while supplementing their medical education with specific concepts.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 2 hour(s), Laboratory 4 hour(s), Clinical Activity 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **PMR 421 – Introduction to Sports Medicine (1 unit)**

*Course Description:* Introduction to basic concepts of Sports Medicine in Physical Medicine & Rehabilitation. Students attend afternoon clinic with Sports Medicine attending; attend lectures focusing on Sports Medicine topics. Students also eligible to cover sporting events with attending physicians where available.

*Learning Activities:* Lecture 1 hour(s), Clinical Activity 4 hour(s), Fieldwork.

*Grade Mode:* Pass/Fail only.

## **PMR 440 – Introduction to Rehabilitation Medicine (3 units)**

*Course Description:* Rehabilitation and comprehensive care of physically disabled and physical medicine management of neurologic, neuromuscular and musculoskeletal disorders. Emphasis on evaluation and conservative treatment of spinal disorders, sports injuries and neuromuscular disease. Additional emphasis on inpatient rehabilitation, pediatrics, spine or sports possible.

*Prerequisite(s):* IMD 430; SUR 430; consent of instructor.

*Learning Activities:* Clinical Activity 36 hour(s), Lecture/Discussion 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PMR 461 – Comprehensive Rehabilitation Medicine (6 units)**

*Course Description:* Four-week rotation designed as broad overview of Physical Medicine & Rehabilitation practice for students interested in residency training in the specialty. Emphasis on evaluation and conservative treatment of spinal disorders, sports injuries, neuromuscular disease, neurological and non-operative orthopedic problems requiring rehabilitative management.

*Prerequisite(s):* IMD 430; SUR 430; consent of instructor.

*Learning Activities:* Clinical Activity 36 hour(s), Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Honors/Pass/Fail.

## **PMR 462 – Rehabilitation Medicine Clinical Elective (5-18 units)**

*Course Description:* Emphasis on evaluation of patients with neurological or orthopaedic problems requiring rehabilitative techniques for their management. Introduction to management of such patients. Physical Medicine & Rehabilitation at off-campus facility must be approved by Chairperson.

*Prerequisite(s):* IMD 430; SUR 430; and consent of instructor; completion of third-year in Medical School.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **PMR 463 – Pediatric Rehabilitation Medicine: Caring for Developmental Disabilities (3 units)**

*Course Description:* Clerkship. Participate in the outpatient clinical care of children with a wide variety of medical conditions at Shriner's Hospitals for Children. Rotate through a variety of different outpatient clinics including cerebral palsy, neuromuscular disease, limb difference, spinal cord injury, spina bifida, brachial plexus, and sports medicine.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **PMR 470 – Away Acting Internship in Physical Medicine & Rehabilitation (3-6 units)**

*Course Description:* AI Externship option for PM&R rotations at other institutions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PMR 493 – Applied Musculoskeletal Anatomy: Sports & Spine SSM (6 units)**

*Course Description:* This four-week module will review the anatomy and biomechanics of the musculoskeletal system as well as its associated pathology. The students will be instructed on appropriate musculoskeletal exam techniques and logical approach to the patient in the clinical setting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **PMR 494 – Applied Musculoskeletal Anatomy: Sports & Spine (3-6 units)**

*Course Description:* Review of the anatomy and biomechanics of the musculoskeletal system as well as its associated pathology. Instruction on appropriate musculoskeletal exam techniques and logical approach to the patient in the clinical setting.

*Learning Activities:* Variable.

*Grade Mode:* Pass/Fail only.

## **PMR 498 – Advanced Group Study (1-5 units)**

*Course Description:* Study and experience for medical students in any of a number of areas in physical medicine and rehabilitation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **PMR 499 – Research for Medical Students (1-12 units)**

*Course Description:* Research on any of a variety of topics in physical medicine and rehabilitation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PAS 243A – Professional Practice in Healthcare 1 (2 units)**

*Course Description:* Role of the Physician Assistant in the context of healthcare system. Physician Assistant topics in practice of healthcare delivery within interprofessional team.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **PAS 243B – Professional Practice in Healthcare 2 (2 units)**

*Course Description:* Current trends for Physician Assistants in U.S. healthcare system; delivery of healthcare; health outcomes; and PA profession. Specific requirements for graduate PA entering professional clinical practice.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **PAS 250 – Foundations of Primary Health Care (8 units)**

*Course Description:* Foundational primary health care concepts essential to the care of common medical and surgical conditions. Foundational content in anatomy, physiology, pathophysiology and clinical reasoning organized by organ system.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 8 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **PAS 251A – Primary Health Care (8 units)**

*Course Description:* Introduction to primary health care concepts essential to the care of common medical and surgical conditions. Various organ systems and specialty areas each quarter: Ophthalmology, Pulmonology, Renal, Genitourinary and Hematology/Oncology.

*Prerequisite(s):* PAS 250 C or better; PAS 270 C or better; PAS 400 C or better; consent of instructor.

*Learning Activities:* Lecture/Discussion 8 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## **PAS 251B – Primary Health Care (8 units)**

*Course Description:* Introduction to primary health care concepts essential to the care of common medical and surgical conditions. Various organ systems and specialty areas each quarter: Cardiology, Ophthalmology, GI and Endocrinology.

*Prerequisite(s):* PAS 251A C or better; PAS 260 C or better; PAS 271A C or better; PAS 410A C or better; or consent of Instructor.

*Learning Activities:* Lecture/Discussion 8 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

# **Physician Assistant Studies (PAS)**

Graduate Studies

**PAS 251C – Primary Health Care (7 units)**

*Course Description:* Introduction to primary health care concepts essential to the care of common medical and surgical conditions. Various organ systems and specialty areas each quarter: Musculoskeletal medicine, Rheumatology, Neurology and Psychiatry.

*Prerequisite(s):* PAS 251B C or better; PAS 271B C or better; PAS 410B C or better; consent of instructor.

*Learning Activities:* Lecture/Discussion 7 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 251D – Gender and Transgender Health (4 units)**

*Course Description:* Health care concepts specific and essential to the care of men, women, and transgender populations. Unique aspects of preventive care and treatment of conditions specific to these populations.

*Prerequisite(s):* PAS 251B C or better; PAS 271B C or better; PAS 410B C or better; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 251E – Surgery & Emergency Medicine (4 units)**

*Course Description:* Concepts essential to the care of common urgent and emergent medical conditions, as well as chronic, urgent, and emergent surgical conditions. Epidemiology, presentation, evaluation and management of these conditions.

*Prerequisite(s):* PAS 251D C or better; PAS 251C C or better; PAS 271C C or better; PAS 410C C or better; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 251F – Pediatrics & Gerontology (Special Populations) (4 units)**

*Course Description:* Health care concepts essential to care of special populations at earliest and latest stages of life. Unique aspects of both pediatric and geriatric patients.

*Prerequisite(s):* PAS 410C C or better; PAS 251C C or better; PAS 271C C or better; PAS 251D C or better; consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 260 – Foundations of Behavioral Health (2 units)**

*Course Description:* Spectrum of normal psychological development over the lifespan for children, adults and elders. Theories of stress and coping mechanism as a framework for the assessment of individuals.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 270 – Foundations of Pharmacology (3 units)**

*Course Description:* Introduction to major concepts in foundational pharmacology including pharmacokinetics, pharmacodynamics, pharmacogenetics, and other molecular mechanisms of health and disease.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 271A – Advanced Pharmacology (2 units)**

*Course Description:* Pharmacology series aligned with pathophysiology and physical exam skills courses. Variable content each quarter. Different organ systems and specialty areas across the lifespan.

*Prerequisite(s):* PAS 270 C or better; PAS 250 C or better; PAS 400 C or better; consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 271B – Advanced Pharmacology (2 units)**

*Course Description:* Pharmacology series aligned with pathophysiology and physical exam skills courses. Variable content each quarter. Different organ systems and specialty areas across the lifespan.

*Prerequisite(s):* PAS 271A C or better; PAS 251A C or better; PAS 410A C or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 271C – Advanced Pharmacology (2 units)**

*Course Description:* Pharmacology series aligned with pathophysiology and physical exam skills courses. Variable content each quarter. Different organ systems and specialty areas across the lifespan.

*Prerequisite(s):* PAS 271B C or better; PAS 251B C or better; PAS 410B C or better; consent of instructor.

*Learning Activities:* Lecture/Discussion.

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 299 – Research & Writing (1-4 units)**

*Course Description:* Nursing Science and Health-Care Leadership graduate program students conduct research and writing under the supervision of a faculty member.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Extensive Writing/Discussion 3-12 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor.

*Repeat Credit:* May be repeated in different quarters, depending on the length of their program of study to complete their Master's Degree.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PAS 400 – Basic Clinical Skills (5 units)**

*Course Description:* Fundamental clinical skills for patient care. Principles of effective communication in establishing the therapeutic provider-patient relationship.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 5 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 401 – Basic Clinical Skills (1-4 units)**

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 410A – Advanced Clinical Skills (4 units)**

*Course Description:* History taking and physical examination skills with advanced/specialized content. Organ system focus varies by quarter.

*Prerequisite(s):* PAS 400 C or better; PAS 250 C or better; PAS 270 C or better; consent of instructor.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 410B – Advanced Clinical Skills (3 units)**

*Course Description:* History taking and physical examination skills with advanced/specialized content. Organ system focus varies by quarter.

*Prerequisite(s):* PAS 410A C or better; PAS 251A C or better; PAS 271A C or better; consent of instructor.

*Learning Activities:* Lecture/Lab 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 410C – Advanced Clinical Skills (3 units)**

*Course Description:* History taking and physical examination skills with advanced/specialized content. Organ system focus varies by quarter.

*Prerequisite(s):* PAS 410B C or better; PAS 251B C or better; PAS 271B C or better; consent of instructor.

*Learning Activities:* Lecture/Lab 3hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 410D – Advanced Clinical Skills (3 units)**

*Course Description:* History taking and physical examination skills with advanced/specialized content. Organ system focus varies by quarter.

*Prerequisite(s):* PAS 410C C or better; PAS 251C C or better; PAS 271C C or better; PAS 251D C or better; consent of instructor.

*Learning Activities:* Lecture/Lab 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 410E – Advanced Clinical Skills (1-4 units)**

This version has ended; see updated course, below.

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor.

*Grade Mode:* Letter.

**PAS 410E – Advanced Clinical Skills (1 units)**

*Course Description:* History taking and physical examination skills with advanced/specialized content. Organ system focus varies by quarter.

*Prerequisite(s):* PAS 410D C or better; PAS 251E C or better; PAS 251F C or better; consent of instructor.

*Learning Activities:* Lecture/Lab 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**PAS 410F – Advanced Clinical Skills (1-4 units)**

This version has ended; see updated course, below.

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to Graduate Students in the Nursing Science & Health-Care Leadership Graduate Degree programs, or by consent of instructor.

*Grade Mode:* Letter.

**PAS 410F – Advanced Clinical Skills (1 units)**

*Course Description:* History taking and physical examination skills with advanced/specialized content. Organ system focus varies by quarter.

*Prerequisite(s):* PAS 410E C or better; consent of instructor.

*Learning Activities:* Lecture/Lab 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

This course version is effective from, and including: Winter Quarter 2024.

**PAS 410G – Advanced Clinical Skills (1-4 units)**

This version has ended; see updated course, below.

*Course Description:* Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Lab 1-4 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 410G – Advanced Clinical Skills (1 units)**

*Course Description:* History taking and physical examination skills with advanced/specialized content. Organ system focus varies by quarter.

*Prerequisite(s):* PAS 410F C or better; consent of instructor.

*Learning Activities:* Lecture/Lab 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

This course version is effective from, and including: Spring Quarter 2024.

**PAS 440 – Preparation for Clinical Practice (1-3 units)**

*Course Description:* Students are placed in clinical settings and/or clinical simulation laboratories to observe and practice the integration of clinical skills with direct supervision by faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 36 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 450 – Supervised Clinical Practice Experience - Family Medicine (1-16 units)**

*Course Description:* Five-week clinical rotation under the supervision of an appropriate community-based family medicine provider per accreditation requirements.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C + or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 451 – Supervised Clinical Practice Experience - Pediatrics (1-16 units)**

*Course Description:* Five-week clinical rotation under the supervision of an appropriate community-based pediatric medicine provider per accreditation requirements.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C + or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 452 – Supervised Clinical Practice Experience - Women's Health (1-16 units)**

*Course Description:* Five-week clinical rotation under the supervision of an appropriate community-based women's health and prenatal care provider per accreditation requirements.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C + or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 453 – Supervised Clinical Practice Experience - Mental Health (1-16 units)**

*Course Description:* Five-week clinical rotation under the supervision of an appropriate community-based psychiatrist, psychiatric/mental health provider per accreditation requirements.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C + or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 454 – Supervised Clinical Practice Experience - Emergency Medicine (1-16 units)**

*Course Description:* Five-week clinical rotation under the supervision of an appropriate emergency medicine provider per accreditation requirements.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C + or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 455 – Supervised Clinical Practice Experience - Inpatient Surgery (1-16 units)**

*Course Description:* Five-week clinical experience under the supervision of an appropriate surgical provider per accreditation requirements.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C + or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

**PAS 456 – Supervised Clinical Practice Experience - Internal Medicine (1-16 units)**

*Course Description:* Five-week clinical rotation under the supervision of an appropriate internal medicine provider per accreditation requirements.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C + or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Grade Mode:* Letter.

## PAS 459 – Supervised Clinical Practice Experience - Other Specialties (1-16 units)

*Course Description:* Five-week selective rotations available to accommodate student interest and/or accommodate a student's clinical deficits identified by the program.

*Prerequisite(s):* PAS 251E C+ or better; PAS 251F C+ or better; PAS 410D C+ or better; or consent of instructor.

*Learning Activities:* Clinical Activity 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students in School of Nursing programs, or consent of instructor.

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Letter.

# Physics (PHY)

College of Letters & Science

## PHY 001A – Principles of Physics (3 units)

*Course Description:* Mechanics. Introduction to general principles and analytical methods used in physics with emphasis on applications in applied agricultural and biological sciences and in physical education.

*Prerequisite(s):* Trigonometry or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open to students who have received credit for PHY 007B or PHY 009A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 001B – Principles of Physics (3 units)

*Course Description:* Continuation of PHY 001A. Heat, optics, electricity, modern physics.

*Prerequisite(s):* PHY 001A or PHY 009A.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have received credit for PHY 007A, PHY 007B, PHY 007C, PHY 009B, PHY 009C, or PHY 009D.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 007A – General Physics (4 units)

*Course Description:* Introduction to general principles and analytical methods used in physics for students majoring in a biological science.

*Prerequisite(s):* MAT 016B (can be concurrent) or MAT 017B (can be concurrent) or MAT 021B (can be concurrent); completion or concurrent enrollment in MAT 016B or MAT 017B or MAT 021B.

*Learning Activities:* Lecture 1.50 hour(s), Discussion/Laboratory 5 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed to students who have completed PHY 001B or PHY 009B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 007B – General Physics (4 units)

*Course Description:* Continuation of PHY 007A.

*Prerequisite(s):* PHY 007A.

*Learning Activities:* Lecture 1.50 hour(s), Discussion/Laboratory 5 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed to students who have completed PHY 001A or PHY 009A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 007C – General Physics (4 units)

*Course Description:* Continuation of PHY 007B.

*Prerequisite(s):* PHY 007B.

*Learning Activities:* Lecture 1.50 hour(s), Discussion/Laboratory 5 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed to students who have completed PHY 009C or PHY 005C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 009A – Classical Physics (5 units)

*Course Description:* Introduction to general principles and analytical methods used in physics for physical science and engineering majors. Classical mechanics.

*Prerequisite(s):* MAT 021B or MAT 021M; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2.50 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have completed PHY 001A or PHY 007B; not open for credit to students who have completed PHY 009HA.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 009B – Classical Physics (5 units)

*Course Description:* Continuation of PHY 009A. Fluid mechanics, thermodynamics, wave phenomena, optics.

*Prerequisite(s):* PHY 009A; MAT 021C; MAT 021D (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Laboratory 2.50 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have completed PHY 007A; not open for credit to students who have completed PHY 009HB, PHY 009HC, or ENG 105.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 009C – Classical Physics (5 units)

*Course Description:* Electricity and magnetism including circuits and Maxwell's equations.

*Prerequisite(s):* PHY 009B; MAT 021D; (MAT 022A or MAT 027A (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Laboratory 2.50 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 3 units of credit for students who have completed PHY 007C; not open for credit to students who have completed PHY 009HD.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## PHY 009D – Modern Physics (4 units)

*Course Description:* Introduction to physics concepts developed since 1900. Special relativity, quantum mechanics, atoms, molecules, condensed matter, nuclear and particle physics.

*Prerequisite(s):* PHY 009C; (MAT 022A or MAT 027A); MAT 022B or MAT 27B recommended (may be taken concurrently).

*Learning Activities:* Lecture 3 hour(s), Discussion 1.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 009HA – Honors Physics (5 units)**

*Course Description:* Classical mechanics. Same material as PHY 009A in greater depth. For students in physical sciences, mathematics, and engineering.

*Prerequisite(s):* MAT 021B (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have completed PHY 007B; not open for credit to students who have completed PHY 009A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 009HB – Honors Physics (5 units)**

*Course Description:* Special relativity, thermal physics. Continuation of PHY 009HA.

*Prerequisite(s):* (PHY 009HA or PHY 009A); MAT 021C (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have completed PHY 007A; not open for credit to students who have completed PHY 009B or PHY 009D.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 009HC – Honors Physics (5 units)**

*Course Description:* Waves, sound, optics, quantum physics. Continuation of Physics 9HB.

*Prerequisite(s):* PHY 009HB; MAT 021D (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Only 2 units of credit for students who have completed PHY 007C; not open for credit to students who have completed PHY 009B or PHY 009D.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 009HD – Honors Physics (5 units)**

*Course Description:* Electricity and magnetism. Continuation of Physics 9HC.

*Prerequisite(s):* PHY 009HC; MAT 021D.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PHY 009C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 009HE – Honors Physics (5 units)**

*Course Description:* Application of quantum mechanics.

*Prerequisite(s):* PHY 009HD; (MAT 022B or MAT 027B (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PHY 009D.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 010 – Topics in Physics for Nonscientists (4 units)**

*Course Description:* Emphasis varies: survey of basic principles or a deeper exploration of some particular branch. Past topics included black holes, space time, and relativity; physics of music; history and philosophy; energy and the environment; and natural phenomena.

*Prerequisite(s):* High school algebra.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No units of credit allowed if taken after any other PHY course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 010C – Physics of California (3 units)**

*Course Description:* Atmospheric phenomena common in CA, local weather patterns and microclimes. Applications to CA energy, water, and resource management policies. Physics underlying regional sports in CA.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed any quarter of PHY 009 or PHY 009H, or any upper division PHY course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

**PHY 010CY – Physics of California (3 units)**

*Course Description:* Conceptual understanding of the physics underlying regional sports in CA. Focus on skiing, surfing, and scuba diving.

Atmospheric phenomena common in CA, local weather patterns and microclimes, applications to CA energy, and water are also discussed.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 0.50 hour(s), Discussion 1.50 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PHY 010C, any quarter of PHY 009A, PHY 009B, PHY 009C, PHY 009D, PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, or PHY 009HE, or any upper division PHY course.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

**PHY 012 – Visualization in Science (3 units)**

*Course Description:* Production, interpretation, and use of images in physics, astronomy, biology, and chemistry as scientific evidence and for communication of research results.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

**PHY 030 – Fractals, Chaos & Complexity (3 units)**

*Course Description:* Modern ideas about the unifying ideas of fractal geometry, chaos and complexity. Basic theory and applications with examples from physics, earth sciences, mathematics, population dynamics, ecology, history, economics, biology, computer science, art and architecture.

*Prerequisite(s):* MAT 016A or MAT 017A or MAT 021A.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* GEL 030.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **PHY 040 – Introduction to Computational Physics (3 units)**

*Course Description:* Introduction to programming with examples from numerical analysis and computational physics. Introduction to modern tools used for scientific analysis and computer algebra.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 045 – Computational Physics (4 units)**

*Course Description:* Algorithms and programming techniques of computational physics with applications from introductory physics.

*Prerequisite(s):* PHY 040; PHY 009C or PHY 009HD.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Credit Limitation(s):* No credit if PHY 104B was taken prior to Fall 2022; 2 units of credit if student has taken PHY 102.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 049 – Supplementary Work in Lower Division Physics (1-3 units)**

*Course Description:* With consent of instructor, students with partial credit in lower division physics courses may complete the credit under this heading.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 080 – Experimental Techniques (4 units)**

*Course Description:* Experimental techniques. Design of circuits. Data analysis, sources of noise, statistical and systematic uncertainties. Light sources, detection, and measurement in basic optical systems.

*Prerequisite(s):* PHY 009D or PHY 009HD.

*Learning Activities:* Lecture 2 hour(s), Laboratory 5 hour(s).

*Enrollment Restriction(s):* Open to Physics and Applied Physics majors only.

*Grade Mode:* Letter.

## **PHY 090X – Lower Division Seminar (2 units)**

*Course Description:* Examination of a special topic in Physics through shared readings, discussions, written assignments, or special activities such as laboratory work.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor. Primary for lower division students.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PHY 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PHY 102 – Computational Laboratory in Physics (1 unit)**

*Course Description:* Introduction to computational physics and to the computational resources in the physics department. Preparation for brief programming assignments required in other upper division physics classes.

*Prerequisite(s):* (MAT 021D, (MAT 022A or MAT 027A), (MAT 022B or MAT 027B)), (PHY 009D or PHY 009HD), PHY 040, PHY 104A (can be concurrent).

*Learning Activities:* Laboratory 4 hour(s).

*Credit Limitation(s):* Not open to students who have completed PHY 104B or PHY 105AL.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 104A – Introduction to Mathematical Methods in Physics (4 units)**

*Course Description:* Introduction to mathematics used in upper division physics courses, including applications of vector spaces, Fourier analysis, and partial differential equations.

*Prerequisite(s):* PHY 009C or PHY 009HD; MAT 022B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 104B – Computational Methods of Mathematical Physics (4 units)**

*Course Description:* Introduction to the use of computational techniques to solve the mathematical problems that arise in advanced physics courses, complementing the analytical approaches emphasized in PHY 104A.

*Prerequisite(s):* PHY 104A C- or better; PHY 105AL; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 104C – Intermediate Methods of Mathematical Physics (4 units)**

*Course Description:* Applications of complex analysis, conditional probability, integral transformations and other advanced topics.

*Prerequisite(s):* PHY 104A C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

## **PHY 105A – Classical Mechanics (4 units)**

*Course Description:* Principles and applications of Newtonian mechanics. Introduction to Lagrangian and Hamiltonian mechanics.

*Prerequisite(s):* PHY 009C or PHY 009HD; MAT 022A; MAT 022B (can be concurrent).

*Learning Activities:* Lecture 3 hour(s); Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 105B – Analytical Mechanics (4 units)**

*Course Description:* Principles and applications of Newtonian mechanics; introduction to Lagrange's and Hamilton's equations.

*Prerequisite(s):* PHY 104A C or better; PHY 105A C or better; or consent of department for any of the courses.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 105C – Continuum Mechanics (4 units)**

*Course Description:* The continuum hypothesis and limitations, tensors, isotropic constitutive equations, and wave propagation. Applications such as elastic solids, heat flow, aerodynamics, and ocean waves.

*Prerequisite(s):* PHY 104A C- or better; PHY 105A C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 108 – Optics (3 units)**

*Course Description:* The phenomena of diffraction, interference, and polarization of light, with applications to current problems in astrophysics, material science, and atmospheric science. Study of modern optical instrumentation. Open to non-majors.

*Prerequisite(s):* ((PHY 009A, PHY 009B, PHY 009C, PHY 009D) or (PHY 007A, PHY 007B, PHY 007C) or (PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, PHY 009HE)); (MAT 021A, MAT 021B, MAT 021C, MAT 021D); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 108L – Optics Laboratory (1 unit)**

*Course Description:* The laboratory will consist of one major project pursued throughout the quarter, based on modern applications of optical techniques.

*Prerequisite(s):* PHY 108 (can be concurrent); PHY 108 required concurrently.

*Learning Activities:* Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 110A – Electricity & Magnetism (4 units)**

*Course Description:* Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves.

*Prerequisite(s):* (PHY 009B C- or better, PHY 009C C- or better, PHY 009D C- or better) or (PHY 009HB C- or better, PHY 009HC C- or better, PHY 009HD C- or better, PHY 009HE C- or better); MAT 021D C- or better; (MAT 022A C- or better or MAT 027A C- or better); (MAT 022B C- or better or MAT 027B C- or better); PHY 104A; PHY 105A; or consent of department.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 110B – Electricity & Magnetism (4 units)**

*Course Description:* Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves.

*Prerequisite(s):* PHY 110A C- or better; PHY 104A C- or better; or consent of department.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 110C – Electricity & Magnetism (4 units)**

*Course Description:* Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves.

*Prerequisite(s):* PHY 110B C- or better; or consent of department.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 110L – Computational Physics Lab for Electricity & Magnetism (1 unit)**

*Course Description:* Applications of computational physics to problems from electricity and magnetism.

*Prerequisite(s):* PHY 045 or ECS 036B; PHY 110B (can be concurrent).

*Learning Activities:* Lecture/Lab 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 112 – Thermodynamics & Statistical Mechanics (4 units)**

*Course Description:* Introduction to classical and quantum statistical mechanics and their connections with thermodynamics. Theory is developed for the ideal gas model and simple magnetic models and then extended to studies of solids, quantum fluids, and chemical equilibria.

*Prerequisite(s):* PHY 115A; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 112L – Computational Physics Lab for Statistical Mechanics (1 unit)**

*Course Description:* Applications of computational physics to problems from statistical mechanics.

*Prerequisite(s):* PHY 045 or ECS 036B; PHY 112 (can be concurrent).

*Learning Activities:* Lecture/Lab 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 115A – Foundation of Quantum Mechanics (4 units)**

*Course Description:* Introduction to the methods of quantum mechanics with applications to atomic, molecular, solid state, nuclear and elementary particle physics. Extensive problem solving.

*Prerequisite(s):* PHY 104A C- or better; PHY 105A C- or better; or consent of department.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 115B – Applications of Quantum Mechanics (4 units)**

*Course Description:* Angular momentum and spin; hydrogen atom and atomic spectra; perturbation theory; scattering theory.

*Prerequisite(s):* PHY 115A C- or better; or consent of department.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 115L – Computational Physics Lab for Quantum Mechanics (1 unit)**

*Course Description:* Applications of computational physics to problems from Classical and Quantum Mechanics.

*Prerequisite(s):* PHY 045 or ECS 036B; PHY 115A.

*Learning Activities:* Lecture/Lab 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 116A – Electronic Instrumentation (4 units)**

*Course Description:* Experimental and theoretical study of important analog electronic circuits. Linear circuits, transmission lines, input impedance, feedback, amplifiers, oscillators, noise.

*Prerequisite(s):* (PHY 009C or PHY 009HD); (MAT 022B or MAT 027B); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **PHY 116B – Electronic Instrumentation (4 units)**

*Course Description:* Continuation of PHY 116A. Introduction to the use of digital electronics and microcomputers in experimental physics. Nonlinear electronics, integrated circuits, analog-to-digital and digital-to-analog converters, transducers, actuators.

*Prerequisite(s):* PHY 009C or PHY 009HD; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 116C – Introduction to Computer-Based Experiments in Physics (4 units)**

*Course Description:* Introduction to techniques for making physical measurements using computer-based instrumentation.

*Prerequisite(s):* (PHY 009D or PHY 009HD); PHY 116B; MAT 022B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **PHY 117 – Physics Instrumentation with Analog & Digital Electronics (4 units)**

*Course Description:* Experimental and theoretical study of important electronic circuits involving analog and digital components. Feedback, amplifiers, oscillators, noise, integrated circuits, digital logic, timers, analog-to-digital and digital-to-analog converters.

*Prerequisite(s):* PHY 080.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Credit Limitation(s):* 2 units of credit if student has taken PHY 116A; no credit if student has taken PHY 116B.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 118 – Physics Instrumentation for Data Acquisition (4 units)**

*Course Description:* Experimental application of modern high-density integrated circuits. Automated data acquisition, microprocessors, field programmable gate arrays.

*Prerequisite(s):* PHY 080; PHY 045 or ECS 036B.

*Learning Activities:* Lecture 3 hour(s); Laboratory 3 hour(s).

*Credit Limitation(s):* 2 units of credit if student has taken PHY 116B; no credit if student has taken PHY 116C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 122A – Advanced Laboratory in Condensed Matter Physics (4 units)**

*Course Description:* Experimental techniques and measurements in solid-state physics. Three-six experiments performed depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required.

*Prerequisite(s):* PHY 104A; PHY 105A; PHY 110B; PHY 115A; PHY 112 (can be concurrent); PHY 080; or consent of the department.

*Learning Activities:* Laboratory 8 hour(s).

*Enrollment Restriction(s):* Registration by Permission to Add (PTA) number only; priority given to graduating PHY and APP majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **PHY 122B – Advanced Laboratory in Particle Physics (4 units)**

*Course Description:* Experimental techniques and measurements in nuclear and particle physics. Students perform three to six experiments depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required.

*Prerequisite(s):* PHY 104A; PHY 105A; PHY 110B; PHY 115A; PHY 112 (can be concurrent); PHY 080; or consent of the department.

*Learning Activities:* Laboratory 8 hour(s).

*Enrollment Restriction(s):* Registration by Permission to Add (PTA) number only; priority given to graduating PHY and APP majors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **PHY 123 – Signals & Noise in Physics (4 units)**

*Course Description:* Techniques of measurement and analysis designed to avoid systematic error and maximize signal/noise ratio. Illustrative examples of optimal filters ranging from condensed matter to cosmology.

*Prerequisite(s):* (PHY 009A, PHY 009B, PHY 009C, PHY 009D) or (PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, PHY 009HE); PHY 104A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have taken this course previously as PHY 198 with the Signals & Noise in Physics topic.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 129A – Introduction to Nuclear Physics (4 units)**

*Course Description:* Survey of basic nuclear properties and concepts requiring introductory knowledge of quantum mechanics: nuclear models and forces, radioactive decay and detecting nuclear radiation and nuclear reaction products, alpha, beta and gamma decay.

*Prerequisite(s):* PHY 115A C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 129B – Nuclear Physics, Extensions & Applications (4 units)**

*Course Description:* Continuation of PHY 129A. Nuclear reactions, neutrons, fission, fusion accelerators, introduction to meson and particle physics, nuclear astrophysics, and applications of nuclear physics and techniques to mass spectrometry, nuclear medicine, trace element analysis.

*Prerequisite(s):* PHY 129A.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 130A – Elementary Particle Physics (4 units)**

*Course Description:* Properties and classification of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak interactions. Introduction to Feynman calculus.

*Prerequisite(s):* PHY 115A C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 130B – Elementary Particle Physics (4 units)**

*Course Description:* Properties and classification of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak interactions. Introduction to Feynman calculus.

*Prerequisite(s):* PHY 115A C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 140A – Introduction to Solid State Physics (4 units)**

*Course Description:* Survey of fundamental ideas in the physics of solids, with selected device applications. Crystal structure, x-ray and neutron diffraction, phonons, simple metals, energy bands and Fermi surfaces, semiconductors, optical properties, magnetism, superconductivity.

*Prerequisite(s):* PHY 115A C- or better; or equivalent course passed with C- or better, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 140B – Introduction to Solid State Physics (4 units)**

*Course Description:* Survey of fundamental ideas in the physics of solids, with selected device applications. Crystal structure, x-ray and neutron diffraction, phonons, simple metals, energy bands and Fermi surfaces, semiconductors, optical properties, magnetism, superconductivity.

*Prerequisite(s):* PHY 115A C- or better; or equivalent course passed with C- or better, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 150 – Special Topics in Physics (4 units)**

*Course Description:* Topics vary, covering areas of contemporary research in physics.

*Prerequisite(s):* (PHY 009A, PHY 009B, PHY 009C, PHY 009D) or (PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, PHY 009HE); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 151 – Stellar Structure & Evolution (4 units)**

*Course Description:* Chemical composition, structure, energy sources and evolutionary history of stars, with equal emphasis on both the observational data and theoretical models, including black holes, neutron stars and white dwarfs and the formation of substellar masses.

*Prerequisite(s):* (PHY 009A, PHY 009B, PHY 009C, PHY 009D) or (PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, PHY 009HE); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 152 – Galactic Structure & the Interstellar Medium (4 units)**

*Course Description:* Structure, contents, and formation of our Milky Way galaxy, viz. its shape and size, the nature of the interstellar medium, stellar populations, rotation curves, mass determination and evidence of dark matter.

*Prerequisite(s):* ((PHY 009A, PHY 009B, PHY 009C, PHY 009D) or (PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, PHY 009HE)); PHY 105A (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PHY 153 – Extragalactic Astrophysics (4 units)**

*Course Description:* Structure and evolution of galaxies and clusters of galaxies, including distance and mass determination, galaxy types and environments, active galactic nuclei and quasars, gravitational lensing and dark matter, global cosmological properties.

*Prerequisite(s):* ((PHY 009A, PHY 009B, PHY 009C, PHY 009D) or (PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, PHY 009HE)); PHY 104A; PHY 105A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Credit Limitation(s):* Not open to students who have taken PHY 127.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 154 – Astrophysical Applications of Physics (4 units)**

*Course Description:* Applications of classical and quantum mechanics, thermodynamics, statistical mechanics, and electricity and magnetism to astrophysical settings such as the Big Bang, degenerate white dwarf and neutron stars, and solar neutrinos.

*Prerequisite(s):* PHY 105A; PHY 105B; PHY 110B (can be concurrent); PHY 115A (can be concurrent); PHY 112; PHY 112 or consent of instructor; PHY 110B and PHY 115A required concurrently.

*Learning Activities:* Lecture 3 hour(s), Project.

*Enrollment Restriction(s):* Not open to students who have taken this course previously as PHY 198.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 155 – General Relativity (4 units)**

*Course Description:* Definition of the mathematical frame work for the description of the gravitational field, introduction of the dynamical equations of Einstein governing its evolution and review of the key solutions, including black holes and expanding universes.

*Prerequisite(s):* PHY 104A; PHY 105A; PHY 105B; PHY 110A; PHY 105B and PHY 110A or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 156 – Introduction to Cosmology (4 units)**

*Course Description:* Contemporary knowledge regarding the origin of the universe, including the Big Bang and nucleosynthesis, microwave background radiation, formation of cosmic structure, cosmic inflation, cosmic acceleration and dark energy.

*Prerequisite(s):* ((PHY 009A, PHY 009B, PHY 009C, PHY 009D) or (PHY 009HA, PHY 009HB, PHY 009HC, PHY 009HD, PHY 009HE)); PHY 105A (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Credit Limitation(s):* Not open to students who have completed PHY 126.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 157 – Astronomy Instrumentation & Data Analysis Laboratory (4 units)**

*Course Description:* Experimental techniques, data acquisition and analysis involving laboratory astrophysics plus stellar, nebular and galaxy digital imaging, photometry and/or spectroscopy. Students perform three experiments. Individual work stressed. Minimum 10-15 page journal style articles of two experiments are required.

*Prerequisite(s):* PHY 080; PHY 104A; PHY 105A; PHY 110A; PHY 110B (can be concurrent); PHY 115A (can be concurrent); and consent of department.

*Learning Activities:* Laboratory 8 hour(s).

*Enrollment Restriction(s):* Registration by Permission to Add (PTA) number only; priority given to graduating PHY astrophysics emphasis seniors.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **PHY 158 – Formation of Galaxies & Cosmic Structures (4 units)**

*Course Description:* Formation of the cosmic web, including dark-matter halos and galaxies within them. Components of the Universe (dark matter, gas, stars) and their dynamical evolution. Gravitational collapse and virialization. Gas dynamics, heating, and cooling. Galactic star formation and stellar dynamics. Emphasis on theoretical concepts, computational methods, and simulations.

*Prerequisite(s):* (PHY 009A or PHY 009HA C- or better); (PHY 009B or PHY 009HB C- or better); (PHY 009C or PHY 009HC C- or better); (PHY 009D or PHY 009HD C- or better); PHY 104A C- or better; PHY 105A C- or better; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

## **PHY 160 – Environmental Physics & Society (3 units)**

*Course Description:* Impact of humankind on the environment are discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications are considered.

*Prerequisite(s):* (PHY 009D or PHY 007C); (PHY 010 or PHY 001B); MAT 016B; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ENG 160.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **PHY 185 – Alumni Seminar Series (1 unit)**

*Course Description:* Weekly guest speakers (usually a physics alumnus or alumna) tell students about their careers. Speakers use their experience to give students valuable perspectives on life after a degree in physics.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PHY 190 – Careers in Physics (1 unit)**

*Course Description:* Overview of important research areas in physics, discussions of research opportunities and internships, strategies for graduate school and industrial careers, the fellowship and assistantship selection process, preparation of resumes, personal statements, and letters of recommendation.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Restricted to Physics and Applied Physics majors only.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PHY 192 – Internship in Physics (1-12 units)**

*Course Description:* Supervised work experience requiring the application of physics principles and techniques in a professional setting, including but not limited to industry and national laboratories.

*Prerequisite(s):* Consent of instructor/Physics Internship Director.

*Learning Activities:* Internship 3-36 hour(s).

*Enrollment Restriction(s):* Enrollment dependent on availability of intern positions; open to Physics majors only.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **PHY 194HA – Special Study for Honors Students (4 units)**

*Course Description:* Open only to Physics and Applied Physics majors who satisfy the College of Letters and Science requirements for entrance into the Honors Program. Independent research project at a level significantly beyond that defined by the normal physics curriculum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 194HB – Special Study for Honors Students (4 units)**

*Course Description:* Open only to Physics and Applied Physics majors who satisfy the College of Letters and Science requirements for entrance into the Honors Program. Independent research project at a level significantly beyond that defined by the normal physics curriculum.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 195 – Senior Thesis (5 units)**

*Course Description:* Open only to Physics and Applied Physics majors with senior standing. Preparation of a senior thesis on a topic selected by the student with approval of the department.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 15 hour(s).

*Repeat Credit:* May be repeated 15 unit(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PHY 197T – Tutoring in Physics & Astronomy (1-5 units)**

*Course Description:* Tutoring of students in lower division courses.

Leading of small voluntary discussion groups affiliated with one of the department's regular courses. Weekly meeting with instructor.

*Learning Activities:* Tutorial.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PHY 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PHY 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PHY 200A – Theory of Mechanics & Electromagnetics (4 units)**

*Course Description:* Theoretical approaches in classical mechanics including the use of generalized coordinates and virtual work; variational calculus; Lagrange equations; symmetries, conservation laws, and Noether theorem; Lagrangian density; Hamilton formalism; canonical transformations; Poisson brackets; and Hamilton-Jacobi equations.

*Prerequisite(s):* PHY 204A (can be concurrent); PHY 104B; PHY 105B; PHY 110C; or equivalent to PHY 110C; PHY 204A required concurrently.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Letter.

## **PHY 200B – Theory of Mechanics & Electromagnetics (4 units)**

*Course Description:* Theoretical approaches in electromagnetics including static electromagnetic fields; Maxwell's equations; plane waves in various media; magnetohydrodynamics; diffraction theory; radiating systems; and special relativity.

*Prerequisite(s):* PHY 200A; PHY 204B (can be concurrent); PHY 204B concurrently.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Letter.

## **PHY 200C – Theory of Mechanics & Electromagnetics (4 units)**

*Course Description:* Theoretical approaches in electromagnetics including static electromagnetic fields; Maxwell's equations; plane waves in various media; magnetohydrodynamics; diffraction theory; radiating systems; and special relativity.

*Prerequisite(s):* PHY 200A; PHY 204B (can be concurrent); PHY 204B concurrently.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Letter.

## **PHY 204A – Methods of Mathematical Physics (4 units)**

*Course Description:* Linear vector spaces, operators and their spectral analysis, complete sets of functions, complex variables, functional analysis, Greens functions, calculus of variations, introduction to numerical analysis.

*Prerequisite(s):* PHY 104A; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Grade Mode:* Letter.

## **PHY 204B – Methods of Mathematical Physics (4 units)**

*Course Description:* Linear vector spaces, operators and their spectral analysis, complete sets of functions, complex variables, functional analysis, Green's functions, calculus of variations, introduction to numerical analysis.

*Prerequisite(s):* PHY 104A; PHY 104B; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Letter.

## **PHY 210 – Computational Physics (3 units)**

*Course Description:* Analytic techniques to solve differential equations and eigenvalue problems. Physics content of course will be self-contained, and adjusted according to background of students.

*Prerequisite(s):* Knowledge of Fortran or C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 215A – Quantum Mechanics (4 units)**

*Course Description:* Formal development and interpretation of non-relativistic quantum mechanics; its application to atomic, nuclear, molecular, and solid-state problems; brief introduction to relativistic quantum mechanics and the Dirac equation.

*Prerequisite(s):* PHY 115B; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Letter.

**PHY 215B – Quantum Mechanics (4 units)**

*Course Description:* Formal development and interpretation of non-relativistic quantum mechanics; its application to atomic, nuclear, molecular, and solid-state problems; brief introduction to relativistic quantum mechanics and the Dirac equation.

*Prerequisite(s):* PHY 115B; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Letter.

**PHY 215C – Quantum Mechanics (4 units)**

*Course Description:* Formal development and interpretation of non-relativistic quantum mechanics; its application to atomic, nuclear, molecular, and solid-state problems; brief introduction to relativistic quantum mechanics and the Dirac equation.

*Prerequisite(s):* PHY 115B; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Letter.

**PHY 219A – Statistical Mechanics (4 units)**

*Course Description:* Foundations of thermodynamics and classical and quantum statistical mechanics with simple applications to properties of solids, real gases, nuclear matter, etc. and a brief introduction to phase transitions.

*Prerequisite(s):* PHY 215B; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving 1 hour(s).

*Grade Mode:* Letter.

**PHY 219B – Statistical Mechanics (4 units)**

*Course Description:* Further applications of thermodynamics and classical and quantum statistical mechanics. The modern theory of fluctuations about the equilibrium state, phase transitions and critical phenomena.

*Prerequisite(s):* PHY 219A.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving 1 hour(s).

*Grade Mode:* Letter.

**PHY 223A – Group Theoretical Methods of Physics-Condensed Matter (3 units)**

*Course Description:* Theory of groups and their representations with applications in condensed matter.

*Prerequisite(s):* PHY 215A; PHY 215B; PHY 215C (can be concurrent); or consent of instructor. PHY 215C required concurrently.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 223B – Group Theoretical Methods of Physics-Elementary Particles (3 units)**

*Course Description:* Theory of groups and their representations with applications in elementary particle physics.

*Prerequisite(s):* PHY 215A; PHY 215B; PHY 215C (can be concurrent); or consent of instructor. PHY 215C required concurrently.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 224A – Nuclear Physics (3 units)**

*Course Description:* Comprehensive study of the nucleon-nucleon interaction including the deuteron, nucleon-nucleon scattering, polarization, determination of real parameters of S-matrix, and related topics.

*Prerequisite(s):* PHY 215B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 224B – Nuclear Physics (3 units)**

*Course Description:* Study of nuclear models, including shell model, collective model, unified model. Energy level spectra, static momenta, and electromagnetic transition rates.

*Prerequisite(s):* PHY 224A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 224C – Nuclear Physics (3 units)**

*Course Description:* Study of nuclear scattering and reactions including the optical model and direct interactions. Beta decay and an introduction to weak interactions.

*Prerequisite(s):* PHY 224B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 229A – Advanced Nuclear Theory (3 units)**

*Course Description:* Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for two-body scattering.

*Prerequisite(s):* PHY 224C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 229B – Advanced Nuclear Theory (3 units)**

*Course Description:* Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for three-body scattering.

*Prerequisite(s):* PHY 229A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 230A – Quantum Theory of Fields (3 units)**

*Course Description:* Relativistic quantum mechanics of particles; techniques and applications of second quantization; Feynman diagrams; renormalization.

*Prerequisite(s):* PHY 215C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 230B – Quantum Theory of Fields (3 units)**

*Course Description:* Continuation of 230A, with selected advanced topics, such as S-matrix theory, dispersion relations, axiomatic formulations.

*Prerequisite(s):* PHY 230A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 230C – Quantum Theory of Fields (3 units)**

*Course Description:* Renormalization theory and applications, including dimensional regularization, Ward identities, renormalization group equations, coupling constant unification, and precision electroweak calculations.

*Prerequisite(s):* PHY 230A; PHY 230B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**PHY 232 – Topics in String Theory (3 units)**

*Course Description:* Current research trends in string theory, with topics ranging from perturbative worldsheet methods, nonperturbative aspects and dualities, AdS/CFT correspondence, string field theory, etc.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor; PHY 230A, PHY 230B, PHY 230C PHY 260 or equivalent are strongly recommended.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**PHY 233 – Advanced Topics in Geometry & Physics (3 units)**

*Course Description:* Modern geometric methods in theoretical physics, with topics ranging from pseudo-Riemannian differential geometry and topology with application to general relativity, black holes, and string theory.

*Prerequisite(s):* PHY 230A, PHY 230B, PHY 230C, PHY 260 or equivalent strongly recommended.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Graduate standing in Physics or consent of instructor required.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**PHY 240A – Condensed Matter Physics A (3 units)**

*Course Description:* Topics in condensed matter physics: Crystal structure; one-electron theory; transport and optical properties of semiconductors; phonons, electron-phonon scattering.

*Prerequisite(s):* PHY 215C; PHY 219A; PHY 140A PHY 140B or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 240B – Condensed Matter Physics B (3 units)**

*Course Description:* Topics in condensed matter physics: transport and optical properties of metals and quantum structures; experimental measurement the Fermi surface and of phonon spectra.

*Prerequisite(s):* PHY 240A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 240C – Condensed Matter Physics (3 units)**

*Course Description:* Review of second quantization. Interacting electron gas, electron-phonon interaction and effects, including instabilities of electronic systems. Topics in the theory of superconductivity and magnetism.

*Prerequisite(s):* PHY 240A; PHY 240B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 241 – Advanced Topics in Magnetism (3 units)**

*Course Description:* Topics chosen from areas of current research interest.

*Prerequisite(s):* PHY 240A; PHY 240B; PHY 240C; PHY 240D; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 242 – Advanced Topics in Superconductivity (3 units)**

*Course Description:* Topics chosen from areas of current research interest.

*Prerequisite(s):* PHY 240A; PHY 240B; PHY 240C; PHY 240D; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 243A – Surface Physics of Materials (3 units)**

*Course Description:* Experimental and theoretical fundamentals of surface and interface physics and chemistry, including electronic and magnetic structure, thermodynamics, adsorption kinetics, epitaxial growth, and a discussion of various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes.

*Prerequisite(s):* PHY 140A; PHY 140B; PHY 115A; PHY 115B; or the equivalent to any; PHY 215A, PHY 240A, or the equivalents recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 243B – Surface Physics of Materials (3 units)**

*Course Description:* Experimental and theoretical fundamentals of surface and interface physics and chemistry, including electronic and magnetic structure, thermodynamics, adsorption kinetics, epitaxial growth, and a discussion of various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes.

*Prerequisite(s):* PHY 140A; PHY 140B; PHY 115A; PHY 115B; or the equivalent to any; PHY 215A, PHY 240A, or the equivalents recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 243C – Surface Physics of Materials (3 units)**

*Course Description:* Experimental and theoretical fundamentals of surface and interface physics and chemistry, including electronic and magnetic structure, thermodynamics, adsorption kinetics, epitaxial growth, and a discussion of various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes.

*Prerequisite(s):* PHY 140A; PHY 140B; PHY 115A; PHY 115B; or the equivalent to any; PHY 215A, PHY 240A, or equivalents recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 245A – High-Energy Physics (3 units)**

*Course Description:* Phenomenology and systematics of strong, electromagnetic, and weak interactions of hadrons and leptons; determination of quantum numbers; quarks and quarkonia; deep inelastic scattering; the quark parton model; experiments at hadron colliders and electron-positron colliders.

*Prerequisite(s):* PHY 230A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 245B – High-Energy Physics (3 units)**

*Course Description:* Electroweak interactions; phenomenology of the Standard Model of SU(2)LxU(1); weak interaction experiments; properties of and experiments with W and Z vector bosons; Glashow-Weinberg-Salam model and the Higgs boson; introduction to supersymmetry and other speculations.

*Prerequisite(s):* PHY 245A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 245C – Collider Physics (3 units)**

*Course Description:* Collider physics. Topics include quark and gluon distribution functions and the computation of cross sections; Large Hadron Collider and International Linear Collider phenomenology; collider and detector characteristics; extracting models from data; software tools for analyzing experimental data.

*Prerequisite(s):* PHY 245A; PHY 252B (can be concurrent); or consent of instructor; PHY 252B taken previously or concurrently.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**PHY 246 – Supersymmetry: Theory & Phenomenology (3 units)**

*Course Description:* Construction of supersymmetric models of particle physics; superfields; supersymmetry breaking the minimal supersymmetric standard model; supergravity. Collider phenomenology of supersymmetry. Dark matter phenomenology.

*Prerequisite(s):* PHY 230A, PHY 230B, PHY 245A, PHY 245B recommended, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 246A – Supersymmetry: Theory & Phenomenology (3 units)**

*Course Description:* Construction of supersymmetric models of particle physics; superfields; supersymmetry breaking the minimal supersymmetric standard model; supergravity. Collider phenomenology of supersymmetry. Dark matter phenomenology. Not offered every year.

*Prerequisite(s):* PHY 230A; PHY 230B; PHY 245A, PHY 245B recommended or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 246B – Advanced Supersymmetry (3 units)**

*Course Description:* Advanced topics in supersymmetry. Topics include holomorphy, the Affleck-Dine-Seiberg superpotential, Seiberg duality for SUSY QCD, dynamical SUSY breaking, Seiberg-Witten theory, superconformal field theories, supergravity, anomaly and gaugino mediation, and the AdS/CFT correspondence.

*Prerequisite(s):* PHY 246A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 250 – Special Topics in Physics (3 units)**

*Course Description:* Topic varies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**PHY 252A – Techniques of Experimental Physics (3 units)**

*Course Description:* Introduction to techniques and methods of designing and executing experiments. Problems and examples from condensed matter research will be utilized.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 252B – Techniques of Experimental Physics (3 units)**

*Course Description:* Introduction to techniques and methods of designing and executing experiments. Problems and examples from nuclear and particle research will be utilized.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 252C – Statistics & Data Analysis for Particle Physics (3 units)**

*Course Description:* Introduction to statistical data analysis methods in particle physics. Theoretical lectures combined with practical computer laboratory work.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 253 – Signals & Noise in Physics (3 units)**

*Course Description:* Techniques for extracting signals from noise, systematic error.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 255 – Econophysics (4 units)**

*Course Description:* Application of ideas from statistical mechanics to the financial markets. Market dynamics from a physics and systems perspective, including the statistical distributions of returns, the dynamics of prices, and models for the markets.

*Prerequisite(s):* Knowledge of Python, R, Excel, Matlab, or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

**PHY 256A – Physics of Information (4 units)**

*Course Description:* Nonlinear dynamics, deterministic chaos, bifurcations, pattern formation, symbolic dynamics, measurement theory, stochastic processes, elementary information theory, information in complex systems, computational laboratory.

*Prerequisite(s):* Consent of instructor; advanced undergraduate or introductory graduate differential equations, applied linear algebra, and probability theory; e.g., MAT 119A/MAT 119B or MAT 207A, MAT 167 or MAT 226A, and MAT 135A/MAT 135B or MAT 235A, respectively; or in PHY 104A/PHY 104B/PHY 104C or PHY 204A/PHY 204B.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

**PHY 256B – Physics of Computation (4 units)**

*Course Description:* Structural complexity, computational mechanics, information measures, causal inference, applications to complex materials, quantum dynamics, and nonequilibrium thermodynamics, computational laboratory.

*Prerequisite(s):* PHY 256A; consent of instructor; advanced undergraduate or introductory graduate differential equations, applied linear algebra, and probability theory; e.g., MAT 119A/MAT 119B or MAT 207A, MAT 167 or MAT 226A, and MAT 135A/MAT 135B or MAT 235A, respectively; or in PHY 104A/PHY 104B/PHY 104C or PHY 204A/PHY 204B.

*Learning Activities:* Lecture 3 hour(s), Extensive Problem Solving.

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

**PHY 260 – Introduction to General Relativity (3 units)**

*Course Description:* An introduction to general relativity. Differential geometry and curved spacetime; the Einstein field equations; gravitational fields of stars and black holes; weak fields and gravitational radiation; experimental tests; Big Bang cosmology.

*Prerequisite(s):* PHY 200A; PHY 200B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 262 – Early Universe Cosmology (3 units)**

*Course Description:* Introduction to early universe cosmology: the Big Bang, inflation, primordial nucleosynthesis, dark matter, dark energy, and other topics of current interest.

*Prerequisite(s):* Second year standing in Physics Graduate Program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 263 – Cosmic Structure Formation (3 units)**

*Course Description:* Growth of structure from small density inhomogeneities in the early universe to the diverse structures observable today. Use of observable properties (cosmic microwave background, gravitational lensing, peculiar velocities, number density, etc.) to constrain models of structure formation and fundamental physics.

*Prerequisite(s):* PHY 260.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 265 – High Energy Astrophysics & Radiative Processes (3 units)**

*Course Description:* Survey covering galactic and extragalactic X-ray and gamma-ray astronomy, radiative processes, and techniques of high-energy astrophysics.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 266 – Data Analysis for Astrophysics (3 units)**

*Course Description:* Survey covering measurement and signal analysis techniques for astrophysics and cosmology throughout the electromagnetic spectrum.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 267 – Observational Extragalactic Astronomy & Cosmology (3 units)**

*Course Description:* Survey covering current areas of research on extragalactic objects, their physical properties, origin, evolution, and distribution in space.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 268 – Research Methods in Astrophysics (3 units)**

*Course Description:* Introduction to research methods in astrophysics and cosmology. Problems and examples from observational and theoretical work will be included.

*Prerequisite(s):* PHY 204A, PHY 204B and PHY 215A recommended.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Graduate standing in Physics or consent of instructor.

*Grade Mode:* Letter.

**PHY 269 – Stellar Structure & Evolution (3 units)**

*Course Description:* Underlying physics of stars as the building blocks of the Universe. Reasons for their existence, mechanisms behind their function, their evolution and ultimate fate. Structure of self-gravitating objects, energy transport in stars, nuclear fusion in stars, stellar evolution, and the birth of compact objects.

*Prerequisite(s):* PHY 200A, PHY 200B, and PHY 215A recommended; graduate standing in Physics; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PHY 270 – Current Topics in Physics Research (3 units)**

*Course Description:* Reading and discussion to help physics graduate students develop and maintain familiarity with the current and past literature in their immediate field of research and related areas.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 285 – Careers in Physics (1 unit)**

*Course Description:* Designed to give Physics graduate students an in-depth appreciation of career opportunities with a graduate degree in physics. Professional physicists, mainly from outside academia, will give seminars describing both research and career insights.

*Prerequisite(s):* Graduate standing in Physics.

*Learning Activities:* Seminar 1.50 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 290 – Seminar in Physics (1 unit)**

*Course Description:* Presentation and discussion of topics of current research interest in physics. Topics will vary weekly and will cover a broad spectrum of the active fields of physics research at a level accessible to all physics graduate students.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Seminar.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 291 – Seminar in Nuclear Physics (1 unit)**

*Course Description:* Presentation and discussion of topics of current research interest in nuclear physics.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 292A – Seminar in Elementary Particle Physics (1 unit)**

*Course Description:* Presentation and discussion of topics of current research interest in elementary particle physics.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 292B – High Energy Frontier Initiative & Cosmology Theory Seminar (1 unit)**

*Course Description:* Weekly seminar on current issues in Particle physics and Cosmology.

*Prerequisite(s):* Physics graduate students.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 5 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 293 – Seminar in Condensed Matter Physics (1 unit)**

*Course Description:* Presentation and discussion of topics of current research interest in condensed matter physics.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 294 – Seminar in Cosmology (1 unit)**

*Course Description:* Presentation and discussion of topics of current research interest in Cosmology.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 295 – Introduction to Departmental Research (1 unit)**

*Course Description:* Seminar to introduce first- and second-year physics graduate students to the fields of specialty and research of the Physics staff.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 296 – Field, Strings, & Gravity Seminar (1 unit)**

*Course Description:* Presentation and discussion of topics of current research interest in the areas of quantum field theory, string theory and gravity.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1.50 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 297 – Research on the Teaching & Learning of Physics (3 units)**

*Course Description:* Discussion and analysis of recent research in how students construct understanding of physics and other science concepts and the implications of this research for instruction.

*Prerequisite(s):* Graduate standing in Physics or consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**PHY 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 371 – Teaching in an Active-Engagement Physics Discussion/Lab Setting (1 unit)**

*Course Description:* Analysis of recent research on science/physics teaching and learning and its implications for teaching labs, discussions, and discussion/labs with an emphasis on differences between conventional and active-engagement instructional settings. The appropriate role of the instructor in specific instructional settings.

*Prerequisite(s):* PHY 009D; or equivalent.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

**PHY 390 – Methods of Teaching Physics (1 unit)**

*Course Description:* Practical experience in methods and problems related to teaching physics laboratories at the university level, including discussion of teaching techniques, analysis of quizzes and laboratory reports and related topics. Required of all Physics Teaching Assistants.

*Prerequisite(s):* Consent of instructor; graduate standing in Physics.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PHY 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Plant Biology (Graduate Group) (PBI)**

Graduate Studies

## PBI 200A – PBGG Core Course Series–Fall quarter (5 units)

**Course Description:** The first of three PBGG graduate core courses. Coverage includes (1) plant genes, (2) biotechnology, (3) genomes and gene flow, (4) principles of plant systematics, and (5) the evolution of flowering plants.  
**Prerequisite(s):** Graduate standing; a broad background of undergraduate level coursework in Plant Biology is recommended.  
**Learning Activities:** Lecture 3 hour(s), Discussion 2 hour(s).  
**Grade Mode:** Letter.

## PBI 200B – PBGG Core Course Series–Winter quarter (5 units)

**Course Description:** The second of three PBGG graduate core courses. Coverage includes (1) embryo development, (2) cytoskeleton and vesicle trafficking, (3) cell walls, (4) cell growth, (5) secondary metabolism, (6) plastids and (7) senescence.  
**Prerequisite(s):** PBI 200A.  
**Learning Activities:** Lecture 3 hour(s), Discussion 2 hour(s).  
**Grade Mode:** Letter.

## PBI 200C – PBGG Core Course Series–Spring quarter (5 units)

**Course Description:** The third of three PBGG graduate core courses. Coverage includes (1) plant water relations, (2) cellular & long distance transport processes, (3) mineral nutrition, (4) environmental impacts on growth & development, (5) stress perception & responses, (6) canopy processes, and (7) plant interactions with other organisms.  
**Prerequisite(s):** PBI 200A; PBI 200B.  
**Learning Activities:** Lecture 3 hour(s), Discussion 2 hour(s).  
**Grade Mode:** Letter.

## PBI 203N – Biology of the Plant Cell (4 units)

**Course Description:** Recent progresses in plant cell biology. Intracellular motility in plant cells. Common techniques associated with the progress of plant cell biology.  
**Prerequisite(s):** PLB 111 or BIS 104; or the equivalent.  
**Learning Activities:** Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).  
**Enrollment Restriction(s):** Open to senior undergraduate students in Plant Biology major.  
**Grade Mode:** Letter.

## PBI 210 – Plant Ecophysiology (3 units)

**Course Description:** Study of the mechanisms of physiological adaptation of plants to their environment.  
**Prerequisite(s):** PLB 111; PLB 112; PLB 117.  
**Learning Activities:** Lecture 3 hour(s).  
**Grade Mode:** Letter.

## PBI 212 – Physiology of Herbicidal Action (3 units)

**Course Description:** Study of the fundamental processes involved in the physiological action of herbicides. Detailed consideration of the fate of herbicides in plants.  
**Prerequisite(s):** PLB 112.  
**Learning Activities:** Lecture 3 hour(s).  
**Grade Mode:** Letter.

## PBI 214 – Higher Plant Cell Walls (3 units)

**Course Description:** Lectures focus on the structure, analysis, synthesis, and development-related metabolism of cell walls. Discussions center on analysis of scientific papers related to lecture topics.  
**Prerequisite(s):** PLB 112; A course in Biochemistry.  
**Learning Activities:** Lecture 2 hour(s), Discussion 1 hour(s).  
**Grade Mode:** Letter.

## PBI 220 – Plant Developmental Biology (4 units)

**Course Description:** A survey of the concepts of plant development and organization. Examines plant cells, tissues, and organs with special emphasis on experimental evidence for mechanisms regulating developmental processes.  
**Prerequisite(s):** Plant Anatomy, Physiology, and Biochemistry.  
**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.  
**Grade Mode:** Letter.

## PBI 223 – Special Topics in Scientific Method (2 units)

**Course Description:** Examine the historical and philosophical background of the scientific method. Analyze the rational, perceptual, causal, creative and social aspects of scientific knowledge. Clarify the roles of reason, experimentation and creativity in scientific research.  
**Learning Activities:** Discussion 2 hour(s).  
**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBI 227 – Plant Molecular Biology (4 units)

**Course Description:** Molecular aspects of higher plant biology with emphasis on gene expression. Plant nuclear and organelle genome organization, gene structure, mechanisms of gene regulation, gene transfer, and special topics related to development and response to biological and environmental stimuli.  
**Prerequisite(s):** MCB 121 or MCB 161.  
**Learning Activities:** Lecture/Discussion 4 hour(s).  
**Grade Mode:** Letter.

## PBI 229 – Molecular Biology of Plant Reproduction (3 units)

**Course Description:** Molecular genetic basis of plant reproduction. Emphasis on understanding developmentally regulated gene expression as it relates to the major changes that occur during plant reproduction and on the genetic control of flowering.  
**Learning Activities:** Lecture 3 hour(s).  
**Grade Mode:** Letter.

## PBI 290A – Faculty Seminar (1 unit)

**Course Description:** Discussion of research area of seminar speakers in Plant Biology Graduate Group Seminar Series.  
**Learning Activities:** Discussion 1 hour(s).  
**Enrollment Restriction(s):** Restricted to Plant Biology (PBGG) graduate students.  
**Repeat Credit:** May be repeated 6 time(s).  
**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBI 290B – Seminar (1 unit)

**Course Description:** Seminars presented by visiting scientists on research topics of current interest.  
**Learning Activities:** Seminar 1 hour(s).  
**Repeat Credit:** May be repeated.  
**Grade Mode:** Satisfactory/Unsatisfactory only.

**PBI 290C – Research Conference in Botany (1 unit)**

*Course Description:* Presentation and discussion by faculty and graduate students of research projects in botany.

*Prerequisite(s):* Graduate standing and/or consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBI 291 – Graduate Student Seminar in Plant Biology (1 unit)**

*Course Description:* Student-given seminars on topics in plant biology, with critiques by instructor and peers. How to give a seminar, including preparation of visual and other teaching aids. Topic determined by instructor in charge.

*Prerequisite(s):* Graduate student standing.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBI 292 – Seminars in Plants Biology (1 unit)**

*Course Description:* Review of current literature in botanical disciplines. Disciplines and special subjects to be announced quarterly. Present and analyze assigned topics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBI 293 – Seminar in Postharvest Biology (1 unit)**

*Course Description:* Intensive study of selected topics in the postharvest biology of fruits, vegetables, and ornamentals.

*Prerequisite(s):* Consent of instructor. Open to advanced undergraduates.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBI 297T – Tutoring in Plant Biology (1-5 units)**

*Course Description:* Offers graduate students, particularly those not serving as teaching assistants, the opportunity to gain teaching experience.

*Learning Activities:* Tutorial 3-15 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBI 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBI 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBI 390 – The Teaching of Plant Biology (2 units)**

*Course Description:* Consideration of the problems of teaching botany, especially of preparing for and conducting discussions, guiding student laboratory work, and the formulation of questions and topics for examinations.

*Prerequisite(s):* Graduate standing; concurrent appointment as a teaching assistant in Plant Biology.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Plant Biology (PLB)**

**College of Biological Sciences**

**PLB 010 – Plant Biology (3 units)**

*Course Description:* The social and natural science of plants. Cultural history and socioeconomic importance of plants. Biology of plants reproduction, including flowers, seeds and fruits. Historical, cultural, religious and medicinal uses of plants. Plants in the visual arts, music and literature.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**PLB 090X – Plant Science Seminar (1-4 units)**

*Course Description:* Examination of a special topic in a small group setting.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Credit Limitation(s):* Not open for credit to students who have completed PLS 090X.

*Grade Mode:* Letter.

**PLB 092 – Internship (1-12 units)**

*Course Description:* Technical and/or professional experience on or off campus. Supervised by a member of the Plant Biology faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**PLB 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PLB 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PLB 102 – California Floristics (5 units)**

*Course Description:* Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips.

*Prerequisite(s):* PLS 002 or BIS 002C; or equivalent course in Plant Science.

*Learning Activities:* Lecture 2 hour(s), Laboratory 5 hour(s), Fieldwork.

*Cross Listing:* PLS 102.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**PLB 105 – Developmental Plant Anatomy (5 units)**

*Course Description:* Structural anatomy of vascular plants. Training in basic tissue sectioning, staining, and use of the compound microscope.

*Prerequisite(s):* BIS 002C; or other similar preparation in plant biology.

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Restricted to 50 students; split equally into two lab groups.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLB 108 – Systematics & Evolution of Angiosperms (5 units)**

*Course Description:* Diversity and classification of angiosperms (flowering plants) on a world scale, and current understanding of the origin of angiosperms and evolutionary relationships and trends within them based on morphological and molecular evidence.

*Prerequisite(s):* (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C).

*Learning Activities:* Lecture 3 hour(s), Laboratory 6 hour(s).

*Cross Listing:* EVE 108.

*Grade Mode:* Letter.

**PLB 111 – Plant Physiology (3 units)**

*Course Description:* Plant cell as a functional unit. The processes of absorption, movement, and utilization of water and minerals. Water loss, translocation, photosynthesis, respiration.

*Prerequisite(s):* (BIS 002A, BIS 002B, BIS 002C); (CHE 008B (can be concurrent) or CHE 118B (can be concurrent)); PHY 007C (can be concurrent); PLB 105 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PLB 111D – Problems in Plant Physiology (1 unit)**

*Course Description:* Discussion of problems and applications relating to principles presented in PHY 111. Problems assigned weekly showing novel applications of principles described in PHY 111; repare answers to be delivered orally during the class period.

*Prerequisite(s):* PLB 111 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**PLB 112 – Plant Growth & Development (3 units)**

*Course Description:* Introduction to the mechanisms and control systems that govern plant growth and development and the responses of plants to the environment. Strong emphasis on vegetative development of flowering plants.

*Prerequisite(s):* (BIS 002A, BIS 002B, BIS 002C); (CHE 008B or CHE 118B); BIS 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**PLB 112D – Problems in Plant Growth & Development (1 unit)**

*Course Description:* Discussion of problems and applications relating to principles presented in PLB 112. Students will be assigned problems each week showing novel applications of the principles described in PLB 112 and will prepare answers to be delivered orally during class period.

*Prerequisite(s):* PLB 112 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**PLB 113 – Molecular & Cellular Biology of Plants (3 units)**

*Course Description:* Molecular and cellular aspects of the growth and development of plants and their response to biological and environmental stresses. Primary focus on processes unique to plants. Experimental approaches will be emphasized.

*Prerequisite(s):* (BIS 002A, BIS 002B, BIS 002C); BIS 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**PLB 113D – Problems in Molecular & Cellular Biology of Plants (1 unit)**

*Course Description:* Discussion of topics and applications related to principles presented in PLB 113. Assigned topics each week show novel applications of the principles described in PLB 113; discussion of topics during class period.

*Prerequisite(s):* PLB 113 required concurrently.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Pass/No Pass only.

**PLB 116 – Plant Morphology & Evolution (5 units)**

*Course Description:* Introduction to the form, development and evolution of vascular plants. Emphasis given to the form and development of reproductive structures in ferns and seed-producing plants as a basis for determining evolutionary relationships.

*Prerequisite(s):* Introductory Plant Biology; e.g., BIS 002C, PLS 002.

*Learning Activities:* Lecture 3 hour(s), Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLS 116.

*Cross Listing:* PLS 116.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLB 117 – Plant Ecology (4 units)**

**Course Description:** The study of the interactions between plants, plant populations or vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required.

**Prerequisite(s):** (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C); PLB 111 recommended.

**Learning Activities:** Lecture 3 hour(s), Fieldwork 3 hour(s).

**Cross Listing:** EVE 117.

**Grade Mode:** Letter.

**PLB 119 – Population Biology of Invasive Plants & Weeds (3 units)**

**Course Description:** Origin and evolution of invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions between invasive species, native species, and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species.

**Prerequisite(s):** (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C); introductory statistics recommended.

**Learning Activities:** Lecture 2 hour(s), Laboratory 3 hour(s).

**Cross Listing:** EVE 119.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**PLB 123 – Plant-Virus-Vector Interaction (3 units)**

**Course Description:** Analysis of interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern approaches to the interdiction of viral movement.

**Prerequisite(s):** BIS 002A; BIS 101; PLB 105, PLP 120, and ENT 100 recommended.

**Learning Activities:** Lecture 3 hour(s).

**Cross Listing:** ENT 123, PLP 123.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**PLB 126 – Plant Biochemistry (3 units)**

**Course Description:** The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants.

**Prerequisite(s):** BIS 103 or BIS 105.

**Learning Activities:** Lecture 3 hour(s).

**Cross Listing:** MCB 126.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Scientific Literacy (SL).

**PLB 143 – Evolution of Crop Plants (4 units)**

**Course Description:** Origins of crops and agriculture, including main methodological approaches, centers of crop biodiversity, dispersal of crops, genetic and physiological differences between crops and their wild progenitors, agriculture practiced by other organisms, and role and ownership of crop biodiversity.

**Prerequisite(s):** PLS 002 or BIS 001C or BIS 002C.

**Learning Activities:** Lecture 3 hour(s), Discussion 1 hour(s).

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

**PLB 148 – Introductory Mycology (4 units)**

**Course Description:** Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans.

**Prerequisite(s):** BIS 002A; BIS 002B; BIS 002C.

**Learning Activities:** Lecture 2 hour(s), Laboratory 6 hour(s).

**Enrollment Restriction(s):** Limited enrollment.

**Cross Listing:** PLP 148.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**PLB 189 – Experiments in Plant Biology: Design & Execution (3 units)**

**Course Description:** Provides an opportunity for undergraduate students to formulate experimental approaches to current questions in plant biology and to carry out their proposed experiments.

**Prerequisite(s):** (BIS 001A, BIS 001B, BIS 001C) or (BIS 002A, BIS 002B, BIS 002C); or the equivalent courses in Plant Sciences, and consent of instructor.

**Learning Activities:** Discussion/Laboratory 6 hour(s).

**Repeat Credit:** May be repeated 12 unit(s).

**Grade Mode:** Pass/No Pass only.

**PLB 190C – Research Conference in Plant Biology (1 unit)**

**Course Description:** Introduction to research methods in plant biology. Design of field or laboratory research projects, survey of appropriate literature, and discussion of research by faculty and students.

**Prerequisite(s):** Consent of instructor; upper division standing in Plant Biology or related discipline.

**Learning Activities:** Discussion 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

**PLB 192 – Internship (1-12 units)**

**Course Description:** Technical and/or professional experience on or off campus. Supervised by a member of the Plant Biology Department faculty.

**Prerequisite(s):** Consent of instructor; completion of 84 units.

**Learning Activities:** Internship 3-36 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

**PLB 194H – Special Study for Honors Students (1-5 units)**

**Course Description:** Independent study of selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis.

**Prerequisite(s):** Consent of instructor; open only to majors of senior standing on honors list.

**Learning Activities:** Variable.

**Grade Mode:** Pass/No Pass only.

**PLB 197T – Tutoring in Plant Biology (1-5 units)**

**Course Description:** Assisting the instructor by tutoring students in one of the Department's regular courses.

**Prerequisite(s):** Consent of instructor; upper division standing.

**Learning Activities:** Discussion 2-6 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

**PLB 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PLB 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PLB 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Practical experience in acting as teaching assistant in Plant Biology courses. Learning activity: hands on experience in preparing for and conducting discussions, guiding student laboratory work, and the formulation of questions and topics for examinations.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-20 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## Plant Pathology (PLP)

College of Agricultural & Environmental Sciences

**PLP 040 – Edible Mushroom Cultivation (2 units)**

*Course Description:* Principles and practices of growing edible mushrooms, including culture maintenance, basic mushroom substrate preparation, composting, spawn generation techniques, inoculation methods, harvesting, and pests and pest management.

*Prerequisite(s):* BIS 010 or MIC 020 recommended.

*Learning Activities:* Lecture 1 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

**PLP 100 – Plant Pathogen Biology (3 units)**

*Course Description:* Behavior, pathology, ecology, and evolution of plant pathogens with global impact on food security and environmental health. Bacteria, fungi, viruses, and other pathogens that infect plants.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PLP 120 – Introduction to Plant Pathology (4 units)**

*Course Description:* The nature, cause, and control of plant diseases.

*Prerequisite(s):* BIS 002C; or consent of instructor; MIC 102 recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Letter.

**PLP 123 – Plant-Virus-Vector Interaction (3 units)**

*Course Description:* Analysis of interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern approaches to the interdiction of viral movement.

*Prerequisite(s):* BIS 002A; BIS 101; PLB 105, PLP 120, and ENT 100 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ENT 123, PLB 123.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

**PLP 130 – Fungal Biology & Disease (3 units)**

*Course Description:* Physiology, cell biology and biochemistry of fungi. Pathobiology of the diseases that fungi or their metabolites cause on plants, animals and humans. Control of fungal pathogens using fungicides.

*Prerequisite(s):* BIS 002A (can be concurrent); BIS 002B (can be concurrent); BIS 002C (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PLP 135 – Field Identification of Mushrooms (1 unit)**

*Course Description:* Collection and identification of mushrooms and other fleshy fungi based on macro and microscopic features.

*Prerequisite(s):* Introductory course in Biological Sciences; course in mycology recommended.

*Learning Activities:* Fieldwork.

*Grade Mode:* Pass/No Pass only.

**PLP 148 – Introductory Mycology (4 units)**

*Course Description:* Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C.

*Learning Activities:* Lecture 2 hour(s), Laboratory 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Cross Listing:* PLB 148.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLP 150 – Fungal Ecology (3 units)**

*Course Description:* Ecological roles of fungi as saprobes, mutualists and parasites in native and managed ecosystems. Physiological and reproductive strategies associated with adaptations to diverse habitats.

*Prerequisite(s):* BIS 002C; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PLP 185 – Advanced Mushroom Taxonomy (2 units)**

*Course Description:* Microscopic and molecular methods used in the identification of mushroom species; molecular characterization including PCR-amplification of ribosomal nuclear DNA, digestion of the product with restriction enzymes, and DNA sequencing; a one-day field trip is required.

*Prerequisite(s):* (PLP 135 or PLP 148); BIS 101; or the equivalent to BIS 101.

*Learning Activities:* Discussion/Laboratory 3 hour(s), Fieldwork 1 hour(s).

*Enrollment Restriction(s):* Limited to 12 students.

*Grade Mode:* Letter.

**PLP 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus, supervised by a member of the faculty.

*Prerequisite(s):* PLP 120; and consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**PLP 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PLP 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**PLP 201A – Impacts, Mechanisms & Control of Plant Disease (4 units)**

*Course Description:* Case-studies approach to analysis of plant diseases caused by bacteria, fungi, oomycetes, and viruses, including impacts, etiology, pathogen taxonomy and epidemiology, biochemical and genetic aspects of pathogen-host interactions, virulence and resistance, and approaches to disease control.

*Prerequisite(s):* PLP 120; graduate student status in the Plant Pathology Graduate Program or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**PLP 201B – Impacts, Mechanisms & Control of Plant Disease (3 units)**

*Course Description:* Case-studies approach to analysis of plant diseases, including emerging diseases, caused by bacteria, fungi, nematodes, and oomycetes: impacts, etiology, pathogen taxonomy, epidemiology, biochemical and genetic aspects of pathogen-host interactions, virulence, resistance, disease control and statistical analysis.

*Prerequisite(s):* PLP 120; PLP 201A; graduate student status in the Plant Pathology Graduate Program or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**PLP 202A – Applied Plant Pathology - Field Biology, Diagnosis, Management, & Outreach (5 units)**

*Course Description:* Field biology, economic impacts, diagnosis, epidemiology, and management of disease in agricultural crops. Plant disease in agricultural settings at different production stages (nursery, field, processing, post-harvest).

*Prerequisite(s):* PLP 201A or PLP 201B; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s); Laboratory 3 hour(s); Fieldwork 6 hour(s).

*Grade Mode:* Letter.

**PLP 202B – Applied Plant Pathology - Field Trip (1 unit)**

*Course Description:* Continuation of PLP 202A. Four-day field trip investigating diseases of agricultural crops and forest trees.

*Prerequisite(s):* PLP 202A; or consent of instructor.

*Learning Activities:* Fieldwork.

*Grade Mode:* S/U only.

**PLP 205A – Diseases of Vegetable & Field Crops (3 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Clinical study of diseases of vegetable and field crops with emphasis on etiology, epidemiology, diagnosis, and control. Field trips required.

*Prerequisite(s):* PLP 120.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

**PLP 205B – Diseases of Vegetable & Field Crops; Summer Field Trip (1 unit)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Continuation of PLP 205A. Four-day field trip investigating diseases of vegetable and field crops.

*Prerequisite(s):* PLP 120; PLP 205A.

*Learning Activities:* Fieldwork 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLP 210 – Biochemistry & Molecular Biology of Plant-Microbe Interaction (4 units)**

*Course Description:* Discussion of plantmicrobe interactions, focused on the underlying cellular, biochemical, and molecular events that determine the diseased state.

*Prerequisite(s):* BIS 101; BIS 102; BIS 103; BIS 104; or the equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**PLP 217 – Molecular Genetics of Fungi (3 units)**

*Course Description:* Advanced treatment of molecular biology and genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; plant pathogenesis; secretion; control of reproduction; reproduction; molecular evolution; transformation; and gene manipulation.

*Prerequisite(s):* BIS 101; BIS 103; MCB 161; PLB 119; PLP 130; PLP 215X; graduate standing in a Biological Science; MIC 215 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* BCM 217.

*Grade Mode:* Letter.

**PLP 224 – Advanced Mycology (3 units)**

*Course Description:* Physiology, cell biology and biochemistry of fungi. Topics include mycotoxins, epidemiology and nature of emerging and re-emerging fungal diseases, fungicides, and fungicide resistance.

*Prerequisite(s):* (PLP 148 or PLB 148); PLP 120; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PLP 228 – Plant Bacteriology (3 units)**

*Course Description:* Study of plant pathogenic microorganisms including taxonomy, biology, molecular mechanisms of disease, and plant disease management. Topics include quorum sensing, rhizosphere biology, genomics, virulence factors, and host plant resistance genes.

*Prerequisite(s):* PLP 120; or equivalent or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**PLP 230 – Plant Virology (3 units)**

*Course Description:* Viruses as causal agents of plant disease and as tools for manipulating plants; structures of virus particles; mechanisms of transmission, replication, and spread in the plant; cytology and molecular biology in susceptible and resistant reactions to virus infection; virus disease control.

*Prerequisite(s):* Upper division or graduate course in Molecular Biology or graduate student in Plant Pathology.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Only 2 units of credit to students who complete MIC 262; not open for credit to students who have completed PLP 226.

*Grade Mode:* Letter.

**PLP 290 – Seminar (1 unit)**

*Course Description:* Review and evaluation of current research in plant pathology.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLP 290C – Advanced Research Conference (1 unit)**

*Course Description:* Presentation, evaluation, and critical discussions of research activities in the area of advanced plant pathology; primarily designed for graduate students.

*Prerequisite(s):* PLP 120; or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLP 291 – Seminar in Molecular Plant Pathology (1 unit)**

*Course Description:* Review and evaluation of current literature and research in biochemistry and molecular biology of plant microbe interactions.

*Prerequisite(s):* PLP 120; or consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLP 295 – Seminar in Mycology (1 unit)**

*Course Description:* Review and evaluation of current literature and research in mycology.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLP 298 – Special Group Study (1-5 units)**

*Course Description:* Special group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**PLP 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Plant Science (PLS)**

College of Agricultural & Environmental Sciences

**PLS 001 – Agriculture, Nature & Society (3 units)**

*Course Description:* Multiple perspectives and connections between natural sciences, social sciences, and agriculture. Emphasizes agriculture's central position between nature and society and its key role in our search for a productive, lasting and hospitable environment. Several full-period field trips provide hands-on learning.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 001. (Former AMR 001.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLS 002 – Botany & Physiology of Cultivated Plants (4 units)**

*Course Description:* Holistic introduction to the underlying botanical and physiological principles of cultivated plants and their response to the environment. Includes concepts behind plant selection, cultivation, and utilization. Laboratories include discussion and interactive demonstrations.

*Prerequisite(s):* High school course in biology and chemistry recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 002. (Former AMR 002.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**PLS 003 – Seminar: Overview of the Plant Sciences****Major (1 unit)**

*Course Description:* Introduction to topics covered in the core courses and areas of specialization within the Plant Sciences major. Research and internship opportunities and potential career paths in plant breeding, crop management and ecology, horticulture, precision agriculture, crop quality and safety, ecosystem management and restoration, and related fields.

*Learning Activities:* Seminar 1.5 hour(s).

*Grade Mode:* Pass/Not Passed only.

**PLS 006 – Flower Power; Art & Science of Flowers & Their Uses (2 units)**

*Course Description:* Introduction to the art and science of using and growing flowers to harness the power that is represented by their aesthetic beauty. Handling, production, arranging, breeding and marketing of flowers. Emphasis on potted plants and cut-flowers.

*Prerequisite(s):* High school biology.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**PLS 006V – Flower Power; Art & Science of Flowers & Their Uses (2 units)**

*Course Description:* Introduction to the art and science of using and growing flowers to harness the power that is represented by their aesthetic beauty. Handling, production, arranging, breeding and marketing of flowers. Emphasis on potted plants and cut-flowers.

*Prerequisite(s):* High school biology.

*Learning Activities:* Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Grade Mode:* P/NP only.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE).

## **PLS 007 – Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink (4 units)**

*Course Description:* Coffee used as a case study to examine biological, ecological and social factors influencing sustainability of farming systems and how food production systems impact human well-being.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Writing Experience (WE).

## **PLS 007V – Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink (4 units)**

*Course Description:* Coffee used as a case study to examine biological, ecological and social factors influencing sustainability of farming systems and how food production systems impact human well-being.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Writing Experience (WE).

## **PLS 012 – Plants & Society (4 units)**

*Course Description:* Dependence of human societies on plant and plant products. Plants as resources for food, fiber, health, enjoyment and environmental services. Sustainable uses of plants for food production, raw materials, bioenergy, and environmental conservation. Global population growth and future food supplies.

*Prerequisite(s):* High school biology.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 012. (Former PLB 012.)

*Cross Listing:* SAS 012.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Writing Experience (WE).

## **PLS 013 – Chocolate, Covered: The Past, Present, & Future of Cacao (3 units)**

*Course Description:* Multidisciplinary perspectives on the crop that gives us chocolate. History, genetics, agronomy, sensory science, and economics of cacao production.

*Prerequisite(s):* High school biology.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **PLS 015 – Introduction to Sustainable Agriculture (4 units)**

*Course Description:* Multidisciplinary introduction to agricultural sustainability with a natural sciences emphasis. Sustainability concepts and perspectives. Agricultural evolution, history, resources and functions. Diverse agricultural systems and practices and their relative sustainability. Laboratories provide direct experience with selected agricultural practices and systems.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 021 – Application of Computers in Technology (3 units)**

*Course Description:* Concepts of computing and applications using personal computers, spreadsheets, database management, word processing and communications.

*Prerequisite(s):* High school algebra.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Not open for students who have completed PLS 021V or AMR 021. (Former AMR 021.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **PLS 021V – Application of Computers in Technology (3 units)**

*Course Description:* Concepts of computing and applications using personal computers, spreadsheets, database management, word processing and communications.

*Prerequisite(s):* High school algebra.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Enrollment Restriction(s):* Not open for students who have taken PLS 021.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **PLS 049 – Organic Crop Production Practices (3 units)**

*Course Description:* Principles and practices of organic production of annual crops. Including organic crops, soil, and pest management, cover cropping, composting, seeding, transplanting, irrigation, harvesting and marketing.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 049. (Former AMR 049.)

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## **PLS 092 – Internship (1-12 units)**

*Course Description:* Work experience on or off campus in subject areas pertaining to plant and environmental sciences. Internship supervised by a faculty member.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **PLS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; primarily for lower division students.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **PLS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor; primarily for lower division students.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

## **PLS 100A – Metabolic Processes of Cultivated Plants (3 units)**

*Course Description:* Principles of energy capture and photosynthesis, water use, and nutrient cycling. Conversion of these resources into products (carbohydrates, proteins, lipids, and other chemicals) by plants. Emphasis on the relationships between environmental resources, plant metabolism and plant growth.

*Prerequisite(s):* PLS 002 or BIS 002C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 100AL – Metabolic Processes of Cultivated Plants Laboratory (2 units)**

*Course Description:* Techniques and instruments used to study plant metabolic processes, including water relations, respiration, photosynthesis, enzyme kinetics, microscopy, immunochemistry, and nitrogen fixation. Quantitative methods, problem solving, and practical applications are emphasized.

*Prerequisite(s):* PLS 100A (can be concurrent); or the equivalent.

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 100B – Growth & Yield of Cultivated Plants (3 units)**

*Course Description:* Principles of the cellular mechanisms and hormonal regulation underlying plant growth, development, and reproduction. Emphasis on how these processes contribute to the harvestable yield of cultivated plants and can be managed to increase crop productivity and quality.

*Prerequisite(s):* PLS 100A; or the equivalent of PLS 100A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 100BL – Growth & Yield of Cultivated Plants Laboratory (2 units)**

*Course Description:* Laboratory exercises in plant growth and development and their regulation, including photomorphogenesis, plant growth regulators, plant anatomy, seed germination, fruit ripening and senescence. Includes field trips to illustrate relationships to cropping and marketing systems.

*Prerequisite(s):* PLS 100B (can be concurrent); or equivalent.

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 100C – Environmental Interactions of Cultivated Plants (3 units)**

*Course Description:* Principles of plant interactions with their physical and biological environments and their acquisition of the resources needed for growth and reproduction. Emphasis on how management practices and environmental conditions affect crop productivity.

*Prerequisite(s):* PLS 100A; or the equivalent of PLS 100A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 100CL – Environmental Interactions of Cultivated Plants Laboratory (2 units)**

*Course Description:* Techniques and instruments used to study plant interactions with their physical and biological environments, including light responses, transpiration, microclimatology, nutrient availability and utilization, biomass accumulation. Quantitative methods and modeling are emphasized.

*Prerequisite(s):* PLS 100C (can be concurrent).

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 101 – Agriculture & the Environment (3 units)**

*Course Description:* Focus on the interaction between agriculture and the environment to address the principles required to analyze conflict and develop solutions to complex problems facing society.

*Prerequisite(s):* PLS 002; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 101. (Former AMR 101.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **PLS 102 – California Floristics (5 units)**

*Course Description:* Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips.

*Prerequisite(s):* PLS 002 or BIS 002C; or equivalent course in Plant Science.

*Learning Activities:* Lecture 2 hour(s), Laboratory 5 hour(s), Fieldwork.

*Cross Listing:* PLB 102.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **PLS 105 – Concepts in Pest Management (3 units)**

*Course Description:* Introduction to the ecological principles of integrated pest management, biology of different classes of pests and the types of losses they cause, population assessment, evaluation of advantages and disadvantages of different techniques used for pest management, IPM programs.

*Prerequisite(s):* CHE 008B; (PLS 002 or BIS 002B or BIS 002C).

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 105. (Former AMR 105.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 110 – Crop Management Systems for Vegetable Production (4 units)**

*Course Description:* Horticultural principles applied to production and management systems for vegetable crops. Laboratory and discussion illustrate efficient field management and resource use practices.

*Prerequisite(s):* PLS 002 or (BIS 002A, BIS 002B, BIS 002C).

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLS 110C. (Former PLS 110C.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 111 – Principles of Agronomic Crop Production Systems (4 units)**

*Course Description:* Principles, practices and technologies of agronomic cropping systems, including crop systematics, physiology, agroecology, equipment, and management. Cropping systems analysis and integration of economic and ecological decision-making considerations involved in crop production. One weekend field trip required.

*Prerequisite(s):* PLS 002 or (BIS 002A, BIS 002B, BIS 002C).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLS 110A. (Former PLS 110A.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 112 – Forage Crop Production (3 units)**

*Course Description:* Forages as a world resource in food production. Ecological principles governing the adaptation, establishment, growth and management of perennial and annual forages, including pastures, rangelands and hay; aspects of forage quality which affect feeding value to livestock.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 112. (Former AMR 112.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 113 – Biological Applications in Fruit Tree Management (2 units)**

*Course Description:* Physiology, growth, development and environmental requirements of fruit trees and the cultural practices used to maintain them. Emphasis on the application of biological principles in the culture of commercially important temperate zone fruit tree species.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C; or equivalent.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students that have completed PLB 173. (Former PLB 173.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 114 – Biological Applications in Fruit Production (2 units)**

*Course Description:* Reproductive biology of tree crop species. Biological principles of fruit production, tree nutrition and orchard management for optimizing cropping. Laboratories emphasize hands-on work with orchard tree systems that are done specifically to produce the crop.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C; PLS 113 recommended.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 174. (Former PLB 174.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 116 – Plant Morphology & Evolution (5 units)**

*Course Description:* Introduction to the form, development, and evolution of vascular plants. Emphasis given to the form and development of reproductive structures in ferns and seed-producing plants as a basis for determining evolutionary relationships.

*Prerequisite(s):* Introductory Plant Biology; e.g., BIS 002C, PLS 002.

*Learning Activities:* Lecture 3 hour(s), Laboratory 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 116.

*Cross Listing:* PLB 116.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 120 – Applied Statistics in Agricultural Sciences (4 units)**

*Course Description:* Application of statistical methods to design and analysis of research trials for plant, animal, behavioral, nutritional, and consumer sciences. Basic concepts and statistical methods are presented in lectures, laboratories emphasize data processing techniques, problem solving, and interpretation in specialized fields.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed AMR 120. (Former AMR 120.)

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

## **PLS 123 – Introduction to Plant & Crop Systems Modeling (3 units)**

*Course Description:* Modeling approaches commonly used in plant and crop applications. Fundamentals of how plant/crop models are developed and considerations regarding their limitations. Example model applications include degree-day and radiation-use-efficiency models of growth and yield, phenological models, and crop coefficients.

*Prerequisite(s):* college algebra/precalculus college physics recommended.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division and graduate students.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

## **PLS 124 – Introduction to Digital Agriculture (3 units)**

*Course Description:* Introduction to quantitative approaches for collecting, analyzing, and interpreting environmental data used in plant sciences research. Remote sensing data for estimating plant structure, function and water status, spatial and temporal aspects of data, data science and machine learning, synthesizing complex, high-dimensional data.

*Prerequisite(s):* PLS 021 C or better (can be concurrent) or PLS 021 C or better (can be concurrent); PLS 120 C or better; PHY 007A; PHY 007B; PHY 007C; or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s); Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 125 – Proximal & Remote Sensing of Plants (3 units)**

*Course Description:* Quantitative approaches for collecting, analyzing and interpreting remote sensing data at scales from the leaf to the satellite in plant sciences research. Hands-on experience collecting, processing, and analyzing leaf and canopy-level remote sensing data.

*Prerequisite(s):* PLS 124 C or better (can be concurrent); PLS 021 C or better (can be concurrent or PLS 021V C or better (can be concurrent)); PHY 007A; PHY 007B; PHY 007C; PLS 120 C or better; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s); Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 130 – Grassland Ecology (3 units)**

*Course Description:* Comprehensive survey of grassland ecology including distributions of major grassland types; systematics; morphology, physiology, and diversity of grassland species; population, community, and ecosystem processes occurring in grasslands; the role of grazing, fire, and drought in grasslands; management and conservation.

*Prerequisite(s):* PLS 002 or BIS 002B or BIS 002C; or consent of instructor; upper division standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 135 – Ecology & Community Structure of Grassland & Savannah Herbivores (3 units)**

*Course Description:* Feeding ecology of grassland herbivores and its importance in evolution of herbivore communities and social systems. Optimal foraging, interspecific interactions, and primary productivity are considered as factors structuring natural and managed grassland and savannah systems.

*Prerequisite(s):* (BIS 001A or BIS 001B); (PLS 002 or BIS 001C); General ecology course (ESP 100) recommended.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 135. (Former AMR 135.)

*Grade Mode:* Letter.

## **PLS 141 – Ethnobotany (4 units)**

*Course Description:* Relationships and interactions between plants and people, including human perceptions, management, and uses of plants, influences of plants on human cultures, and effects of human activity on plant ecology and evolution. Concepts, questions, methods, and ethical considerations in ethnobotanical research.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 141. (Former PLB 141.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

## **PLS 144 – Trees & Forests (4 units)**

*Course Description:* Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 144 or ENH 144 or ERS 144. (Formerly PLB 144, ENH 144, ERS 144.)

*Cross Listing:* ESM 144.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **PLS 147 – California Plant Communities (3 units)**

*Course Description:* Ecology, distribution, and species of California's plant communities. Environmental forces that determine these communities, the threats they face, and their conservation and restoration opportunities.

*Prerequisite(s):* PLS 002 or BIS 002C.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 147. (Former PLB 147.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **PLS 147L – California Plant Communities Field Study (1 unit)**

*Course Description:* Visits to many of northern California's plant communities, from the north coast to the Central Valley to the Sierras. Discussion of community ecology and hands-on identification of species. Two Saturday and two three-day field trips required.

*Prerequisite(s):* (PLS 002 or BIS 002C); concurrent or previous enrollment in PLS 147.

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 147. (Former PLB 147.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

## **PLS 148 – Field Course: Flora of Northern California's Mountains (3 units)**

*Course Description:* Diversity, taxonomy, ecology, evolution, and traditional cultural importance of the flora of the Cascade and Klamath mountain ranges. Conservation and management issues. Legal and ethical responsibilities of field botanists. Hands-on botanical field methods including plant identification, characterization of vegetation types, and rare plant surveys. Field course offered the last two weeks of July, based at Lassen Volcanic National Park.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 5 hour(s), Laboratory 5 hour(s), Fieldwork 25 hour(s).

*Grade Mode:* Letter.

## **PLS 150 – Sustainability & Agroecosystem Management (4 units)**

*Course Description:* Interdisciplinary analysis of agricultural production and food systems with primary emphasis on biophysical processes. General concepts governing the functioning of temperate and tropical agroecosystems in relation to resource availability, ecological sustainability, and socio-economic viability. Comparative ecological analyses of agroecosystems.

*Prerequisite(s):* SSC 010; CHE 002A; (PLS 002 or BIS 001C or BIS 002C).

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 150. (Former AMR 150.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Scientific Literacy (SL).

## **PLS 152 – Plant Genetics (4 units)**

*Course Description:* Basic principles of transmission genetics, cytogenetics, population and quantitative genetics, and molecular genetics. Practical aspects of genetic crosses and analysis of segregating populations.

*Prerequisite(s):* BIS 001A or BIS 002A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Credit Limitation(s):* Not open to students who have completed PLB 152. (Former PLB 152.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 153 – Plant, Cell, Tissue & Organ Culture (4 units)**

*Course Description:* Basic and applied aspects of plant tissue culture including media preparation, micropropagation, organogenesis, embryogenesis, anther culture, protoplast culture and transformation.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 153. (Former PLB 153.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 154 – Introduction to Plant Breeding (4 units)**

*Course Description:* Principles, methods and applications of plant breeding and genetics to the improvement of crop plants. Illustration of how plant breeding is a dynamic, multidisciplinary, constantly-evolving science. Laboratory emphasizes hands-on experience in the basics of breeding through experiments.

*Prerequisite(s):* PLS 152 or BIS 101; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 154. (Former PLB 154.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 157 – Physiology of Environmental Stresses in Plants (4 units)**

*Course Description:* Stress concepts and principles; molecular, physiological, developmental and morphological characteristics enabling plants to avoid or tolerate environmental stresses; stress acclimation and adaptation processes; responses of wild and cultivated species to drought, flooding, nutrient deficiencies, salinity, toxic ions, extreme temperatures, etc.

*Prerequisite(s):* PLS 100C or PLB 111 or PLB 112 or ENH 102 or VEN 110.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 157. (Former PLB 157.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 158 – Mineral Nutrition of Plants (4 units)**

*Course Description:* Evolution and scope of plant nutrition; essential elements; mechanisms of absorption and membrane transporters; translocation and allocation processes; mineral metabolism; deficiencies and toxicities; genetic variation in plant nutrition; applications to management and understanding ecological effects of nutrient availability or deficiency.

*Prerequisite(s):* PLS 100A or PLB 111 or ENH 102 or VEN 110.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 158. (Former PLB 158.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 160 – Agroforestry: Global & Local Perspectives (3 units)**

*Course Description:* Traditional and evolving use of trees in agricultural ecosystems; their multiple roles in environmental stabilization and production of food, fuel, and fiber; and socioeconomic barriers to the adoption and implementation of agroforestry practices.

*Prerequisite(s):* (PLS 002 or BIS 001C or BIS 002C); (PLS 142 or PLS 150 or BIS 002B); or general ecology course in lieu of PLS 142 or PLS 150 or BIS 002B.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have previously taken AMR 160. (Former AMR 160.)

*Cross Listing:* IAD 160.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **PLS 162 – Urban Ecology (3 units)**

*Course Description:* Application of fundamental concepts and approaches in landscape and ecosystem ecology to urban ecosystems. Ecological and social drivers and responses. Landscape heterogeneity, nutrient dynamics, invasive species, altered hydrology and climate, and pollution. Discussion of primary literature.

*Prerequisite(s):* ECL 200AN C- or better or ECL 200BN C- or better or ENH 160 C- or better or ESM 144 C- or better or ESP 100 C- or better or ESP 110 C- or better or ESP 121 C- or better or EVE 101 C- or better or EVE 104 C- or better or EVE 117 C- or better or EVE 120 C- or better or EVE 181 C- or better or PLB 117 C- or better or PLS 130 C- or better or PLS 144 C- or better or PLS 163 C- or better or SSC 112 C- or better; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**PLS 163 – Ecosystem & Landscape Ecology (4 units)**

This version has ended; see updated course, below.

*Course Description:* Integration of concepts to understand and manage ecosystems in a complex and changing world. Emphasis on interactions among biotic, abiotic & human factors and changes over space/time. Local to global controls over water, carbon and nutrients across ecosystems/landscapes.

*Prerequisite(s):* (ESP 100 C- or better) or (SSC 112 C- or better) or (EVE 117 C- or better) or (PLB 117 C- or better) or (PLS 144 C- or better) or (ESM 144 C- or better) or (PLS 162 C- or better) or (ENH 160 C- or better) or (EVE 101 C- or better); or similar class with consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECL 201.

*Grade Mode:* Letter.

**PLS 163 – Ecosystem & Landscape Ecology (4 units)**

*Course Description:* Integration of concepts to understand and manage ecosystems in a complex and changing world. Emphasis on interactions among biotic, abiotic & human factors and changes over space/time. Local to global controls over water, carbon and nutrients across ecosystems/landscapes.

*Prerequisite(s):* ENH 160 C- or better or ESM 144 C- or better or ESP 100 C- or better or ESP 155 C- or better or EVE 101 C- or better or EVE 117 C- or better or PLB 117 C- or better or PLS 130 C- or better or PLS 144 C- or better or PLS 147 C- or better or PLS 150 C- or better or PLS 162 C- or better or SSC 100 C- or better or SSC 102 C- or better or SSC 109 C- or better or SSC 112 C- or better or HYD 124 C- or better or ECL 200AN C- or better or ECL 200BN (can be concurrent); or similar class with consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed ECL 201.

*Grade Mode:* Letter.

This course version is effective from, and including: Fall Quarter 2023.

**PLS 170A – Fruit & Nut Cropping Systems (2 units)**

*Course Description:* Overview of production and handling systems of major pomological crops, analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing.

*Prerequisite(s):* PLS 002 or BIS 002C; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 170A. (Former AMR 170A.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLS 170B – Fruit & Nut Cropping Systems (2 units)**

*Course Description:* Overview of production and handling systems of major pomological crops, including analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing.

*Prerequisite(s):* PLS 002 or BIS 002C; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AMR 170B. (Former AMR 170B.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLS 171 – Principles & Practices of Plant Propagation (4 units)**

*Course Description:* Principles and practices of propagating plants covering anatomical, physiological, and practical aspects.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Laboratory 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 171. (Former PLB 171.)

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLS 172 – Biology and Quality of Harvested Crops (4 units)**

*Course Description:* Overview of physiological and molecular processes related to the quality and safety of harvested crop products. Targeted approaches and technologies to improve/maintain crop quality and limit crop losses after harvest. Socioeconomic aspects of crop losses and food waste.

*Prerequisite(s):* BIS 002A; PLS 002; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLS 173 – Molecular & Cellular Aspects of Postharvest Biology (3 units)**

Starting Winter Quarter 2024, this course is no longer offered.

*Course Description:* Basic concepts and current knowledge of issues relevant to postharvest biology. Mechanisms of fruit ripening, senescence, programmed cell death. Metabolism and functions of phytohormones, carbohydrates, lipids, pigments, flavor compounds, and phytonutrients at molecular and cellular levels.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLS 174 – Microbiology & Safety of Fresh Fruits & Vegetables (3 units)**

*Course Description:* Overview of microorganisms on fresh produce, pre- and postharvest factors influencing risk of microbial contamination, attachment of microorganisms to produce, multiplication during postharvest handling and storage, and methods of detection. Mock outbreak trial and presentation of science-based forensic discovery.

*Prerequisite(s):* PLS 002 or BIS 001C or BIS 002C; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**PLS 176 – Introduction to Weed Science (4 units)**

**Course Description:** Weed biology and ecology, methods of weed management, biological control, herbicides and herbicide resistance. Weed control in managed and natural ecosystems; invasive species. Laws and regulations. Application of herbicides. Sight and software-assisted identification of common weeds.

**Prerequisite(s):** PLS 002 or BIS 001C or BIS 002C.

**Learning Activities:** Lecture 2 hour(s), Discussion/Laboratory 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed PLB 176. (Former PLB 176.)

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Visual Literacy (VL).

**PLS 178 – Biology & Management of Aquatic Plants (3 units)**

**Course Description:** Brief survey of common and invasive fresh water plants and macroalgae, their reproductive modes, physiology, growth (photosynthesis, nutrient utilization), development (hormonal interactions), ecology, modes and impacts of invasion, and management. Two Saturday field trips required.

**Prerequisite(s):** (PLS 002 or BIS 001C or BIS 002C); (CHE 008B or CHE 118B); PLS 100C, PLB 111, ENH 102, or HYD 122 recommended.

**Learning Activities:** Lecture 3 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed former PLB 178. (Former PLB 178.)

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE).

**PLS 188 – Undergraduate Research Proposal (3 units)**

**Course Description:** Preparation and review of a scientific proposal. Problem definition, identification of objectives, literature survey, hypothesis generation, design of experiments, data analysis planning, proposal outline and preparation.

**Prerequisite(s):** Upper division standing.

**Learning Activities:** Lecture/Discussion 3 hour(s).

**Cross Listing:** BIT 188.

**Grade Mode:** Letter.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

**PLS 189L – Laboratory Research in Plant Sciences (2-5 units)**

**Course Description:** Formulating experimental approaches to current questions in plant science; performance of proposed experiments.

**Prerequisite(s):** PLS 188; and consent of instructor.

**Learning Activities:** Laboratory 3-12 hour(s), Discussion 1 hour(s).

**Repeat Credit:** May be repeated 12 unit(s).

**Grade Mode:** Pass/No Pass only.

**PLS 190 – Seminar on Alternatives in Agriculture (2 units)**

**Course Description:** Seminar on topics related to alternative theories, practices and systems of agriculture and the relationship of agriculture to the environment and society. Scientific, technological, social, political and economic perspectives.

**Prerequisite(s):** Upper division standing or consent of instructor.

**Learning Activities:** Seminar 1 hour(s), Discussion 1 hour(s).

**Repeat Credit:** May be repeated 2 time(s) for a total of three times.

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE).

**PLS 190C – Research Group Conference (1 unit)**

**Course Description:** Weekly conference on research problems, progress and techniques in the plant sciences.

**Prerequisite(s):** Consent of instructor; advanced standing.

**Learning Activities:** Discussion 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

**PLS 192 – Internship (1-12 units)**

**Course Description:** Work experience on or off campus in subject areas pertaining to plant and environmental sciences. Internship supervised by a faculty member.

**Prerequisite(s):** Consent of instructor; completion of 84 units.

**Learning Activities:** Internship 3-36 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Pass/No Pass only.

**PLS 193 – Garden & Farm-Based Experiential Education Methods (2 units)**

**Course Description:** Methods of teaching children and youth about fruit and vegetable production and consumption. Lesson and activity planning for garden and farm field trips. Basic biology, ecology, plant science, and crop management practices. Mentorship in experiential learning. Preparation of garden site.

**Prerequisite(s):** Upper division standing or consent of instructor.

**Learning Activities:** Lecture 1 hour(s), Laboratory 3 hour(s).

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE); Oral Skills (OL).

**PLS 194H – Senior Honors Thesis (1-2 units)**

**Course Description:** Independent study of selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis.

**Prerequisite(s):** Senior standing; overall GPA of 3.250 or higher and consent of master advisor.

**Learning Activities:** Independent Study 3-6 hour(s).

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE); Writing Experience (WE).

**PLS 196 – Postharvest Technology of Horticultural Crops (3 units)**

**Course Description:** Intensive study of postharvest considerations and current procedures and challenges in postharvest handling for fruits, nuts, vegetables, and ornamentals in California. Scheduled first two weeks immediately following last day of spring quarter.

**Prerequisite(s):** Upper division or graduate student standing.

**Learning Activities:** Lecture/Discussion 45 hour(s), Fieldwork 45 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed PLB 196. (Former PLB 196.)

**Grade Mode:** Pass/No Pass only.

**General Education:** Science & Engineering (SE).

**PLS 197T – Tutoring in Plant Sciences (1-5 units)**

**Course Description:** Leading small voluntary discussion or lab groups affiliated with one of the department's regular courses.

**Prerequisite(s):** Consent of instructor; upper division standing, completion of course being tutored or the equivalent.

**Learning Activities:** Tutorial 1-5 hour(s).

**Repeat Credit:** May be repeated 8 unit(s).

**Grade Mode:** Pass/No Pass only.

**PLS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**PLS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**PLS 205 – Experimental Design & Analysis (5 units)**

*Course Description:* Introduction to the research process and statistical methods to plan, conduct and interpret experiments.

*Prerequisite(s):* PLS 120; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed AGR 205. (Former AGR 205.)

*Grade Mode:* Letter.

**PLS 206 – Applied Multivariate Modeling in Agricultural & Environmental Sciences (4 units)**

*Course Description:* Multivariate linear and nonlinear models. Model selection and parameter estimation. Analysis of manipulative and observational agroecological experiments. Discriminant, principal component, and path analyses. Logistic and biased regression.

Bootstrapping. Exercises based on actual research by UC Davis students.

*Prerequisite(s):* PLS 120; (STA 106 or STA 108 or PLS 205).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have complete AGR 206. (Former AGR 206.)

*Grade Mode:* Letter.

**PLS 207 – Applied Statistical Modeling for the Environmental Sciences (3 units)**

*Course Description:* Introduction to building statistical models in classical and Bayesian frameworks, model fitting methods, introduction to hierarchical Bayes, regularization and priors, applications of hierarchical Bayesian models to important kinds of problems of environmental data analysis.

*Prerequisite(s):* PLS 205 (can be concurrent); PLS 206 (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PLS 212 – Postharvest Biology & Biotechnology of Fruits & Nuts (3 units)**

*Course Description:* Review of postharvest biology of fruits and nuts and biotechnological approaches to address postharvest challenges. Morphology, biology and postharvest handling of fruits and nuts are presented along with current research, including biotechnology, and discussion of future research needs and approaches.

*Prerequisite(s):* PLS 172.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed POM 212.

*Grade Mode:* Letter.

**PLS 213 – Postharvest Physiology of Vegetables (3 units)**

*Course Description:* Comparative physiology of harvest vegetables; emphasis on maturation, senescence, compositional changes, physiological disorders and effects of environmental factors. Concepts and research procedures.

*Prerequisite(s):* PLS 172 or PLS 100B or PLB 112.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed VCR 212. (Former VCR 212.)

*Grade Mode:* Letter.

**PLS 217 – Field Techniques in Plant Physiology (3 units)**

*Course Description:* Hands-on practice applying a wide range of field-oriented plant physiology equipment and techniques. Use of water relations techniques, gas exchange devices, and image analysis, with extensive focus on dataloggers and sensing. Training in field-based plant physiology techniques intended to help students design research projects and appreciate the value and limitations of new equipment.

*Prerequisite(s):* Prior coursework in plant physiology such as PLS 100A, PLS 100CL, PLS 157, PLS 210, PLB 111 or similar.

*Learning Activities:* Discussion/Laboratory 2.50 hour(s), Extensive Problem Solving 1 hour(s).

*Grade Mode:* Letter.

**PLS 220 – Genomics & Biotechnology of Plant Improvement (3 units)**

*Course Description:* Integration of modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits.

*Prerequisite(s):* BIS 101; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed VCR 220. (Former VCR 220.)

*Cross Listing:* GGG 220.

*Grade Mode:* Letter.

**PLS 221 – Genomics & Breeding of Vegetable Crops (3 units)**

*Course Description:* Preview of genome structure, mapping, gene tagging and development of other genetic resources applied to improvement of major vegetables. For graduate students contemplating a career in modern vegetable breeding and biotechnology.

*Prerequisite(s):* BIS 101; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed VCR 221. (Former VCR 221.)

*Grade Mode:* Letter.

**PLS 222 – Advanced Plant Breeding (4 units)**

*Course Description:* Philosophy, methods, and problems in developing improved plant species. Topics include: inbreeding, heterosis, progeny testing, breeding methodology, index selection, germplasm conservation, and breeding for stress resistance. Laboratories include tours of breeding facilities and calculation and interpretation of quantitative data.

*Prerequisite(s):* PLS 154; PLS 205; GGG 201D or ANG 107 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**PLS 225 – Quantitative Genetics (4 units)**

*Course Description:* Introduction to the principles of quantitative genetics including the study and analysis of quantitative variation, concepts of heritability and genetic gain from artificial selection, and application of classic and genome-informed approaches in breeding.

*Prerequisite(s):* PLS 205; GGG 201D; or consent of instructor; graduate standing.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**PLS 240 – Extension Education, Outreach & Science Communication (4 units)**

*Course Description:* History, theory, and current practice of extension education. Role and skills needed of the extension educator. Pluralistic nature of extension education. Development of skills to create lasting change through outreach and communication in an extension education program.

*Prerequisite(s):* Graduate standing; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s); Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

**PLS 290 – Seminar (1-2 units)**

*Course Description:* Topics of current interest related to Plant Sciences.

*Learning Activities:* Seminar 1-2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLS 290C – Research Conference (1 unit)**

*Course Description:* Research conference.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLS 297T – Tutoring in Plant Sciences (1-5 units)**

*Course Description:* Designed for graduate students who desire teaching experience but are not teaching assistants.

*Prerequisite(s):* Consent of instructor; graduate standing; completion of course to be tutored or the equivalent.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated 5 unit(s) and same course may not be tutored more than once.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLS 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**PLS 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PLS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-12 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Plastic Surgery (PSU)**

School of Medicine

**PSU 460 – Clinical Plastic Surgery Elective (1-18 units)**

*Course Description:* Total involvement in patient care involving surgical preparation, treatment, operative care, and follow-up. Developing and understanding reconstruction and aesthetic plastic surgery.

Microvascular surgery included. Student rotation.

*Prerequisite(s):* SUR 430; and consent of instructor; third- or fourth-year medical students.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**Political Science (POL)**

College of Letters & Science

**POL 001 – American National Government (4 units)**

*Course Description:* Survey of American national government, including the constitutional system, political culture, parties, elections, the presidency, Congress, and the courts.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 002 – Introduction to Comparative Politics (4 units)**

*Course Description:* Introduction to basic concepts in political analysis and application of them in comparative studies of selected countries. Coverage is given to cultural and other informal dimensions of politics as well as to more formal political and governmental structures.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 003 – International Relations (4 units)**

*Course Description:* International conflict and cooperation, including the Cold War, nuclear weapons, and new techniques for understanding international politics.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 004 – Basic Concepts in Political Theory (4 units)**

*Course Description:* Analysis of such concepts as the individual, community, liberty, equality, justice, and natural law as developed in the works of the major political philosophers.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 005 – Contemporary Problems of the American Political System (4 units)**

*Course Description:* In-depth treatment of selected problems and issues of American politics, governmental institutions, and policies.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 007 – Contemporary Issues in Law & Politics (4 units)**

*Course Description:* Seminar focusing on the political dimensions of American law and institutions. Examines the role of courts in resolving contemporary issues of law and politics including abortion, capital punishment, and civil rights.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment; open to students having no more than 40.1 units.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 011A – America Decides: Who Will Win This Year's Election? (4 units)**

*Course Description:* Survey of factors influencing presidential and congressional elections. Analysis of candidate nominations, campaign strategy, campaign finance, media coverage, and voter decision-making.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 011B – Citizen Lawmaking: Direct Democracy, Public Policy & Political Representation in America (4 units)**

*Course Description:* Analysis of direct participation by citizens in the lawmaking process.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 011C – Politics & Film (4 units)**

*Course Description:* Survey of portrayals of politics and policy issues in moving pictures. Analysis of political processes, policy development, social mores, and historical periods as highlighted in Hollywood movies, television, and/or documentary films.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

**POL 011D – Political Persuasion (4 units)**

*Course Description:* Examination of political influence and persuasion.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 012A – Politics & Sports (4 units)**

*Course Description:* Core issues in American and world politics through the lens of sports and the athletes who play them. Introduction of American civil rights movement, the Cold War, Middle East Tensions, and democratization.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 012B – Climate Change & Politics (4 units)**

*Course Description:* Analysis of political institutions' response and adaptation to climate change.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 012Y – Data Visualization in the Social Sciences (4 units)**

*Course Description:* Introduction to quantitative data across the social sciences (Communications, Political Science, Psychology, Sociology, and other disciplines). Transforming data, describing data, producing graphs, visual reasoning, and interpretations.

*Learning Activities:* Lecture 2 hour(s), Laboratory 1.50 hour(s), Web Virtual Lecture 1.50 hour(s).

*Cross Listing:* CMN 012Y, SOC 012Y, PSC 012Y.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL); Visual Literacy (VL).

**POL 051 – Scientific Study of Politics (4 units)**

*Course Description:* Introduction to the basic principles of the scientific study of politics. Research design and empirical analysis of data with applications to different methodological approaches and different substantive areas in political science.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**POL 090X – Lower Division Seminar (4 units)**

*Course Description:* Examines fundamental issues and concepts that shape the study and practice of politics. Students will read, discuss and write about some of the most significant texts in political science in order to develop a foundation for the study of politics.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Seminar 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**POL 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **POL 100 – Local Government & Politics (4 units)**

*Course Description:* Politics and government of local communities in the United States, including cities, counties and special districts. Emphasizes sources and varieties of community conflict, legislative and executive patterns, expertise, decision making and the politics of structure.

Observation of local governing boards.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **POL 102 – Urban Public Policy (4 units)**

*Course Description:* Political and economic relationships among central cities, suburbs, and regional, state, and federal governments. Focuses upon policy areas such as poverty, transportation, welfare, and housing, and upon who governs and who benefits from the policies in these areas.

*Prerequisite(s):* Consent of instructor; POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 104 – California State Government & Politics (4 units)**

*Course Description:* California political system. Political culture, constitution, elections and parties, direct democracy, legislature, governor, executive branch, courts, finances, state-local relations and policy issues.

*Prerequisite(s):* Consent of instructor; POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **POL 105 – The Legislative Process (4 units)**

*Course Description:* Legislative process with emphasis on the United States Congress; legislative organization and procedures, legislative leadership and policy making, legislators and constituents, relations between Congress and other agencies.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **POL 106 – The Presidency (4 units)**

*Course Description:* American presidencies origins and development; presidential power and influence as manifest in relationships with Congress, courts, parties, and the public in the formulation and administration of foreign and domestic policy; nominations, campaigns, and elections.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **POL 107 – Environmental Politics & Administration (4 units)**

*Course Description:* Environment as a political issue in the United States. Development of administrative mechanisms for handling environmental problems. Changing role of Congress, the presidency, the bureaucracy and the courts in environmental policy formulation and implementation.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 108 – Policy Making in the Public Sector (4 units)**

*Course Description:* Theoretical rationale for governmental activity, program evaluation, PPBS, positive theories of policy making, the quantitative study of policy determinants, implementation, and proposals for improved decision making.

*Prerequisite(s):* Consent of instructor; POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 109 – Public Policy & the Governmental Process (4 units)**

*Course Description:* Processes of formulating public policy, including individual and collective decision making, political exchange, competition, bargaining, coalition formation and the allocation of public goods, resources and opportunities.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 110 – The Strategy of Politics (4 units)**

*Course Description:* Introduction to game theory. Explanation of the behavior of individuals in strategic interaction. Rational and behavioral approaches. Applications to political science and other fields.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 112 – Contemporary Democratic Theory (4 units)**

*Course Description:* Major contemporary attempts to reformulate traditional democratic theory, attempts to replace traditional theory by conceptual models derived from modern social science findings.

*Prerequisite(s):* POL 004 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**POL 113 – American Political Thought (4 units)**

*Course Description:* Origins and nature of American political thought. Principles of American thought as they emerge from the founding period to the present.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 114 – Quantitative Analysis of Political Data (4 units)**

*Course Description:* Logic and methods of analyzing quantitative political data. Topics covered include central tendency, probability, correlation, and non-parametric statistics. Particular emphasis will be placed on understanding the use of statistics in political science research.  
*Prerequisite(s):* POL 051 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**POL 115 – Medieval Political Thought (4 units)**

*Course Description:* Examination of the ideas central to medieval political thinking. Emphasis will be upon the thoughts of the major political thinkers of the period, rather than upon political history.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**POL 116 – Foundations of Political Thought (4 units)**

*Course Description:* Analysis and evaluation of the seminal works of a major political philosopher or of a major problem in political philosophy.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Repeat Credit:* May be repeated 1 time(s) when topic differs.  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 117 – Topics in the History of Political Thought (4 units)**

*Course Description:* Political thought of a specific historical period. Topics may include: Ancient Athens, the Italian Renaissance, the Enlightenment, or 19th-century Germany.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Repeat Credit:* May be repeated 1 time(s) when topic differs.  
*Grade Mode:* Letter.  
*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 118A – History of Political Theory: Ancient (4 units)**

*Course Description:* Critical analyses of classical and medieval political philosophers such as Plato, Aristotle, Cicero and St. Thomas.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 118B – History of Political Theory: Early Modern (4 units)**

*Course Description:* Critical analysis of the works of early modern political philosophers such as Machiavelli, Montaigne, Hobbes, Locke and Hume.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 118C – History of Political Theory: Late Modern (4 units)**

*Course Description:* Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 119 – Contemporary Political Thought (4 units)**

*Course Description:* Contemporary political thought from the end of the 19th century to the present. Emphasis upon an individual philosopher, concept, or philosophical movement; e.g., Nietzsche, Continental political thought, Rawls and critics, theories of distributive justice, feminist theory.  
*Prerequisite(s):* POL 004 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 120 – Theories of International Politics (4 units)**

*Course Description:* Major contemporary approaches to the study of international politics, including balance of power, game theory, Marxist-Leninist theory, systems theory, and decision-making analysis.  
*Prerequisite(s):* Consent of instructor; POL 003 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 121 – Scientific Study of War (4 units)**

*Course Description:* Analysis of political processes involved in the initiation, conduct and termination of modern interstate warfare.  
*Prerequisite(s):* POL 003 recommended.  
*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).  
*Grade Mode:* Letter.  
*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

**POL 122 – International Law (4 units)**

*Course Description:* Selected topics in international law; territory, sovereign immunity, responsibility, the peaceful settlement or nonsettlement of international disputes.

*Prerequisite(s):* POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 123 – The Politics of Interdependence (4 units)**

*Course Description:* In the past several decades, growing economic interdependence has generated new problems in international relations. Deals with difficulties in managing complex interdependence and its implication on national policies and politics.

*Prerequisite(s):* Consent of instructor; POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 124 – The Politics of Global Inequality (4 units)**

*Course Description:* Analysis of current economic and political international relations resulting from a long standing division of the global system into rich and poor regions.

*Prerequisite(s):* POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 126 – Ethnic Self-Determination & International Conflict (4 units)**

*Course Description:* Compares the claims of the state and ethnic peoples in countries undergoing internal conflicts; e.g., South Africa, Northern Ireland. Analyzes the role of the international community in facilitating the peaceful resolution of conflicts.

*Prerequisite(s):* POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**POL 129 – Special Studies in International Politics (4 units)**

*Course Description:* Intensive examination of one or more special problems in international politics. May be taught abroad.

*Prerequisite(s):* POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 130 – Recent U.S. Foreign Policy (4 units)**

*Course Description:* Broad survey of the development of U.S. foreign policy in 20th century with emphasis on transformation of policy during and after World War II, and the introduction to analytic tools and concepts useful for understanding of current foreign policy issues.

*Prerequisite(s):* Consent of instructor; POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 131 – Analysis of U.S. Foreign Policy (4 units)**

*Course Description:* Detailed presentation and examination of the formulation of execution of U.S. foreign policy. Survey of numerous factors influencing policy outcomes and how such determinants vary according to policy issue areas.

*Prerequisite(s):* Consent of instructor; POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 132 – National Security Policy (4 units)**

*Course Description:* Development of national security policies since 1945. Analysis of deterrence and assumptions upon which it is based. Effects of nuclear weapons upon conduct of war, alliance systems, and the international system. Prospects of security and stability through arms control.

*Prerequisite(s):* POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 134 – Africa & U.S. Foreign Policy (4 units)**

*Course Description:* Overview of American foreign policy toward Africa. Relationship to global adversaries. Legacies of colonialism. Challenge of national self-determination and white racism. Policies on non-alignment, producer cartels, multinational corporations, continental integration and trade and aid relations.

*Prerequisite(s):* Consent of instructor; POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**POL 135 – International Politics of the Middle East (4 units)**

*Course Description:* International politics of the Middle East as a microcosm of world politics. The Middle East as a regional system. Domestic and International Politics in the Middle East. Changing Political Structures in the Middle East. Superpower involvement in the Middle East.

*Prerequisite(s):* Consent of instructor; POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 136 – The Arab-Israeli Conflict (4 units)**

*Course Description:* Causes, course, and implications of Arab-Israeli conflict. Competing Israeli and Arab narratives, politics of force, diplomacy. Domestic politics and A-I conflict, the superpowers and the A-I conflict, A-I conflict and world politics, potential solutions.

*Prerequisite(s):* POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **POL 137 – International Relations in Western Europe (4 units)**

*Course Description:* Analysis of European unity, problems of the Atlantic alliance, Atlantic political economy, East-West relations, communism in Western Europe and the relationship between domestic politics and foreign policy. May be taught abroad.

*Prerequisite(s):* POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 139 – Special Studies in Foreign Policy (4 units)**

*Course Description:* Extensive examination of one or more special problems in foreign policy.

*Prerequisite(s):* Consent of instructor; POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

## **POL 140A – Comparative Political Institutions: Electoral Systems (4 units)**

*Course Description:* Workings of electoral institutions, focusing on systems used to elect presidents and assemblies, pass laws, and generally make decisions. Examples from systems throughout the world, including cases from both the advanced industrial and developing worlds.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 140B – Comparative Political Institutions: Parties (4 units)**

*Course Description:* Factors shaping political parties and their role in democratic representation.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **POL 140C – Comparative Political Institutions: Legislatures (4 units)**

*Course Description:* Examination of legislatures from a comparative perspective.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **POL 140D – When Institutions Fail (4 units)**

*Course Description:* Examination of factors contributing to the success and failure of political institutions.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 140E – Policy-Making Processes (4 units)**

*Course Description:* Comparative analysis of policy-making in the U.S. and other countries.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 140F – Experiments in Social Change (4 units)**

*Course Description:* Concept and practice of randomized policy experiments. Applications in comparative politics. Practical exercises in cleaning, analyzing, visualizing, and interpreting data from experiments.

*Prerequisite(s):* POL 002; POL 051 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 142A – Comparative Development: Political Development in Modernizing Societies (4 units)**

*Course Description:* Nature and sequence of political development; its economic and social concomitants; role of elites, military, bureaucracy, and party systems; social stratification and group politics; social mobilization and political participation; instability, violence, and the politics of integration.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 142B – Comparative Development: Politics & Inequality (4 units)**

*Course Description:* Linkages between politics and the distribution of social and economic goods. Impact of civil rights legislation, the politics of welfare states, and the effects of political participation on the distribution of goods.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 142C – Comparative Political Development: Democracy & Democratization (4 units)**

*Course Description:* Examination of conditions promoting democratization and democratic stability.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## POL 143A – Latin American Politics (4 units)

*Course Description:* Issues related to democratic consolidation in Latin America, with a regional focus on South America. Topics include transitions to democracy, the role of the military, political economy, and political behavior.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 143B – Mexican Politics (4 units)

*Course Description:* Introduction to the politics of contemporary Mexico. Focus on rise, fall, and aftermath of Mexico's one-party dominant system.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 144A – Politics of Post-Communist Countries: East European Politics (4 units)

*Course Description:* Post-war democratization, state-building and economic reform in East European states.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 144B – Politics of Post-Communist Countries: Russia (4 units)

*Course Description:* Democratization, state-building and economic reform; creation of new institutions; impacts of Soviet rule.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 145B – Politics in Israel (4 units)

*Course Description:* Introduction to the domestic politics of Israel in comparative perspective, including issues of internal cultural diversity, religion and politics, fragmentation of the political party system, and coalition governance.

*Learning Activities:* Term Paper, Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Political Science, Political Science-Public Service, and International Relations majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## POL 146A – Politics of Africa: Issues in Contemporary African Politics (4 units)

*Course Description:* African politics since the end of the Cold War. Topics include: Strategic Security Approach, Democratization, Human Rights, HIV/AIDS, African Peacekeeping, Terrorism, Religious and Ethnic Conflict, Debt and Stalled Development.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 146B – Politics of Africa: Development in Africa (4 units)

*Course Description:* Political and economic development within Sub-Saharan Africa. States and institutions, democracy, party systems, military coups/rule, bureaucracy/corruption, race/ethnicity, national/regional integrations, trade unions, economic development strategies, class formation, and women's roles and ideology.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 147A – West European Politics (4 units)

*Course Description:* Evolution, politics, and contemporary problems of selected political systems of Western Europe. May be taught abroad.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 147B – West European Politics: British Politics (4 units)

*Course Description:* Evolution, politics, and contemporary problems of Britain's political system.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## POL 147C – West European Politics: French Politics (4 units)

*Course Description:* Evolution, politics and contemporary problems of France's political system.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 147D – West European Politics: German Politics (4 units)**

*Course Description:* Evolution, politics and contemporary problems of Germany's political system.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 148A – Government & Politics of East Asia: China (4 units)**

*Course Description:* Evolution of political institutions and political culture in China with emphasis on the post-1949 period. Primary attention to nationalism, modernization and political efficacy.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 148B – Government & Politics in East Asia: Japan (4 units)**

*Course Description:* Japanese politics, with an emphasis on the postwar period. Particular emphasis on political parties, elections, political economy, and social problems.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 148C – Government & Politics in East Asia: Southeast Asia (4 units)**

*Course Description:* Evolution of political institutions and economy of selected nations in Southeast Asia. Emphasis on imperialist legacy, nation building in multi-ethnic communities, and contrasts in economic performance.

*Prerequisite(s):* POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **POL 150 – Judicial Politics & Constitutional Interpretation (4 units)**

*Course Description:* Politics of judicial policy making, issues surrounding constitutional interpretation and decision making, prerequisite for courses on the politics of constitutional law.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 151 – Constitutional Politics of the First Amendment & the Right to Privacy. (4 units)**

*Course Description:* Constitutional politics surrounding such issues as the right to free expression, associational rights, the right to free exercise of religious beliefs and the right to privacy.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 152 – The Constitutional Politics of the Equality (4 units)**

*Course Description:* Constitutional politics of equality in the American political system; issues surrounding constitutional doctrine and judicial policymaking; special attention on racial and sexual equality.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 153 – The Constitutional Politics of the Justice System (4 units)**

*Course Description:* Constitutional politics of the American criminal justice system. Issues surrounding constitutional doctrine and judicial policymaking on issues such as search and seizure. Arrest, trial, incarceration and other issues of due process.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 154 – Legal Philosophy (4 units)**

*Course Description:* Analysis of the nature and functions of law; law as an instrument of social control and the relationship between law and morality.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **POL 155 – Judicial Process & Behavior (4 units)**

*Course Description:* Analysis of the behavior of judges and courts in the political process. Techniques of judicial decision making. Relationships among courts and other decision-making bodies.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **POL 160 – American Political Parties (4 units)**

*Course Description:* Analysis of the structured operations of the party system in the United States; party functions and organizations, nomination processes, campaigns and elections, party trends and reforms.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Quantitative Literacy (QL); Writing Experience (WE).

## **POL 161 – Ballots, Bucks, & Maps: The Rules of the Electoral Game in American Politics (4 units)**

*Course Description:* Analysis of laws and court cases on the organization and administration of elections in the United States. Topics include campaign finance, redistricting, voting rights, race & representation, and comparisons with other democracies.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **POL 162 – Elections & Voting Behavior (4 units)**

*Course Description:* Analysis of American elections and partisan behavior; political socialization, political participation, partisanship and individual and group determinants of voting.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 163 – Group Politics (4 units)**

*Course Description:* Groups, institutions and individuals, especially in American politics. Historical and analytical treatment of group theories as applied to interest groups (especially labor, business, agriculture, science, military); to racial, ethnic and sectional groups; to parties, public and legislative groups, bureaucracies.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 164 – Public Opinion (4 units)**

*Course Description:* Nature of public opinion in America as it is supposed to be and as it is. Distribution of opinions among different publics and the significance of that distribution for system stability and institutions. Opinion polling and its problems.

*Prerequisite(s):* Consent of instructor; POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 165 – Mass Media & Politics (4 units)**

*Course Description:* Organization of and decision making within the media; media audiences and the effect of the media on attitudes and behavior; the relationship of the government to the media (censorship, secrecy, freedom of the press, government regulation); the media in election campaigns.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One only open to students in Political Science majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **POL 165V – Mass Media & Politics (4 units)**

*Course Description:* Organization of and decision making within the media; media audiences and the effect of the media on attitudes and behavior; the relationship of the government to the media (censorship, secrecy, freedom of the press, government regulation); the media in election campaigns.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One open to students in Political Science majors only.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **POL 166 – Women in Politics (4 units)**

*Course Description:* Role of women in American politics. Historical experiences; contemporary organizations and strategies; areas of legislative concern; the impact of differences in social class, race, and ethnicity upon the involvement of women in politics.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 168 – Chicano Politics (4 units)**

*Course Description:* Political aspects of Chicano life in America; examines the Chicano's political role as it has been historically defined by different groups in society and the Chicano's responses to his/her political environment.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **POL 170 – Political Psychology (4 units)**

*Course Description:* Overview to the growing literature on political psychology. Introduction to how psychological concepts (personality, attitudes, stereotypes, heuristics, affect, identity, group dynamics) help us understand how citizens think about politics.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 171 – The Politics of Energy (4 units)**

*Course Description:* Nature and performance of political processes for making energy choices at the international, national and state levels. Interaction of energy policy with other political goals and the ability of governmental institutions to overcome constraints on policy innovation.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 172 – American Political Development (4 units)**

*Course Description:* Systematic analysis of contemporary issues in American political development: historical determinants of political change; the timing and character of institutional development; conditions for successful political action. Democratization, cultural change, party formation, state-building, constitutionalism, race relations.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**POL 174 – Government & the Economy (4 units)**

*Course Description:* Political basis of economic policy (taxation, spending and regulation); impact of prices, employment and growth on political demands; elite responses to economic conditions; policy alternatives and the public interest.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 175 – Science, Technology, & Policy (4 units)**

*Course Description:* Analysis of policymaking for science and the use of scientific expertise for making decisions about technology. Topics include funding of basic research, relationship of science to technological development, science and military policy, technological risks, technology assessment and scientists and politics.

*Prerequisite(s):* Consent of instructor; POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Writing Experience (WE).

**POL 176 – Racial Politics (4 units)**

*Course Description:* Race, racial attitudes and racial policies in the United States with a specific emphasis on African Americans.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**POL 179 – Special Studies in Comparative Politics (4 units)**

*Course Description:* Intensive examination of one or more special problems appropriate to comparative politics. Coverage is given to formal and informal political institutions, economically developing and developed countries, and non-democratic, democratic, and democratizing countries.

*Prerequisite(s):* Consent of instructor; POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 180 – Bureaucracy in Modern Society (4 units)**

*Course Description:* Role of bureaucracy in a complex society, with emphasis upon changing relationships between government and the economy; consequences of rapid technological and social change for bureaucratic structures and processes; the problems of reconciling expertise and democracy and increasing the responsiveness of public bureaucracy.

*Prerequisite(s):* Consent of instructor; POL 001 or POL 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 183 – Administrative Behavior (4 units)**

*Course Description:* Implications for American public administration of evolving concepts about behavior in organizations.

*Prerequisite(s):* POL 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 187 – Administrative Theory (4 units)**

*Course Description:* Historical and critical analysis of the principal theories of organization and management of public agencies in light of such concepts as decision making, bureaucracy, authority and power, communication and control; examination of role of government bureaucracies in the total society.

*Prerequisite(s):* POL 004 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 190 – International Relations (4 units)**

*Course Description:* Analysis and evaluation of substantive issues in contemporary international relations. Readings drawn from current academic and non-academic periodicals. May be taught abroad.

*Prerequisite(s):* Consent of instructor; POL 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 192A – Internship in Public Affairs (3-6 units)**

*Course Description:* Supervised internship and study in political, governmental, or related organizations.

*Prerequisite(s):* Consent of Instructor; highest priority assigned to students with Political Science Public Service major; upper division standing required.

*Learning Activities:* Internship.

*Enrollment Restriction(s):* Open to Political Science, Political Science-Public Service and International Relations majors only.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

**POL 192B – Internship in Public Affairs (1-5 units)**

*Course Description:* Supervised internship and study in political, governmental, or related organizations.

*Prerequisite(s):* POL 192A; consent of instructor; highest priority assigned to students with Political Science-Public Service major; upper division standing.

*Learning Activities:* Internship.

*Enrollment Restriction(s):* Open to Political Science, Political Science-Public Service and International Relations majors only.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

**POL 193 – Research in Practical Politics (2 units)**

*Course Description:* Supervised preparation of an extensive paper relating internship experience to concepts, literature, and theory of political science.

*Prerequisite(s):* POL 192A; POL 192B; open only to Political Science-Public Service majors, for whom it is required.

*Learning Activities:* Project 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 193W – Washington Center Research Seminar (4 units)**

*Course Description:* Core academic component of Washington Program offered every quarter. Topics coordinated with internships. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper.

*Prerequisite(s):* WAS 192W (can be concurrent).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion.

*Repeat Credit:* May be repeated 2 time(s).

*Cross Listing:* WAS 193.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 194HA – Special Study for Honors Students (4 units)**

*Course Description:* Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty advisor.

*Prerequisite(s):* Major in Political Science with upper division standing and a GPA of 3.500 in the major.

*Learning Activities:* Seminar 2 hour(s), Independent Study 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**POL 194HB – Special Study for Honors Students (4 units)**

*Course Description:* Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty advisor.

*Prerequisite(s):* Major in Political Science with upper division standing and a GPA of 3.500 in the major.

*Learning Activities:* Seminar 2 hour(s), Independent Study 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**POL 195 – Special Studies in American Politics (4 units)**

*Course Description:* Intensive examination of one or more special problems appropriate to American politics.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 196A – Seminar in American Politics (4 units)**

*Course Description:* Intensive reading, discussion, research, writing in American politics. Topics may include Congress, the Presidency, the Supreme Court, federalism, voting behavior, interest groups, ethnic groups or other topics with a more specialized content than normal course offerings.

*Prerequisite(s):* Upper division Political Science majors or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**POL 196B – Seminar in Comparative Politics (4 units)**

*Course Description:* Intensive reading, discussion, research, writing in comparative politics. Topics may include one country or geographical area, political institutions or behavior across countries, political development, or other topics that are more specialized than normal course offerings.

*Prerequisite(s):* Upper division Political Science majors or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 196C – Seminar in International Relations (4 units)**

*Course Description:* Intensive reading, discussion, research, writing in international relations including study of international political institutions (UN, EU, or NATO) or interstate relations (war, trade, immigration) and other topics with more specialized content than normal course offerings.

*Prerequisite(s):* Upper division Political Science majors or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 196D – Seminar in Political Theory (4 units)**

*Course Description:* Intensive reading, discussion, research, writing in political theory. Topics may include study of a single political thinker, a group of related thinkers, development of political concepts, or other topics with more specialized content than normal course offerings.

*Prerequisite(s):* Upper division Political Science majors or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**POL 196E – Seminar in Research Methods (4 units)**

*Course Description:* Intensive reading, discussion, research, and writing in selected topics in Research Methods such as research design, statistics, game theory, etc.

*Prerequisite(s):* Upper division Political Science majors or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**POL 197T – Tutoring in Political Science (1-5 units)**

*Course Description:* Tutor responsibilities such as attending class, offering a guest lecture on a select topic, assisting in group discussions, hosting consultation or review sessions, or assisting instructor with assignments (though not grading).

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial.

*Enrollment Restriction(s):* Restricted to POL, PPS, and IRE majors only.

*Repeat Credit:* May be repeated 10 unit(s) with consent of instructor.

*Grade Mode:* Passed/Not Passed Only.

*General Education:* Social Sciences (SS).

**POL 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Open to Political Science, Political Science-Public Service and International Relations majors only.

*Repeat Credit:* May be repeated for credit when topic differs or with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**POL 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of Instructor; upper division standing.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Open to POL, PPS, and IRE majors only.

*Repeat Credit:* May be repeated for 15 unit(s), when topic differs or with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**POL 201 – Urban Government & Politics (4 units)**

*Course Description:* Survey and analysis of the literature in the field of local government and politics in the United States. Approaches to the study of political reform, local autonomy, community power, representation, expertise, service delivery, policy making and political change.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 202 – American State Government & Politics (4 units)**

*Course Description:* Survey and analysis of the literature in the field of state government, politics, and policy. Approaches to the study of the American states as political systems, including their governing institutions and processes and their role in the Federal system.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 203A – American Government: The Presidency (4 units)**

*Course Description:* Thorough overview of the current research on political executives, with particular emphasis on the American presidency. Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students only.

*Grade Mode:* Letter.

**POL 203B – American Government: Congress (4 units)**

*Course Description:* Thorough overview of the current research on Congress, with particular emphasis on political representation.

Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students only.

*Grade Mode:* Letter.

**POL 203C – American Government: Courts (4 units)**

*Course Description:* Survey and analysis of the literature in the field of American government with a focus on courts. Emphasis on the development and testing of theories of behavior and processes.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 207 – Environmental Public Policy (4 units)**

*Course Description:* Analysis of the interface between the world of academic reflection about ecological and environmental problems and the world of political action. Evaluation of alternative approaches to policy analysis and recommendation. Individual research, including field research, will parallel discussion of the literature.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 208 – Policy Analysis (4 units)**

*Course Description:* Social science techniques applied to public policy formation and evaluation.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 209 – The American Political System (4 units)**

*Course Description:* Analysis of selected theoretical and empirical issues posed by contemporary research in American government and politics.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students only.

*Grade Mode:* Letter.

**POL 210 – Research Design in Political Science (4 units)**

*Course Description:* Introduction to philosophy of science and research design for political science. Topics include: logic of empirical research, overview of research design approaches for political science research.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**POL 211 – Research Methods in Political Science (4 units)**

*Course Description:* Introductory seminar on the foundations of probability theory and mathematical statistics that are critical to empirical investigations in political science.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One open to graduate majors; Pass Two open to graduate students.

*Grade Mode:* Letter.

**POL 212 – Quantitative Analysis in Political Science I (4 units)**

*Course Description:* Seminar provides an introduction to the linear regression model. Will obtain a working knowledge of basic regression techniques and problems.

*Prerequisite(s):* POL 211.

*Learning Activities:* Seminar 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Pass One open to graduate majors; Pass Two open to graduate students.

*Grade Mode:* Letter.

**POL 213 – Quantitative Analysis in Political Science II (4 units)**

*Course Description:* More advanced topics in the use of statistical methods, with emphasis on political applications. Topics include: properties of least squares estimates, problems in multiple regression, and advanced topics (probit analysis, simultaneous models, time-series analysis, etc.).

*Prerequisite(s):* POL 211; POL 212.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to graduate majors; pass 2 open to graduate students.

*Grade Mode:* Letter.

**POL 214A – Research in Political Science (4 units)**

*Course Description:* Research seminar sequence required of all PhD students. Design, execution, and defense of an original piece of research in political science, culminating in a paper of publishable quality.

*Prerequisite(s):* POL 213.

*Learning Activities:* Discussion 2 hour(s), Lecture 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Advanced level graduate students in the Department of Political Science only.

*Grade Mode:* Letter.

**POL 214B – Research in Political Science (4 units)**

*Course Description:* Research seminar sequence required of all PhD students. Design, execution, and defense of an original piece of research in political science, culminating in a paper of publishable quality.

*Prerequisite(s):* POL 212; POL 214A.

*Learning Activities:* Discussion 2 hour(s), Lecture 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Advanced level graduate students in the Department of Political Science only.

*Grade Mode:* Letter.

**POL 215 – Introduction to Modeling Political Behavior (4 units)**

*Course Description:* Introduction to formal and game theoretic analyses of politics. Students will learn basic game theory and modeling skills. We examine the benefits of modeling, and look at examples of formal analysis in a variety of political science sub-fields.

*Prerequisite(s):* POL 211; POL 212.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to graduate majors; pass 2 open to graduate students.

*Grade Mode:* Letter.

**POL 216 – Qualitative Research Methods (4 units)**

*Course Description:* Methodology for utilizing theoretically-oriented case studies and controlled comparison of a small number of cases to develop and test theories. Examination of how the case study method complements experimental, statistical and deductive modes of research.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

**POL 217 – Social Choice Theory & Spatial Modeling (4 units)**

*Course Description:* Introduction to social choice theory and formal spatial modeling including Arrow's Theorem, the paradox of voting, cycling and agenda control. Focus on mastering modeling techniques as well as interpretation of classic works.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 218 – Topics in Political Theory (4 units)**

*Course Description:* Topics vary and may be the work of a single theorist, time period, or political concept, such as justice.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

**POL 219A – Political Theory Sequence (4 units)**

*Course Description:* Survey of the great works in ancient and medieval political theory including such writers as Plato, Aristotle, Cicero, St. Augustine, Aquinas, Alfarabi and Marsilius. Discussions of various interpretations of these authors.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**POL 219B – Political Theory Sequence (4 units)**

*Course Description:* Survey of the great works in early modern to contemporary political theory including such writers as Machiavelli, Hobbes, Locke, Rousseau, Marx, Mill, Nietzsche, and Rawls. Discussion of various interpretations of these authors.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**POL 219C – Contemporary Political Theory (4 units)**

*Course Description:* Survey of important works in contemporary political theory including such writers as Nietzsche, Heidegger, Arendt, Rawls, Nozick, Sandel.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**POL 220 – Seminar in Political Theory (4 units)**

*Course Description:* Introduction to political theory and current debates over its study. Readings from and textual interpretations of political theory including the Federalist Papers and major works by thinkers such as Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, and Rawls. Other readings addressing issues of textual interpretation.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

**POL 223 – International Relations (4 units)**

*Course Description:* International relations.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 224 – International Security (4 units)**

*Course Description:* Contemporary scholarship on issues related to international conflict and political violence, with particular emphasis on how current trends in globalization and governance affect global security.

*Prerequisite(s):* POL 223; consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper

*Grade Mode:* Letter.

**POL 225 – The International System (4 units)**

*Course Description:* Analysis of the international system by means of theory formulation and integration; critique of research designs; use of various techniques of data generation and analysis.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 226 – Seminar in International Political Economy (4 units)**

*Course Description:* Research in international political economy. Structure of the global economy, as well as specific dimensions of international economic relations, including trade, capital flows, global production structures, and migration.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

**POL 230 – American Foreign Policy (4 units)**

*Course Description:* American foreign policy.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 231 – U.S. Political Culture & Foreign Relations (4 units)**

*Course Description:* Relates U.S. political culture to formulation of foreign policy. Analyzes American ideological preferences in historical perspective, contemporary public opinion, decision making and implementation. Concludes by examining linkages between foreign policy behavior and democratic process.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 241 – Communist Political Systems (4 units)**

*Course Description:* Systematic analysis of selected topics dealing with the political process of communist political systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 242 – Seminar in Comparative Politics (4 units)**

*Course Description:* Systematic survey of theories and methods used in the study of comparative politics.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 243 – Comparative Institutional Change (4 units)**

*Course Description:* Comparison of institutional changes in countries of the former Soviet Union and Eastern Europe during the period of transition to democracy. Special attention to institutions of mass representation; electoral and party systems and national legislatures.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

**POL 246 – Policymaking in Third-World Societies (4 units)**

*Course Description:* Included in an analysis of policymaking process in Third-World countries are such topics as political resources, institutional resources, decision making, resource allocations, planning, and budgeting, implementation, and distribution of world resources.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**POL 250 – Policy Development & Impact in U.S. Courts (4 units)**

*Course Description:* Thorough overview of the literature regarding courts as policymaking institutions of government, with emphasis on the formation and implementation of judicial policy. Differences and similarities across the judicial, congressional, and executive branch policy processes.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 260 – Political Parties (4 units)**

*Course Description:* Survey of selected topics in American and comparative parties.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 261 – Political Behavior (4 units)**

*Course Description:* Survey of selected topics in political behavior and public opinion.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

**POL 274 – Political Economy (4 units)**

*Course Description:* Politics of economic policy as reflected in taxation, spending and regulation; impact of prices, employment, and growth on political demands; government responses to economic conditions; electoral politics and the political business cycle.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

**POL 279 – Political Networks: Methods & Applications (4 units)**

*Course Description:* Structure of political networks, socio-matrices and affiliation networks; general networks characteristics: density, centralization, polarization, interdependence, dyadic and triadic characteristics: structural and role equivalence; subsets of networks: cliques, blocks and bloc modeling; characteristics of individuals in networks: centrality and prestige.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 280 – Bayesian Methods: for Social & Behavioral Sciences (4 units)**

*Course Description:* Methodology seminar introducing Bayesian quantitative methods to issues and problems in political science and other social and behavioral sciences.

*Prerequisite(s):* POL 212; or equivalent to course.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to graduate majors only; Pass Two open to graduate students.

*Grade Mode:* Letter.

**POL 281 – Statistical Computing Issues in Political Science (4 units)**

*Course Description:* Methodology seminar introducing computing issues in empirical models for political science and other social and behavioral sciences.

*Prerequisite(s):* POL 213; or equivalent to course.

*Learning Activities:* Seminar 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

**POL 282 – Advanced Modeling of Political Behavior (4 units)**

*Course Description:* Applications of formal theory to political science. Review of relevant contributions in other social sciences. Consideration of advanced techniques in game theory. Rational and behavioral approaches.

*Prerequisite(s):* POL 215; or equivalent to course.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing or with instructors permission.

*Grade Mode:* Letter.

**POL 283 – Organizational Behavior (4 units)**

*Course Description:* Organizational behavior as it relates to public sector decision making.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**POL 284 – Advanced Network Analysis (4 units)**

*Course Description:* Exponential Random Graph Models (ERGMS) of networks, game theoretic models of network formation and network dynamics, diffusion processes, shocks and network collapse, percolation, cross-network spillover processes, social and political applications of advanced network models.

*Prerequisite(s):* POL 211; POL 212; POL 279.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**POL 285 – Statistics of Causal Inference in Political Science (4 units)**

*Course Description:* Approaches to causal inference using the potential outcomes framework, with political science applications using observational and experimental data. Covers several prominent causal research designs used for studying politics.

*Prerequisite(s):* POL 211; POL 212; POL 213.

*Learning Activities:* Lecture 3 hour(s); Term Paper.

*Grade Mode:* Letter.

**POL 290A – Research in American Government & Public Policy (4 units)**

*Course Description:* Special research seminar on problems and issues in the study of American government and public policy.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Repeat Credit:* May be repeated 6 time(s) when topic differs.

*Grade Mode:* Letter.

**POL 290B – Research in Political Theory (4 units)**

*Course Description:* Special research seminar on problems and issues in the study of political theory.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students only.

*Repeat Credit:* May be repeated 6 time(s) when topic differs.

*Grade Mode:* Letter.

## POL 290C – Research in International Relations (4 units)

*Course Description:* Special research seminar on select problems and issues in the study of international relations.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students only.

*Repeat Credit:* May be repeated 6 time(s) when topic differs.

*Grade Mode:* Letter.

## POL 290D – Research in Judicial Politics (4 units)

*Course Description:* Contemporary research on judicial politics, judicial institutions, jurisprudence, and judicial behavior.

*Prerequisite(s):* Graduate standing in Political Science or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## POL 290E – Research in Political Parties, Politics, & Political Behavior (4 units)

*Course Description:* Special research seminar on selected problems and issues in the study of political parties, politics, and political behavior.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## POL 290F – Research in Comparative Government & Policy (4 units)

*Course Description:* Special research seminar on select problems and issues in the study of comparative government and policy.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students only.

*Repeat Credit:* May be repeated 6 time(s) when topic differs.

*Grade Mode:* Letter.

## POL 290G – Research in Methodology (4 units)

*Course Description:* Special research seminar on selected problems and issues in methods in political science.

*Prerequisite(s):* POL 212.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) when topic differs.

*Grade Mode:* Letter.

## POL 297 – Internships in Political Science (2 units)

*Course Description:* Application and evaluation of theoretical concepts through work experience or systematic observation in public and political agencies.

*Prerequisite(s):* Open only to persons who have internships or other positions in governmental agencies, political parties, etc.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## POL 298 – Group Study (1-5 units)

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## POL 299 – Research (1-12 units)

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## POL 299D – Research (1-12 units)

*Course Description:* Research.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## POL 390 – The Teaching of Political Science (1 unit)

*Course Description:* Methods and problems of teaching political science at the undergraduate level.

*Prerequisite(s):* Graduate student standing in Political Science.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## POL 396 – Teaching Assistant Training Practicum (1-4 units)

*Course Description:* Teaching assistant training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## Population Biology (PBG)

### Graduate Studies

## PBG 200A – Principles of Population Biology (5 units)

*Course Description:* Principles of single-species ecology and evolution.

Topics include ecology of individuals, population growth models, structured populations, life history strategies, stochastic populations, basic population genetics theory, deleterious alleles in natural populations, and molecular population genetics.

*Prerequisite(s):* PBG 231 required concurrently; and consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

## PBG 200B – Principles of Population Biology (6 units)

*Course Description:* Principles of multi-species communities. Topics include competition, mutualism, metapopulations, food webs and trophic cascades, interactions between simple ecological communities, island biogeography, succession, and large-scale patterns.

*Prerequisite(s):* PBG 200A; PBG 231.

*Learning Activities:* Lecture 5 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## PBG 200C – Principles of Population Biology (6 units)

*Course Description:* Principles of microevolution and macroevolution.

Topics include evolutionary quantitative genetics, analysis of hybrid zones, speciation, the fossil record, biogeography, and phylogeny reconstruction.

*Prerequisite(s):* PBG 200B.

*Learning Activities:* Lecture 5 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**PBG 203 – Advanced Evolution (3 units)**

*Course Description:* Adaptation and speciation, and biochemical and morphological evolution in plants and animals with emphasis on the appropriateness of different methods of analysis.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 1 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

**PBG 206 – Ecology of Insect Parasitoids (4 units)**

*Course Description:* Insect parasitoids will be investigated as model systems to address current topics in behavioral, population, and evolutionary ecology. Theory will be synthesized and critical empirical tests of ecological hypotheses emphasized.

*Prerequisite(s):* Introductory animal ecology or behavior.

*Learning Activities:* Lecture 3 hour(s), Seminar 1 hour(s).

*Grade Mode:* Letter.

**PBG 207 – Plant Population Biology (3 units)**

*Course Description:* Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plant population biology.

*Prerequisite(s):* Advanced undergraduate ecology course (e.g., ESP 100, EVE 101, ENT 104, PLB 117), and advanced undergraduate course in genetics and/or evolution (e.g., BIS 101 or EVE 100).

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* ECL 207.

*Grade Mode:* Letter.

**PBG 212 – Topics in Invertebrate Evolution (2 units)**

*Course Description:* Advanced seminar that critically examines problems relevant to evolutionary patterns among the invertebrates.

*Prerequisite(s):* Graduate standing or consent of instructor; courses in evolutionary biology, systematics, and ecology highly recommended.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 221 – Animal Behavior, Ecology & Evolution (3 units)**

*Course Description:* Interface between animal behavior, ecology and evolution. New developments in behavioral ecology development and testing of hypotheses in this discipline.

*Prerequisite(s):* NPB 102; EVE 100; EVE 101; or the equivalent, and consent of instructor, graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ANB 221.

*Grade Mode:* Letter.

**PBG 224 – Field Reconnaissance for Population Biologists (2 units)**

*Course Description:* Biweekly field trips to acquaint students with plant and animal communities, biodiversity, and ecological and evolutionary research opportunities in northern and central California.

*Prerequisite(s):* Graduate student in Population Biology, or consent of instructor.

*Learning Activities:* Fieldwork 6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 225 – Terrestrial Field Ecology (4 units)**

*Course Description:* Field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results are stressed.

*Prerequisite(s):* Introductory ecology and introductory statistics, or consent of instructor.

*Learning Activities:* Seminar 1 hour(s), Fieldwork 12 hour(s).

*Cross Listing:* ECL 225, ENT 225.

*Grade Mode:* Letter.

**PBG 231 – Mathematical Methods in Population Biology (3 units)**

*Course Description:* Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed.

*Prerequisite(s):* MAT 016C or MAT 021C; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ECL 231.

*Grade Mode:* Letter.

**PBG 233 – Computational Methods in Population Biology (3 units)**

*Course Description:* Numerical methods for simulating population dynamics using the computational software package R. Emphasis placed on model formulation and development, theoretical concepts and philosophical principles to guide simulation efforts, model parameterization, and implementing simulations with R.

*Prerequisite(s):* A course in theoretical ecology (e.g., ECL 231 or an equivalent to ESP 121 from your undergraduate institution) or consent of instructor; no programming experience required.

*Learning Activities:* Lecture/Lab 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* ECL 233.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PBG 250A – Interdisciplinary Approaches to Biological Invasions (4 units)**

*Course Description:* An integrative consideration of biological invasions, including an overview of concepts from ecology, ecological theory, evolution, genetics, philosophy, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem-solving.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**PBG 250B – Interdisciplinary Approaches to Biological Invasions (4 units)**

*Course Description:* An integrative consideration of biological invasions, including an overview of concepts from history, sociology, communications, law, policy, management, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem-solving.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

## PBG 251 – Collaborative Project in Biological Invasions (3 units)

**Course Description:** A year-long interdisciplinary collaborative project focusing on biological invasions, resulting in a paper or other suitable product presented at a symposium at the conclusion of the project.  
**Prerequisite(s):** PBG 250A; PBG 250B; or equivalent courses, and consent of instructor.

**Learning Activities:** Project, Discussion 1 hour(s).

**Repeat Credit:** May be repeated 5 time(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 270 – Research Conference in Evolutionary Biology (1 unit)

**Course Description:** Critical presentation and evaluation of current literature and ongoing research in evolutionary biology.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Seminar 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 271 – Research Conference in Ecology (1 unit)

**Course Description:** Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Seminar 1 hour(s).

**Repeat Credit:** May be repeated.

**Cross Listing:** ECL 271.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 287 – Advanced Animal Behavior (2 units)

**Course Description:** Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution.

**Prerequisite(s):** NPB 102; EVE 100; or the equivalents; graduate standing; consent of instructor.

**Learning Activities:** Seminar 2 hour(s).

**Repeat Credit:** May be repeated 2 time(s).

**Cross Listing:** ANB 287.

**Grade Mode:** Letter.

## PBG 290 – Seminar (1 unit)

**Course Description:** Seminars presented by visiting lecturers, UC Davis graduate students and faculty.

**Prerequisite(s):** Consent of instructor; graduate standing.

**Learning Activities:** Seminar 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 290C – Research Conference in Population Biology (1 unit)

**Course Description:** Presentation and discussion of faculty and graduate student research in population biology.

**Prerequisite(s):** PBG 299 (can be concurrent); and consent of instructor.

Graduate standing; PBG 299 required concurrently.

**Learning Activities:** Discussion 1 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 292 – Topics in Ecology & Evolution (1 unit)

**Course Description:** Seminar presented by visiting lecturers, UC Davis faculty and graduate students.

**Prerequisite(s):** Graduate standing.

**Learning Activities:** Seminar 1 hour(s).

**Repeat Credit:** May be repeated.

**Cross Listing:** ECL 296.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 296 – Seminar in Geographical Ecology (2 units)

**Course Description:** Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics.

**Prerequisite(s):** EVE 100 or EVE 101; or consent of instructor.

**Learning Activities:** Seminar 2 hour(s).

**Repeat Credit:** May be repeated.

**Cross Listing:** GEO 214.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 298 – Group Study (1-5 units)

**Course Description:** Group study.

**Prerequisite(s):** Consent of instructor; graduate standing.

**Learning Activities:** Variable.

**Grade Mode:** Satisfactory/Unsatisfactory only.

## PBG 299 – Research (1-12 units)

**Course Description:** Research.

**Prerequisite(s):** Consent of instructor; graduate standing.

**Learning Activities:** Variable.

**Grade Mode:** Satisfactory/Unsatisfactory only.

# Population Health & Reproduction (PHR)

## School of Veterinary Medicine

## PHR 092 – Internship in Veterinary Science (1-4 units)

**Course Description:** Supervised work experience in reproduction.

**Prerequisite(s):** Approval of project prior to period of internship by faculty sponsor.

**Learning Activities:** Discussion/Laboratory 1-4 hour(s), Clinical Activity 3-36 hour(s).

**Grade Mode:** Pass/No Pass only.

## PHR 106 – Human-Animal Interactions: Benefits & Issues (2 units)

**Course Description:** Contributions of animals to human society, including historic, anthropologic, developmental, human health and therapeutic perspectives, as well as effects of humans on animals. One field trip required.

**Prerequisite(s):** Upper division standing or consent of instructor.

**Learning Activities:** Lecture 18 hour(s), Fieldwork 1 hour(s).

**Grade Mode:** Letter.

**PHR 192 – Internship in Veterinary Science (1-12 units)**

*Course Description:* Supervised work experience in Reproduction.  
*Prerequisite(s):* Upper division standing; approval of project prior to period of internship.  
*Learning Activities:* Discussion/Laboratory 1-12 hour(s), Clinical Activity 3-36 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Pass/No Pass only.

**PHR 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.  
*Learning Activities:* Variable 3-15 hour(s).  
*Repeat Credit:* May be repeated.  
*Grade Mode:* Pass/No Pass only.

**PHR 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.  
*Learning Activities:* Variable.  
*Grade Mode:* Pass/No Pass only.

**MPM 200 – Introduction to Information Management for Epidemiologists (1 unit)**

*Course Description:* Introduction to practical application of epidemiological methods to solve problems involving population health data. Emphasis on using worksheet/database software tools for organizing, analyzing, reporting, and interpreting data. Ten, three-hour sessions.  
*Learning Activities:* Laboratory 1 hour(s).  
*Enrollment Restriction(s):* Restricted to students in the Master of Preventive Veterinary Medicine program.  
*Grade Mode:* Letter.

**MPM 201 – Emerging Issues at the Interface of Animal, Human, & Ecosystem Health (2.5 units)**

*Course Description:* Introduce one health topics emphasizing relationships between environmental, animal and human health. Topics include ecosystem change and impacts on animals and humans, cross-species disease transmission and approaches for addressing critical data gaps to inform ecosystem health and disease prevention.  
*Learning Activities:* Lecture 1 hour(s), Discussion 1.50 hour(s).  
*Enrollment Restriction(s):* Limited to 35 students.  
*Grade Mode:* Letter.

**MPM 202 – Medical Statistics I (4 units)**

*Course Description:* Basic statistics in clinical, laboratory and population medicine: descriptive statistics; probability; binomial, Poisson, normal, t-, F-, and Chi-square distributions; sampling distributions; parameter estimation; hypothesis testing; elementary nonparametric methods, simple linear regression and correlation; life table construction and analysis.  
*Prerequisite(s):* MPVM or MPH standing or consent of instructor.  
*Learning Activities:* Lecture 15 hour(s), Laboratory 10 hour(s).  
*Enrollment Restriction(s):* Restricted to 80 students.  
*Grade Mode:* Letter.

**MPM 203 – Medical Statistics II (4 units)**

*Course Description:* Continuation of MPM 202. Analysis of variance in biomedical sciences; nonparametric methods; multiple regression; unconditional logistic regression; biomedical applications of statistical methods. Microcomputer applications in population medicine to reinforce principles that are taught in lecture. Required for students in the Preventive Veterinary Program Graduate Group (PVM) and the Masters of Public Health Program (MPH).

*Prerequisite(s):* MPM 202; or consent of instructor, or equivalent.  
*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).  
*Grade Mode:* Letter.

**MPM 204 – Medical Statistics III (4 units)**

*Course Description:* Continuation of MPM 203. Selecting the best regression equation, conditional logistic regression, Poisson regression, survival analysis, analysis of time dependent variation and trends. Microcomputer applications in population medicine to reinforce principles that are taught in lecture.  
*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).  
*Grade Mode:* Letter.

**MPM 205 – Principles of Epidemiology (4 units)**

*Course Description:* Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance.  
*Prerequisite(s):* MPM 202; or consent of instructor; an introductory statistics course.  
*Learning Activities:* Lecture 4 hour(s).  
*Cross Listing:* EPI 205.  
*Grade Mode:* Letter.

**MPM 206 – Epidemiologic Study Design (4 units)**

*Course Description:* Builds on concepts presented in MPM 205. Concepts of epidemiologic study design (clinical trials, observational cohort studies, case control studies) introduced in MPM 205A are covered in more depth, using a problem-based format. Discussion of published epidemiologic studies.

*Prerequisite(s):* MPM 205; or consent of instructor.  
*Learning Activities:* Lecture 30 hour(s), Discussion 9 hour(s), Laboratory 2 hour(s).  
*Cross Listing:* EPI 206.  
*Grade Mode:* Letter.

**MPM 207 – Applied Epidemiologic Problem Solving (1 unit)**

*Course Description:* Integration of epidemiologic and statistical methodology in a problem-solving approach to contemporary animal population health issues. Data validation and manipulation.  
*Learning Activities:* Discussion/Laboratory 2 hour(s).  
*Grade Mode:* Letter.

**MPM 208 – Research Planning & Reporting I (2 units)**

*Course Description:* Identify and implement research questions through hypothesis construction, articulation of aims, acquiring permits, working as a team, and all other techniques needed to develop a successful research program.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Enrollment Restriction(s):* MPVM standing or consent of instructor.

*Credit Limitation(s):* Not open for credit to students who have previously taken MPM 408B.

*Grade Mode:* Letter.

**MPM 209 – Research Planning & Reporting II (1 unit)**

*Course Description:* Concepts and skills in effective scientific writing for publication in a peer-reviewed journal in animal health or biomedicine. Includes developing an argument, organizing and writing a manuscript, improving readability, and responding to peer review.

*Prerequisite(s):* MPM 208.

*Learning Activities:* Lecture/Discussion.

*Grade Mode:* Letter.

**MPM 210 – Advanced Health Leadership (1.5 units)**

*Course Description:* Develop skills for effective scientific leadership, including: project management and collaboration, conflict resolution, communication with the public, dynamic distribution of health information, and evidence-based policy influence.

*Learning Activities:* Lecture, Discussion.

*Enrollment Restriction(s):* Limited to 35 students.

*Grade Mode:* Letter.

**MPM 212 – Concepts & Methods in Infectious Disease Surveillance & Control (3 units)**

*Course Description:* Basic and advanced level of conceptual and methodological foundations in infectious disease epidemiology necessary for veterinarians to develop and evaluate programs for detection, prevention, and control of infectious diseases in animal populations.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**Portuguese (POR)**

College of Letters & Science

**POR 001 – Elementary Portuguese (5 units)**

*Course Description:* Introduction to Portuguese grammar and development of all language skills in a cultural context with special emphasis on communication.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Students who have successfully completed POR 002 or POR 003 in the 10th or higher grade of high school may receive unit credit for this course on a P/NP grading basis only; although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 001A – Accelerated Intensive Elementary Portuguese (15 units)**

*Course Description:* Intended for students who wish to complete three quarters of Portuguese 1, 2, and 3.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open to students who have completed POR 001, POR 002 or POR 003.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC).

**POR 002 – Elementary Portuguese (5 units)**

*Course Description:* Continuation of POR 001 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication.

*Prerequisite(s):* POR 001.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 003 – Elementary Portuguese (5 units)**

*Course Description:* Continuation of POR 002 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication.

*Prerequisite(s):* POR 002.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 008 – Elementary Portuguese Conversation (2 units)**

*Course Description:* Designed to develop oral communication skills. Emphasis on increasing vocabulary, improving listening comprehension, pronunciation, accuracy and grammar control. Practice of everyday situations.

*Prerequisite(s):* POR 003.

*Learning Activities:* Discussion 3 hour(s).

*Enrollment Restriction(s):* Not open to native speakers or upper division students.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC).

**POR 021 – Intermediate Portuguese (5 units)**

*Course Description:* Review and develop the grammar, vocabulary, and composition acquired in first year Portuguese through exercises and reading of modern texts.

*Prerequisite(s):* POR 003.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 022 – Intermediate Portuguese (5 units)**

*Course Description:* Continuation of POR 021. Focus on more difficult grammar concepts and further composition practice. Development of all language skills through exercises and reading of modern texts.

*Prerequisite(s):* POR 021.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 023 – Portuguese Composition I (4 units)**

*Course Description:* Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Class activities include composition, journals, letters, individual and group projects.

*Prerequisite(s):* POR 022.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**POR 028 – Intermediate Portuguese Conversation (2 units)**

*Course Description:* Continuation of POR 008. Designed to develop oral communication skills at a more advanced level. Practice in more complex situations.

*Prerequisite(s):* POR 008.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

**POR 031 – Intermediate Portuguese for Spanish Speakers (4 units)**

*Course Description:* Development of linguistic and learning skills required for Spanish-speaking students in upper division courses in Portuguese.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

**POR 031G – Portuguese for Spanish-Speaking Graduate Students (4 units)**

*Course Description:* Intensive review of grammar and composition.

Development of all language skills, but with emphasis on reading of modern texts, presentation/discussion, and writing on academic topics. Development on the following writing skills: analytical, argumentative, and creative.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students only.

*Grade Mode:* Letter.

**POR 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study primarily for lower division students.

*Prerequisite(s):* Consent of instructor and department chairperson.

*Learning Activities:* Variable 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**POR 100 – Principles of Luso-Brazilian Literature & Criticism (4 units)**

*Course Description:* Principles of literary criticism applied to the study of fiction, poetry, and essays of major literary writers of the Luso-Brazilian world.

*Prerequisite(s):* POR 022 or POR 023; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**POR 111 – Structure of Portuguese: Sounds & Words (3 units)**

*Course Description:* Linguistic description of sound patterns of Portuguese and how those sounds can be used to form larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**POR 130 – Survey of Luso-Brazilian Literature: 1500-1800 (4 units)**

*Course Description:* Overview of Luso-Brazilian literature, covering three major literary periods: Renaissance, Baroque, and Enlightenment. Attention to the concept of imitation and nativism.

*Prerequisite(s):* POR 100; (POR 022 or POR 023).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 132 – Portuguese Literature: Medieval & Renaissance (4 units)**

*Course Description:* Overview of the origins of the Portuguese literature, spanning from the 13th century to the 16th century. Studies of lyrical and epic poetry, drama, and travel narratives.

*Prerequisite(s):* POR 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 134 – Luis de Camões (4 units)**

*Course Description:* Overview of the greatest Renaissance Portuguese poet, Luis de Camões. Study his famous epic poem, Os Lusiadas, and a series of sonnets written by him.

*Prerequisite(s):* POR 100; (POR 022 or POR 031).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**POR 141 – Introduction to Luso-Brazilian Culture (4 units)**

*Course Description:* Introduction to history, geography, and culture of Portugal and Brazil. Art, history of ideas, and everyday cultural manifestations. Introduction to critical reading and textual analysis. Taught in Portuguese.

*Prerequisite(s):* POR 023 or POR 022.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## POR 159 – Special Topics in Luso-Brazilian Literature & Culture (4 units)

*Course Description:* Special topics in the study of Luso-Brazilian literature and culture.

*Prerequisite(s):* POR 100; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## POR 161 – Luso-Brazilian Literature & Culture (4 units)

*Course Description:* Colonial Brazilian literature survey. Readings include 16th-18th centuries manuscripts and books of cultural importance in a society dominated by censorship and with no printing presses. Study of the role literary Academies played in the so called "culture of manuscripts."

*Prerequisite(s):* POR 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## POR 162 – Introduction to Brazilian Literature (4 units)

*Course Description:* Narrative and poetic texts of the 19th and 20th centuries in Brazil. In-depth and comparative study of Romantic and (Neo)Naturalist movements as a forum for discussion about literary tradition and modernity in Latin America.

*Prerequisite(s):* POR 003; (POR 031 or POR 031G).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## POR 163 – 20th C Masters in Brazilian Literature (4 units)

*Course Description:* Overview of modern Brazilian literature from early 20th C to the poetry by João Cabral de Melo Neto and the Concretists (1960s), including European avant-garde movements and literary and cultural manifestos leading to a revolutionary body of literature.

*Prerequisite(s):* POR 100; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## POR 197T – Tutoring in Portuguese (1-4 units)

*Course Description:* Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Tutorial 3-12 hour(s).

*Repeat Credit:* May be repeated for 8 unit(s).

*Grade Mode:* Passed/Not Passed only.

## POR 198 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor and Department Chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## POR 199 – Special Study for Advanced Undergraduates (1-5 units)

*Course Description:* Independent study with professor for advanced undergraduate students, or honor thesis students.

*Learning Activities:* Variable 2 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

# Professional Accountancy (ACC)

## Graduate Studies

### ACC 201 – Financial Reporting (4 units)

*Course Description:* Coverage includes the fundamentals of accounting and reporting economic events and transactions. Emphasizes the preparation of balance sheets, income statements, statements of cash flow, and statements of stockholders' equity.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Master of Professional Accountancy graduate students.

*Credit Limitation(s):* Not open for credit to students who have taken MGB 200A or MGP 200A or MGT 200A.

*Grade Mode:* Letter.

### ACC 203 – Intermediate Financial Reporting (4 units)

*Course Description:* Focuses on the preparation of complex financial statements. Topics include accounting recognition, measurement, and disclosure, as well as the theoretical foundations of and motivations for financial reporting choices.

*Prerequisite(s):* ACC 201 or (MGB 200A or MGP 200A or MGT 200A).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the Master of Professional Accountancy degree program.

*Credit Limitation(s):* Not open for credit to students who have taken MGB 200A or MGP 200A or MGT 200A.

*Grade Mode:* Letter.

### ACC 205 – Advanced Financial Reporting (4 units)

*Course Description:* Advanced treatment of recognition, measurement, and disclosure including pensions, accounting for income taxes, mergers and acquisitions, consolidations, special-purpose entities, and foreign subsidiaries. Includes accounting for governmental and nonprofit entities, as well as advanced treatment of international accounting standards.

*Prerequisite(s):* ACC 203.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Graduate School of Management.

*Grade Mode:* Letter.

### ACC 211 – Tax Reporting & Analysis (4 units)

*Course Description:* Introduction to the taxation of business entities and their related transactions, with an emphasis on the details of tax law and tax reporting requirements. Topics include individual, partnership, and corporate taxation, as well as tax theory.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Master of Professional Accountancy graduate students.

*Credit Limitation(s):* Not open for credit to students who have completed MGB 264 or MGP 264 or MGT 264.

*Grade Mode:* Letter.

## ACC 213 – Intermediate Tax Reporting & Analysis (4 units)

*Course Description:* Detailed analysis of federal taxation of individuals. Topics include the timing of income recognition, deductions and credits for tax purposes, as well as the basics of property transactions.

*Prerequisite(s):* ACC 211; (MGB 264 or MGP 264 or MGT 264).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in the Graduate School of Management.

*Grade Mode:* Letter.

## ACC 215 – Advanced Tax Reporting & Analysis (4 units)

*Course Description:* Advanced treatment of complex tax transactions and entities. Topics include aspects of federal taxation of entities and the applicable impact upon individual taxpayers. Coverage includes basis analysis as applicable to pass through entities and an introduction to professional responsibilities.

*Prerequisite(s):* ACC 213.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Graduate School of Management.

*Grade Mode:* Letter.

## ACC 217 – Taxation of Individuals, Property, & Estates (4 units)

*Course Description:* In-depth analysis of individual income tax issues and property transactions including non-taxable exchanges, compensation, gifts, and transfer taxes. Expanded analysis of multistate tax issues. Emphasis is on the interrelationships of complex individual transactions as well as planning techniques.

*Prerequisite(s):* ACC 213.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Graduate School of Management.

*Grade Mode:* Letter.

## ACC 219 – Taxation of Business Entities (4 units)

*Course Description:* Analysis of detailed business entity tax issues including basis calculations, alternative minimum taxation, multistate and multinational taxation, stock transactions, and mergers and acquisitions. Tax planning for entities and relationships between business entities and their owners.

*Prerequisite(s):* ACC 213.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Graduate School of Management.

*Grade Mode:* Letter.

## ACC 231 – Analysis & Use of Accounting Reports (4 units)

*Course Description:* Evaluation of complex financial accounting reports by managers and persons outside the firm, such as investors, creditors, and financial analysts. Topics include cash flow vs. income measurement, ratio and valuation analysis, and the effects of international accounting standards.

*Prerequisite(s):* ACC 203.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to students enrolled in the Master of Professional Accountancy degree program.

*Credit Limitation(s):* Not open for credit to students who have completed MGB 272 or MGP 272 or MGT 272.

*Grade Mode:* Letter.

## ACC 241 – Auditing & the Accounting Profession (4 units)

*Course Description:* Introduction to the audit environment, professional standards, the accounting profession, and the professional responsibilities of accountants. Integrate audit topics across the areas of financial, cost, tax and systems accounting.

*Prerequisite(s):* ACC 201; (MGB 200A or MGP 200A or MGT 200A).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate School of Management students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## ACC 243 – Auditing & Attestation Services (4 units)

*Course Description:* Advanced treatment of the audit process and environment. Topics include audit planning and performance, evidence, internal controls, professional standards, and audit reports. Reviews, compilations and attestation services are examined, as are governmental agency audits.

*Prerequisite(s):* ACC 241.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Graduate School of Management.

*Grade Mode:* Letter.

## ACC 251 – Managerial Accounting & Controls (4 units)

*Course Description:* Analysis of management accounting systems including cost accounting, performance measurement, and compensation and reward systems. Focuses on the production of information useful for managerial decision-making, as well as the design of these systems.

*Prerequisite(s):* ACC 201; (MGT 200A or MGP 200A or MGB 200A).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in the Graduate School of Management.

*Credit Limitation(s):* Not open for credit to students who have completed MGB 271 or MGP 271 or MGT 271.

*Grade Mode:* Letter.

## **ACC 253 – Accounting Information & Control Systems (4 units)**

*Course Description:* Analysis of information systems used for accounting, recordkeeping, and control. Topics include the regulatory requirements of accounting control systems as well as their implementation and auditing considerations.

*Prerequisite(s):* ACC 201; (MGT 200A or MGP 200A or MGB 200A).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in Graduate School of Management.

*Credit Limitation(s):* Not open for credit to students who have taken MGB 271 or MGP 271 or MGT 271.

*Grade Mode:* Letter.

## **ACC 261 – Communications for Professional Accountants (4 units)**

*Course Description:* Overview of written and oral professional communications with an emphasis on structuring and documenting audits and reports, understanding audiences (investors, creditors, regulators, and other stakeholders), and consideration of ethical and regulatory responsibilities.

*Prerequisite(s):* ACC 201; (MGT 200A or MGB 200A or MGP 200A).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to graduate students in the Graduate School of Management.

*Credit Limitation(s):* Not open for credit to students who have taken any MGB 268 or MGP 268 or MGT 268.

*Grade Mode:* Letter.

## **ACC 271 – Accounting Ethics (4 units)**

*Course Description:* Analysis of accountants' professional responsibilities and ethics. Topics include the behavioral foundations of ethics in a business environment, how those elements affect accountants' integrity, objectivity, and independence. Professional standards related to accountants' conduct are also covered.

*Prerequisite(s):* ACC 201; (MGT 200A or MGP 200A or MGB 200A).

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate School of Management students.

*Grade Mode:* Letter.

## **ACC 455 – Audit Data Analytics (4 units)**

*Course Description:* Analytical techniques and methods as related to the practice of financial statement auditing. Combines theory and the application of auditing professional standards including diagnosing problems and issues, analyzing relevant information, and reporting decision results and recommendations.

*Prerequisite(s):* ACC 253.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

## **ACC 490 – Topics in Accounting (1-4 units)**

*Course Description:* Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques.

*Learning Activities:* Lecture 1-4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **Psychiatry (PSY)**

**College of Letters & Science**

### **PSY 092 – Willow Clinic (1-2 units)**

*Course Description:* Student run clinic for undergraduate students interested in learning about and meeting the unique health care needs for the homeless population.

*Learning Activities:* Clinical Activity 2-6 hour(s), Seminar 1-2 hour(s), Variable.

*Enrollment Restriction(s):* Open to lower division undergraduate students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

### **PSY 192 – Willow Clinic (1-2 units)**

*Course Description:* Student run clinic for upper division students interested in learning about and meeting the unique health care needs for the homeless population.

*Prerequisite(s):* Consent of instructor. UC Davis enrollment; upper division standing.

*Learning Activities:* Clinical Activity 2-6 hour(s), Seminar 1-2 hour(s), Lecture 1-2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

### **PSY 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; advanced standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **PSY 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; advanced standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **PSY 298 – Directed Group Study for Graduate Students (1-5 units)**

*Course Description:* Directed group study for graduate students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

### **PSY 299 – Special Study for Graduate Students (1-12 units)**

*Course Description:* Special study for graduate students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **PSY 403 – Fundamentals of Clinical Psychiatry (3 units)**

*Course Description:* Psychiatric interviewing, Mental Status Exam and diagnosis. Major child and adult disorders, including substance abuse and dependence. Weekly student interviews of psychiatric patients in small group format.

*Prerequisite(s):* Approval of SOM Committee on Student Progress.

*Learning Activities:* Clinical Activity 1 hour(s), Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to medical student only.

*Grade Mode:* Pass/Fail only.

**PSY 410 – Klingenstein Summer Elective (2.5 units)**

*Course Description:* During this "mini-clerkship," fellows will attend clinics, in-patient settings, and clinicians' offices. They will meet weekly to present cases and review current literature, and will complete a summary narrative at the end of their experience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 20 hour(s).

*Grade Mode:* Pass/Fail only.

**PSY 410L – Klingenstein Longitudinal Elective (2 units)**

*Course Description:* Year-long mentoring program provides clinical exposure to child and adolescent psychiatric healthcare during a medical student's pre-clinical years.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 5 hour(s), Discussion/Laboratory 10 hour(s), Discussion 2 hour(s).

*Grade Mode:* Pass/Fail only.

**PSY 412 – Psychiatry Grand Rounds (1 unit)**

*Course Description:* Weekly conference at UCDMC for presentation of selected clinical cases, presentation of lecture and research reports.

*Prerequisite(s):* Medical students or staff or other qualified mental health professionals with consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**PSY 413 – Outpatient Psychiatry Clerkship (6 units)**

*Course Description:* Experience in clinical management/treatment of adult outpatients with psychiatric and substance abuse disorders; crisis management/intervention, evaluation/development of diagnosis and treatment plan; emphasis on outpatient psychopharmacology/brief psychotherapy; observation of group therapy. Individual supervision by faculty/residents.

*Prerequisite(s):* PSY 430; and/or consent of coordinator.

*Learning Activities:* Clinical Activity 36 hour(s), Conference 2 hour(s), Lecture 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**PSY 414 – Psychosomatic Medicine Clerkship (3-12 units)**

*Course Description:* A large university hospital service in which the student functions as a member of the team in evaluation, management and psychiatric liaison with other medical specialties. Intensive supervision from senior staff and psychiatric residents.

*Prerequisite(s):* Psychiatry Clerkship or consent of instructor; medical students only.

*Learning Activities:* Clinical Activity 32 hour(s), Discussion 8 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail.

**PSY 415 – Telemedicine Clinical Elective (3-9 units)**

*Course Description:* Fourth-year medical student elective in Telemedicine focusing on psychiatric issues. Align with University, School and Center for Health and Technology mission of rural outreach and public health, particularly in primary care.

*Prerequisite(s):* Fourth-year medical student with consent of instructor.

*Learning Activities:* Clinical Activity 20 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**PSY 416 – Child Psychiatry Clerkship (6 units)**

*Course Description:* Didactic and clinical inpatient, outpatient, and consultation-liaison experiences with children, adolescents and families. Clinical observations, diagnostic assessment, and treatment will be undertaken with close supervision. Literature review and case conferences presented on a regular basis.

*Prerequisite(s):* PSY 430; and/or consent of coordinator.

*Learning Activities:* Clinical Activity 36 hour(s), Lecture/Discussion 2 hour(s), Conference 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**PSY 417 – Jail Psychiatric Clerkship (3-6 units)**

*Course Description:* Gain experience, under close faculty supervision, assessing acute and chronic mentally ill inmates in both inpatient and clinic settings.

*Prerequisite(s):* PSY 430; and/or consent of course coordinator.

*Learning Activities:* Clinical Activity 28 hour(s), Conference 8 hour(s), Lecture 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**PSY 418 – Off-Campus Clinical Experience (3-9 units)**

*Course Description:* Clinical or research elective in off-campus medical school or mental health setting. To be arranged with advance approval of instructor and individual in charge of off-campus setting.

*Prerequisite(s):* Consent of instructor; fourth-year medical students.

*Learning Activities:* Clinical Activity 20-40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**PSY 419 – Combined Family Medicine-Psychiatry Clerkship (3-6 units)**

*Course Description:* Students rotate through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Family Practice Faculty to provide medical care of indigent and uninsured patients as well as primary care for psychiatry patients.

*Learning Activities:* Clinical Activity 32 hour(s), Discussion 8 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**PSY 420 – Acting Internship in Psychiatry (3-6 units)**

*Course Description:* Acting intern position with close faculty supervision with emphasis on biological psychiatry, psychopharmacology and psychodynamic aspects appropriate to diagnostic and long-term patient management.

*Prerequisite(s):* PSY 430; and/or consent of course coordinator.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**PSY 421 – Combined Internal Medicine-Psychiatry Clerkship (3-6 units)**

*Course Description:* Students rotate through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Internal Medicine Faculty to provide medical care of indigent and uninsured patients as well as primary care for psychiatry patients.

*Prerequisite(s):* Psychiatry Clerkship or consent of instructor; medical students only.

*Learning Activities:* Clinical Activity 32 hour(s), Discussion 8 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

### **PSY 422 – Readings in Psychiatry (1-3 units)**

*Course Description:* Independent reading of a selected topic in psychiatry.

Supervision and discussion with a psychiatry faculty member.

*Learning Activities:* Discussion.

*Grade Mode:* Honors/Pass/Fail.

### **PSY 423 – Willow Clinic (1-12 units)**

*Course Description:* Student-run clinic for medical students interested in learning about and meeting the unique healthcare needs of the homeless population.

*Learning Activities:* Variable 4-10 hour(s).

*Enrollment Restriction(s):* Open to medical students in all four years of medical school.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

### **PSY 424 – Functional Genomics (2 units)**

*Course Description:* The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430 – Psychiatry Clinical Clerkship (3-12 units)**

*Course Description:* Assigned to clinical settings, students build upon the skills gained in preclinical years; emphasis on diagnostic, therapeutic and interpersonal skills. Areas of focus: patient management, interviewing skills, mental status exam, differential diagnosis, basic psychopharmacology, crisis assessment, intervention and case.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430FA – SJVP Longitudinal Psychiatry Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430FB – SJVP Longitudinal Psychiatry Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430FC – SJVP Longitudinal Psychiatry Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430FD – SJVP Longitudinal Psychiatry Clerkship (1.5-6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430R – Rural PRIME Psychiatry Longitudinal Clerkship (2 units)**

*Course Description:* Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430RA – Rural PRIME Psychiatry Longitudinal Clerkship (3 units)**

*Course Description:* Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430RB – Rural PRIME Psychiatry Longitudinal Clerkship (3 units)**

*Course Description:* Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430RC – Rural PRIME Psychiatry Longitudinal Clerkship (3 units)**

*Course Description:* Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

### **PSY 430RD – Rural PRIME Psychiatry Longitudinal Clerkship (1 unit)**

*Course Description:* Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PSY 430TA – TeachMS Longitudinal Psychiatry Clerkship (A) (4 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Promotions.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PSY 430TB – TeachMS Longitudinal Psychiatry Clerkship (B) (6 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Promotions.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PSY 430TC – TeachMS Longitudinal Psychiatry Clerkship (C) (2 units)**

*Course Description:* Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required.

*Prerequisite(s):* Consent of instructor; approval by School of Medicine Committee on Student Promotions.

*Learning Activities:* Clinical Activity 45 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PSY 439D – Directed Clinical Studies in Psychiatry (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **PSY 439R – Directed Studies in Psychiatry (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Independent Study 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **PSY 480 – Insights in Psychiatry (1-3 units)**

*Course Description:* On individual basis, student provided with an opportunity for gaining insight into various clinical activities in the practice of psychiatry.

*Prerequisite(s):* Consent of instructor; first- or second-year medical student in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PSY 488 – Acting Internship in Inpatient Psychiatry, Away Rotation (6 units)**

*Course Description:* Inpatient acting internship at approved non-UCDHS affiliated training program that provides experience and preparation for ambulatory medical care. Students perform as an intern, with a smaller number of patients, greater supervision, and responsibility for the ongoing care of assigned patients.

*Prerequisite(s):* Psychiatry Clerkship and/or consent of course coordinator.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PSY 489 – Acting Internship in Ambulatory Psychiatry, Away Rotation (6 units)**

*Course Description:* Outpatient acting internship at an approved non-UCDHS affiliated training program that provides experience and preparation for ambulatory medical care. Students perform as an intern, with smaller number of patients, greater supervision, and responsibility for the ongoing care of assigned patients.

*Prerequisite(s):* Psychiatry Clerkship and/or consent of course coordinator.

*Learning Activities:* Clinical Activity 40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PSY 493 – Social Justice & Medicine (3 units)**

*Course Description:* Employ readings, videos and guest presentations to explore how historical injustices have resulted in structural inequities and barriers to wellbeing for marginalized communities. Looks at how socio-political, economic and historical forces create illness in specific groups, and how models of structural competency and cultural humility can be used to explore a path towards equity.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar.

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Pass/Fail only.

## **PSY 498 – Directed Group Study (1-9 units)**

*Course Description:* Approved for graduate degree credit. Medical students desiring to explore particular topics in depth.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **PSY 499 – Research (1-12 units)**

*Course Description:* Approved for graduate degree credit. Individual research on selected topics or research projects.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# Psychology (PSC)

College of Letters & Science

## PSC 001 – General Psychology (4 units)

**Course Description:** Principles and basic concepts of psychology. The empirical study of individual behavior including perception, cognition, development, personality, social interactions and the biological underpinnings of behavior.

**Learning Activities:** Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken PSC 001Y.

**Grade Mode:** Letter.

**General Education:** Social Sciences (SS).

## PSC 001Y – General Psychology (4 units)

**Course Description:** Introduction to empirical approaches. Focus on perception, cognition, personality and social psychology, and biological aspects of behavior.

**Learning Activities:** Lecture 1 hour(s), Discussion 1 hour(s), Web Virtual Lecture 2 hour(s).

**Credit Limitation(s):** Not open for credit to students who have taken PSC 001.

**Grade Mode:** Letter.

**General Education:** Social Sciences (SS).

## PSC 012Y – Data Visualization in the Social Sciences (4 units)

**Course Description:** Introduction to quantitative data across the social sciences (Communications, Political Science, Psychology, Sociology, and other disciplines). Transforming data, describing data, producing graphs, visual reasoning, and interpretations.

**Learning Activities:** Lecture 2 hour(s), Laboratory 1.50 hour(s), Web Virtual Lecture 1.50 hour(s).

**Cross Listing:** CMN 012Y, SOC 012Y, POL 012Y.

**Grade Mode:** Letter.

**General Education:** Quantitative Literacy (QL); Visual Literacy (VL).

## PSC 020 – Freshman Psychology Seminar (4 units)

**Course Description:** Instructor will acquaint students with his or her program of research, the development of scientific questions from the literature, and the application of research methods to examine these questions. Critical thinking will be encouraged via expository writing and brief presentations.

**Prerequisite(s):** Freshman standing.

**Learning Activities:** Seminar 4 hour(s).

**Grade Mode:** Letter.

## PSC 041 – Research Methods in Psychology (4 units)

**Course Description:** Introduction to experimental design, interviews, questionnaires, field and observational methods, reliability, and statistical inference.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 012Y, STA 013, or STA 100 strongly recommended.

**Learning Activities:** Lecture 3 hour(s), Extensive Writing.

**Grade Mode:** Letter.

**General Education:** Quantitative Literacy (QL).

## PSC 061 – Mindreading: Understanding Other Minds (4 units)

**Course Description:** Psychological perspectives on the process of understanding other people's minds. Integration of social-cognitive theories with empirical evidence to explore the human ability to make sense of others' thoughts, feelings, and behaviors.

**Prerequisite(s):** (PSC 001 or PSC 001Y); (SOC 001 or PHI 010).

**Learning Activities:** Lecture 3 hour(s), Extensive Writing.

**Grade Mode:** Letter.

**General Education:** Social Sciences (SS).

## PSC 090X – Lower Division Seminar (1-2 units)

**Course Description:** Examination of a special topic in Psychology through shared readings, discussions, written assignments, or special activities such as fieldwork or laboratory work.

**Prerequisite(s):** Consent of instructor; lower division standing.

**Learning Activities:** Seminar 1-2 hour(s).

**Enrollment Restriction(s):** Limited enrollment.

**Grade Mode:** Letter.

## PSC 098 – Directed Group Study (1-5 units)

**Course Description:** Primarily for lower division students.

**Learning Activities:** Variable.

**Grade Mode:** Pass/No Pass only.

## PSC 099 – Special Study for Lower Division Students (1-5 units)

**Course Description:** Special study for lower division students.

**Learning Activities:** Variable.

**Grade Mode:** Pass/No Pass only.

## PSC 100 – Introduction to Cognitive Psychology (4 units)

**Course Description:** Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 041.

**Learning Activities:** Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed former PSC 136.

**Grade Mode:** Letter.

## PSC 100Y – Introduction to Cognitive Psychology (4 units)

**Course Description:** Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 041.

**Learning Activities:** Web Virtual Lecture 4 hour(s), Discussion 1 hour(s), Lecture 1 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed former PSC 136 or current PSC 100.

**Grade Mode:** Letter.

## PSC 101 – Introduction to Biological Psychology (4 units)

*Course Description:* Survey and integration of the relationships between behavior and biological processes, including physiology, genes, development, ecology, and evolution. May be taught abroad.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to majors.

*Credit Limitation(s):* Only 2 units of credit for those students who have completed NPB 100.

*Grade Mode:* Letter.

## PSC 103A – Statistical Analysis of Psychological Data (5 units)

*Course Description:* Design and statistical analysis of psychological investigations and the interpretation of quantitative data in psychology.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (STA 013 or STA 013Y or STA 102).

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Psychology Majors.

*Credit Limitation(s):* Not open for credit to students who have completed PSC 103.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

## PSC 103B – Statistical Analysis of Psychological Data (5 units)

*Course Description:* Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and correlational approaches. Simple regression analysis, multiple regression analysis, non-parametric statistics, introduction to multivariate statistics, with applications in psychology.

*Prerequisite(s):* PSC 103A; (STA 013 or STA 013Y or STA 102).

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed PSC 105.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

## PSC 104 – Applied Psychometrics: An Introduction to Measurement Theory (4 units)

*Course Description:* Examination of the basic principles and applications of classical and modern test theory. Topics include test construction, reliability theory, validity theory, factor analysis and latent trait theory.

*Prerequisite(s):* PSC 041; PSC 103A; (STA 013 or STA 013Y); upper division standing in Psychology.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

## PSC 107 – Questionnaire & Survey Research Methods (4 units)

*Course Description:* Introduction to survey and questionnaire research methods with emphasis on how to ask questions. Social and psychological factors that influence survey response. Practical aspects of fielding survey and questionnaire research.

*Prerequisite(s):* PSC 001 or PSC 001Y; and consent of instructor; PSC 041 or an equivalent course on social or behavioral research methods or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

## PSC 113 – Developmental Psychobiology (4 units)

*Course Description:* The biology of behavioral development; survey and integration of the organic and environmental processes that regulate the development of behavior.

*Prerequisite(s):* PSC 101.

*Learning Activities:* Lecture 3 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Letter.

## PSC 120 – Agent-Based Modeling (4 units)

*Course Description:* Introduction to agent-based computer simulation and analysis with emphasis on learning how to model animals, including humans, to achieve insight into social and group behavior.

*Prerequisite(s):* PSC 100 and/or PSC 101 recommended.

*Learning Activities:* Lecture/Lab 4 hour(s).

*Enrollment Restriction(s):* Limited to 24 students.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

## PSC 121 – Physiological Psychology (4 units)

*Course Description:* Relationship of brain structure and function to behavior, motivation, emotion, language, and learning in humans and other animals. An introduction to the methodology of physiological psychology and neuroscience.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; PSC 101.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed former PSC 108.

*Grade Mode:* Letter.

## PSC 122 – Advanced Animal Behavior (4 units)

*Course Description:* Advanced integrative survey of biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free-living animals

*Prerequisite(s):* PSC 101 or NPB 102.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed former PSC 150.

*Cross Listing:* NPB 150.

*Grade Mode:* Letter.

**PSC 123 – Hormones & Behavior (3 units)**

*Course Description:* Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress.

*Prerequisite(s):* NPB 101; (PSC 101 or NPB 102).

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed former PSC 152.

*Cross Listing:* NPB 152.

*Grade Mode:* Letter.

**PSC 124 – Comparative Neuroanatomy (3 units)**

*Course Description:* Overview of the neuroanatomy in mammalian vertebrates, focusing on the cerebral cortex and experimental techniques. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations.

*Prerequisite(s):* NPB 100 or NPB 101 or NPB 110B or PSC 121.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* NPB 124.

*Grade Mode:* Letter.

**PSC 124L – Comparative Neuroanatomy Laboratory (2 units)**

*Course Description:* Comparative neuroanatomy laboratory illustrating modern neuroanatomical techniques in determining neural connections within the mammalian brain. Includes experimentation and presentation of results.

*Prerequisite(s):* PSC 124 (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Pass One restricted to PSC and NPB majors; must be concurrently enrolled in PSC 124.

*Cross Listing:* NPB 124L.

*Grade Mode:* Letter.

**PSC 125 – Behavioral Epigenetics (4 units)**

*Course Description:* Review of basic principles in genetics and epigenetics with emphasis on behavior. Introduction to the use of modern molecular methods in understanding the complex relationships between genes, environment, and behavior.

*Prerequisite(s):* PSC 101.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**PSC 126 – Health Psychology (4 units)**

*Course Description:* Psychological factors influencing health and illness. Topics include stress and coping, personality and health, symptom perception and reporting, heart disease, cancer, compliance, and health maintenance and promotion.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; PSC 101 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed former PSC 160.

*Grade Mode:* Letter.

**PSC 130 – Human Learning & Memory (4 units)**

*Course Description:* Consideration of major theories of human learning and memory with critical examination of relevant experimental data.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (PSC 012Y or STA 013 or STA 013Y or STA 100); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**PSC 131 – Perception (4 units)**

*Course Description:* Cognitive organizations related to measurable physical energy changes mediated through sensory channels. Perception of objects, space, motion, events.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (PSC 100 or PSC 100Y or PSC 135).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**PSC 132 – Language & Cognition (4 units)**

*Course Description:* Introduction to the cognitive processes involved in language comprehension and production. Topics include the biological foundations of language, speech perception, word recognition, syntax, reading ability, and pragmatics.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (PSC 100 or PSC 100Y or PSC 135); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**PSC 133 – Neuroeconomics/Reinforcement Learning & Decision Making (4 units)**

*Course Description:* Theoretical and empirical approaches to neuroeconomics (neuroscience of decision making) from psychology, neuroscience, economics, and computer science. Neuroscience of judgment and decision making, behavioral economics, and reinforcement learning.

*Prerequisite(s):* (PSC 100 or PSC 100Y or PSC 135 or ARE 100A or ECN 100A or NPB 162 or NPB 163); (STA 013 or STA 013Y or STA 100 or PSC 103A); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* ECN 107, CGS 107.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL).

**PSC 135 – Cognitive Neuroscience: The Biological Foundations of the Mind (4 units)**

*Course Description:* Neuroscientific foundations of higher mental processes including attention, memory, language, higher-level perceptual and motor processes, and consciousness. Emphasis on the neural mechanisms which form the substrates of human cognition and the relationship of mind to brain. May be taught abroad.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; or consent of instructor; PSC 101 or PSC 121 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**PSC 136 – Psychology of Music (4 units)**

*Course Description:* Introduction to the mental and neural representations of musical structures and processes involved in perceiving, remembering, and performing music. Music and emotion.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (PSC 100 or PSC 100Y or PSC 135 or MUS 006C); or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**PSC 137 – Neurobiology of Learning & Memory (4 units)**

*Course Description:* Overview of the neural basis of learning and memory focusing on modern behavioral neuroscience research with animals.

Topics include consolidation, neural plasticity, cellular competition for memory storage, and the role of neurogenesis in learning.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; PSC 101.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**PSC 138 – Consciousness & Cognition (4 units)**

*Course Description:* Current theoretical and empirical evidence in the study of cognition and consciousness. Theories of consciousness, psychological and neural basis of conscious and unconscious processes such as attention, intentionality, and dreams.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (PSC 100 or PSC 100Y or PSC 135).

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* CGS 138.

*Grade Mode:* Letter.

**PSC 139 – Advanced Cognitive Neuroscience (4 units)**

*Course Description:* Advanced integrative survey of cognitive neuroscience, including perception, attention, memory, and navigation. Emphasis on reviewing literature in psychology, neuroscience, and statistics; understanding methods in cognition; and presentation skills.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; PSC 135; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Scientific Literacy (SL).

**PSC 140 – Developmental Psychology (4 units)**

*Course Description:* An ontogenetic account of human behavior through adolescence with emphasis on motor skills, mental abilities, motivation, and social interaction.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Only 2 units of credit allowed to students who have completed HDE 100A or HDE 100B; not open for credit to students who have completed PSC 112. (Former PSC 112.)

*Grade Mode:* Letter.

**PSC 140Y – Developmental Psychology (4 units)**

*Course Description:* Ontogenetic account of human behavior through adolescence with emphasis on motor skills, mental abilities, motivation, and social interaction.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Discussion 1 hour(s), Lecture 1.50 hour(s), Web Virtual Lecture.

*Enrollment Restriction(s):* Pass One open to Psychology Majors.

*Credit Limitation(s):* Only 2 units of credit allowed to students who have completed HDE 100A or HDE 100B; not open for credit to students who have completed PSC 112. (Former PSC 112.)

*Grade Mode:* Letter.

**PSC 141 – Cognitive Development (4 units)**

*Course Description:* Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning, and the role of plasticity. Topics include attention, memory, concepts about the physical and social world, and language.

*Prerequisite(s):* PSC 140 or PSC 140Y or HDE 100B or HDE 100A.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have taken HDE 101.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**PSC 142 – Social & Personality Development (4 units)**

*Course Description:* Social and personality development of children, infancy through adolescence. Topics include the development of personality, achievement motivation, self-understanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors.

*Prerequisite(s):* PSC 140 or PSC 140Y or HDE 100A or HDE 100B.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**PSC 143 – Infant Development (4 units)**

*Course Description:* Psychological development in infancy. Topics include physical and motor development, sensory and nervous system development, and memory and cognitive development. Emphasis will be on evaluating theories, empirical research, and experimental methods for understanding infant development.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; (PSC 140 or PSC 140Y or HDE 100A).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## PSC 145 – Developmental Cognitive Neuroscience (4 units)

**Course Description:** Neuroscientific theories and methods (EEG, ERP, fNIRS, fMRI) that inform an understanding of behavioral and cognitive development over infancy and childhood. Neurodevelopmental correlates of perception, action, language, and social cognition; value of the neuroscientific perspective; limitations and challenges of neuroscientific research in the developmental context.

**Prerequisite(s):** PSC 135 or ((PSC 140 or PSC 140Y or HDE 100A or HDE 100B); (PSC 101 or PSC 121 or NPB 161 or HDE 163)); PSC 141 recommended.

**Learning Activities:** Lecture 2.50 hour(s), Discussion 1.50 hour(s).

**Enrollment Restriction(s):** Pass One open to Psychology and Cognitive Science Majors.

**Grade Mode:** Letter.

**General Education:** Scientific Literacy (SL).

## PSC 146 – The Development of Memory (4 units)

**Course Description:** Theory and research on memory development with focus on infancy and childhood.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 041; and any Psychology upper division course from Core Group A or D.

**Learning Activities:** Lecture 3 hour(s), Term Paper 1 hour(s).

**Enrollment Restriction(s):** Pass One open to Psychology majors.

**Credit Limitation(s):** Not open for credit to students who have completed former PSC 133.

**Grade Mode:** Letter.

**General Education:** Writing Experience (WE).

## PSC 148 – Developmental Disorders (4 units)

**Course Description:** Current scientific knowledge of the influences of biological, cognitive, and environmental factors on the emergence of disorders with onset in childhood. Examples include autism spectrum, ADD/ADHD, dyslexia and dyscalculia. Emphasis placed on understanding these disorders, their causes and their treatments.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 041; (PSC 140 or PSC 140Y or PSC 141 or HDE 100A or HDE 100B).

**Learning Activities:** Lecture/Discussion 3 hour(s), Term Paper.

**Grade Mode:** Letter.

## PSC 150 – Relationship Science: Lust, Love, & Evolution (4 units)

**Course Description:** Evolutionary perspectives on attraction and close relationships. Integrating social psychological and evolutionary theories with empirical evidence pertaining to human mating.

**Prerequisite(s):** PSC 001 or PSC 001Y; PSC 041 recommended.

**Learning Activities:** Lecture 4 hour(s).

**Credit Limitation(s):** Not open for credit to students who have completed PSC 051.

**Grade Mode:** Letter.

**General Education:** Social Sciences (SS) or Science & Engineering (SE).

## PSC 151 – Social Psychology (4 units)

**Course Description:** Behavior of the individual in the group. Examination of basic psychological processes in social situations, surveying various problems of social interaction: group tensions, norm-development, attitudes, values, public opinion, status.

**Prerequisite(s):** PSC 001 or PSC 001Y, PSC 041 recommended.

**Learning Activities:** Lecture 4 hour(s).

**Enrollment Restriction(s):** Pass One open to Psychology majors.

**Credit Limitation(s):** Not open for credit to students who have completed former PSC 145.

**Grade Mode:** Letter.

**General Education:** Domestic Diversity (DD).

## PSC 151V – Social Psychology (4 units)

**Course Description:** Behavior of the individual in the group. Examination of basic psychological processes in social situations, surveying various problems of social interaction: group tensions, norm-development, attitudes, values, public opinion, status.

**Prerequisite(s):** PSC 001 or PSC 001Y and PSC 041 recommended.

**Learning Activities:** Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).

**Enrollment Restriction(s):** Pass One open to Psychology majors.

**Credit Limitation(s):** Not open for credit to students who have completed former PSC 145.

**Grade Mode:** Letter.

**General Education:** Domestic Diversity (DD).

## PSC 152 – Social Cognition (4 units)

**Course Description:** Examines how social factors influence how we attend to, encode, and process information and how these mental processes affect subsequent judgments and behavior.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 041.

**Learning Activities:** Lecture 4 hour(s).

**Grade Mode:** Letter.

## PSC 153 – Psychology & Law (4 units)

**Course Description:** Current theoretical and empirical issues in the study of psychology and law. Topics include eyewitness testimony, child abuse, jury decision making, juvenile delinquency and criminology, prediction of violence, insanity defense, and memory for traumatic events.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 041.

**Learning Activities:** Lecture 4 hour(s).

**Enrollment Restriction(s):** Pass One open to Psychology majors.

**Credit Limitation(s):** Not open for credit to students who have completed former PSC 115.

**Grade Mode:** Letter.

## PSC 154 – Psychology of Emotion (4 units)

**Course Description:** Introduction to current theories and research on emotion and bodily feelings with special reference to self-knowledge.

**Prerequisite(s):** (PSC 001 or PSC 001Y); PSC 041.

**Learning Activities:** Lecture 4 hour(s).

**Enrollment Restriction(s):** Pass One open to Psychology majors.

**Grade Mode:** Letter.

**PSC 157 – Stereotyping, Prejudice, & Stigma (4 units)**

*Course Description:* Social psychological underpinnings of stereotyping, prejudice, and stigma from sociocultural, motivational, and cognitive perspectives. Topics include: origins, maintenance, change, effects on person perception and memory, and the automaticity/controllability of stereotyping and prejudice.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Domestic Diversity (DD).

**PSC 158 – Sexual Orientation & Prejudice (4 units)**

*Course Description:* Current scientific knowledge about sexual orientation and prejudice based on sexual orientation. Emphasis is placed on learning the skills necessary for a critical understanding of science and public policy issues relevant to sexuality.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**PSC 159 – Gender & Human Reproduction (4 units)**

*Course Description:* Psychology of reproduction. Reproductive events over the course of an individual's life, including sexual development, mate choice, relationships, and reproduction. Biological and social psychological explanations at the levels of mechanism and evolutionary function.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 4 hour(s).

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed former PSC 149. (Former PSC 149.)

*Grade Mode:* Letter.

**PSC 161 – Psychology of the Self (4 units)**

*Course Description:* Psychological theory and research on the self. Topics include: self-knowledge, self-esteem, self-regulation, self-presentation, cognitive and emotional aspects of the self, and the role of the self in shaping social interaction.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**PSC 162 – Introduction to Personality Psychology (4 units)**

*Course Description:* Scientific study of personality. Methods of personality research. Overview of current research and theory in the field of personality psychology. May be taught abroad.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed former PSC 147.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**PSC 165 – Introduction to Clinical Psychology (4 units)**

*Course Description:* Major theoretical formulations in the history of clinical psychology, from classical psychoanalysis to contemporary existentialism and behavior modification. Survey based on lectures, films, and tapes, of what clinical psychologists do, including methods of appraisal, professional roles, and approaches to treatment.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**PSC 168 – Abnormal Psychology (4 units)**

*Course Description:* Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic behavior.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**PSC 169 – The Science of Multi-Cultural Psychology (4 units)**

*Course Description:* Effects of culture and ethnicity on psychological processes, such as social cognition, emotion, motivation, personality, self-concept, and interpersonal behavior (i.e., how culture makes who you are). Individuals' construction of multicultural identity and experiences.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Domestic Diversity (DD).

**PSC 170 – Psychology of Religion (4 units)**

*Course Description:* Major theories, issues, data, and research methodologies of the psychology of religion. Religious experience and expression; religious development in childhood, adolescence, and adulthood; conversion; religious influences on physical and mental health; cross-cultural perspectives.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**PSC 175 – Genius, Creativity, & Leadership (4 units)**

*Course Description:* Phenomenon of genius is examined from a diversity of theoretical, methodological, and disciplinary perspectives, with an emphasis on outstanding creativity and leadership in art, music, literature, philosophy, science, war, and politics.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; or equivalents, or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## PSC 180A – Research in Cognitive & Perceptual Psychology (4 units)

*Course Description:* Empirical research on selected topics in general experimental psychology (general research design and analysis, perception, cognition, cognitive development, etc.). Specific content will vary from quarter to quarter.

*Prerequisite(s):* PSC 041; four upper division Psychology courses and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## PSC 180B – Research in Psychobiology (4 units)

*Course Description:* Empirical research on selected topics in psychobiology (animal learning, animal behavior, physiological and sensory psychology, developmental psychobiology, computer modeling of neural systems). Content varies.

*Prerequisite(s):* PSC 101; three additional upper division Psychology courses and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## PSC 180C – Research in Personality & Social Psychology (4 units)

*Course Description:* Empirical research on selected topics in personality and social psychology (personality, social psychology, organizational psychology, etc.). Content will vary from quarter to quarter.

*Prerequisite(s):* PSC 041; four upper division Psychology courses and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## PSC 180D – Research in Developmental Psychology (4 units)

*Course Description:* Empirical research on selected topics in developmental psychology (research design and analysis, development, cognitive development, social and personality development etc.).

*Prerequisite(s):* PSC 041; consent of instructor; Four upper division Psychology courses.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

## PSC 182 – Methods in Laboratory Research (4 units)

*Course Description:* Training in specific lab-based research methods coupled with hands-on experience in a research lab. Students assessed on their ability report and interpret research findings. Content varies from quarter to quarter.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

## PSC 185 – History of Psychology (4 units)

*Course Description:* Development of psychological thought and research in context of history of philosophy and science.

*Prerequisite(s):* (PSC 001 or PSC 001Y); PSC 041; upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One open to Psychology majors.

*Credit Limitation(s):* Not open for credit to students who have completed PSC 120. (Former PSC 120.)

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## PSC 190 – Seminar in Psychology (4 units)

*Course Description:* Intensive treatment of a special topic or problem of psychological interest.

*Prerequisite(s):* Junior or senior standing; major in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

## PSC 190X – Upper Division Seminar (1-2 units)

*Course Description:* In-depth examination at an upper division level of a special topic in Psychology. Emphasis on student participation in learning. May not be repeated for credit.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Seminar 1-2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## PSC 192 – Fieldwork in Psychology (1-6 units)

*Course Description:* Supervised internship off and on campus, in community and institutional settings. Maximum of 6 units may be used towards satisfaction of upper division major requirement.

*Prerequisite(s):* Consent of instructor; upper division standing in Psychology.

*Learning Activities:* Fieldwork 1-6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 1 time(s) per internship site.

*Grade Mode:* Pass/No Pass only.

## PSC 194HA – Special Study for Honors Students (3 units)

*Course Description:* Directed research. Supervised reading, research and writing leading to submission of a Senior Honors thesis under the direction of faculty sponsor.

*Prerequisite(s):* Consent of instructor; senior standing in Psychology and qualifications for admission into college honors program; at least one course from PSC 180A, PSC 180B, PSC 180C or PSC 199 strongly recommended.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## PSC 194HB – Special Study for Honors Students (3 units)

*Course Description:* Directed research. Supervised reading, research and writing leading to submission of a Senior Honors thesis under the direction of faculty sponsor.

*Prerequisite(s):* PSC 194HA; consent of instructor; senior standing in Psychology and qualifications for admission into college honors program; completion of PSC 194HA required.

*Learning Activities:* Independent Study 9 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## PSC 197T – Tutoring in Psychology (1-3 units)

*Course Description:* Intended for advanced undergraduate students who will lead discussion sections in Psychology courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 1-3 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

## PSC 198 – Directed Group Study (1-5 units)

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## PSC 199 – Special Study for Advanced Undergraduates (1-5 units)

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## PSC 200 – Proseminar in Psychology (3 units)

*Course Description:* Introduces matriculating graduate students to research activities of departmental faculty.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Independent Study 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 201 – Research Preceptorship (4 units)

*Course Description:* Research preceptorship.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory 4 hour(s), Discussion 5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 202 – Research Seminar (1 unit)

*Course Description:* Presentation of graduate research to program faculty and graduate students.

*Prerequisite(s):* Graduate standing in Psychology.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 204A – Statistical Analysis of Psychological Experiments (5 units)

*Course Description:* Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and correlational approaches. Analysis of variance, factorial and repeated measures, and tests of trends.

*Prerequisite(s):* STA 102; or equivalent; graduate standing in Psychology or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PSC 206.

*Grade Mode:* Letter.

## PSC 204B – Causal Modeling of Correlational Data (5 units)

*Course Description:* Examination of how to make causal inferences from correlational data in the behavioral sciences. Emphasis is on testing rival causal models using correlations among observed variables. Beginning with multiple regression analysis, discussion advances to path analysis and related techniques.

*Prerequisite(s):* PSC 204A; or the equivalent course and graduate standing in Psychology or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PSC 207A.

*Grade Mode:* Letter.

## PSC 204D – Advanced Statistical Inference from Psychological Experiments (5 units)

*Course Description:* Advanced topics in statistical inference, which may include probability theory, sampling distributions, statistical inference and hypothesis testing, nonparametric statistics, Bayesian approaches, and advanced issues in analysis of variance.

*Prerequisite(s):* PSC 204A; or the equivalent; graduate standing in Psychology or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Laboratory 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PSC 205.

*Grade Mode:* Letter.

## PSC 205A – Applied Multivariate Analysis of Psychological Data (4 units)

*Course Description:* Review of the major methods of multivariate data analysis for psychological data. Students will program statistical routines using a linear algebra-based computing language. Topics will include multivariate analysis of variance, discriminant analysis, canonical analysis factor analysis, and component analysis.

*Prerequisite(s):* PSC 204A; PSC 204B; PSC 204D; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PSC 207B. (Former PSC 207B.)

*Grade Mode:* Letter.

**PSC 205B – Factor Analysis (4 units)**

*Course Description:* Theory and methods of factor analysis, including exploratory factor analysis, confirmatory factor analysis, and principal component analysis.

*Prerequisite(s):* PSC 204A; PSC 204B; or equivalent courses, or consent of instructor; graduate standing.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 205C – Structural Equation Modeling (4 units)**

*Course Description:* Theory and methods of structural equation modeling, including path analysis, confirmatory factor analysis, multiple-group modeling and latent growth curve modeling.

*Prerequisite(s):* PSC 204A; PSC 204B; or equivalent courses, or consent of instructor; graduate standing.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 205D – Multilevel Models (4 units)**

*Course Description:* Introduction to statistical techniques for the analysis of normal, hierarchically structured data, such as cross-sectional clustered data or repeated-measures data. Topics include hierarchical linear models, latent growth curve models, and how these methods handle unbalanced and/or missing data.

*Prerequisite(s):* PSC 204A; graduate standing or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**PSC 205E – Applied Psychometrics & Measurement Theory (4 units)**

*Course Description:* Examination of the basic principles and applications of classical and modern test theory. Topics include test construction, reliability theory, validity theory, factor analysis, and latent trait theory.

*Prerequisite(s):* PSC 204A; graduate standing in Psychology or consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PSC 204 or PSC 204C.

*Grade Mode:* Letter.

**PSC 205F – Item Response Theory (4 units)**

*Course Description:* Item response theory allows for the creation of precise measurement instruments in psychological testing. Review Classical Test Theory, and then cover basic IRT models through advanced applications.

*Prerequisite(s):* PSC 204A; or the equivalent; graduate standing in Psychology or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 205G – Applied Longitudinal Data Analysis (4 units)**

*Course Description:* Modeling and understanding of intraindividual change and interindividual differences in change. Reviews conventional methods and introduces contemporary techniques for modeling intraindividual change.

*Prerequisite(s):* PSC 204A; graduate standing in Psychology or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 205H – Applied Bayesian Statistics for Social Scientists (3 units)**

*Course Description:* Bayesian methodology and inference for social scientists. Basics of probability theory, Bayes' theorem, inference and model checking, discussion of common distributions, sampling approaches, Bayes factors for hypothesis testing and introduction to dedicated software.

*Prerequisite(s):* PSC 204B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**PSC 206A – Theoretical Foundations: Research Methods in Psychology (4 units)**

*Course Description:* Examines the philosophy and research practices underlying experimental psychology. Topics to be covered include philosophy of science/epistemology, research design, inference and bias in research, theory development, validity, the social context of research, and critical thinking about research.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate student status.

*Grade Mode:* Letter.

**PSC 206B – Research Methods in Psychology: Applications in Social-Personality Research (4 units)**

*Course Description:* Overview of the research designs, assessment methods, and statistical procedure used by social-personality psychologists. Focus on the practical issues that arise when using each method in specific research contexts.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate student status.

*Grade Mode:* Letter.

**PSC 207 – Survey & Questionnaire Research Methods (4 units)**

*Course Description:* Survey and questionnaire research methods with emphasis on how to ask questions. Cognitive, motivational, and social processes that influence how respondents answer questions; sampling techniques; Internet resources; practical aspects of fielding survey and questionnaire research.

*Prerequisite(s):* Completion of a course on social or behavioral research methods; graduate standing.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**PSC 208 – Physiological Psychology (4 units)**

*Course Description:* A conceptual analysis of the contributions of neuroanatomy, neurophysiology and neurochemistry to an understanding of animal and human behavior.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## PSC 208A – Fundamentals of Human Electrophysiology (4 units)

*Course Description:* In-depth introduction and hands-on experience with the event-related potential (ERP) method in the study of attention, executive control, memory, language and social cognitive neuroscience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1.50 hour(s), Laboratory 3 hour(s), Extensive Problem Solving 1.50 hour(s), Project (Term Project) 3 hour(s).

*Enrollment Restriction(s):* Restricted to 15 students.

*Grade Mode:* Letter.

## PSC 209A – Introduction to Programming: Matlab (4 units)

*Course Description:* The Matlab programming environment as a means of organizing, analyzing, and visualizing scientific data. Basic programming concepts such as variables, loops, conditional branching, and efficient programming techniques will be emphasized.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Lab 3 hour(s).

*Grade Mode:* Letter.

## PSC 210 – Fundamentals of Cognitive Neuroimaging (3 units)

*Course Description:* Introduction to empirical foundations and methodology of neuroimaging, emphasizing pragmatics of functional magnetic resonance imaging (fMRI) to study cognition. Topics include MR physics, the relationship between neural activity and the BOLD response, experimental design, and analysis of fMRI data.

*Prerequisite(s):* Basic knowledge of inferential statistics and experimental Psychology.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## PSC 211 – Advanced Topics in Neuroimaging (3 units)

*Course Description:* Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG.

*Prerequisite(s):* PSC 210; or consent of instructor.

*Learning Activities:* Seminar 2 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to 16 students.

*Repeat Credit:* May be repeated when topics differ.

*Cross Listing:* NSC 211, NPB 211.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 212A – Developmental Psychology: Cognitive & Perceptual Development (4 units)

*Course Description:* Theories and empirical findings concerning human cognitive and perceptual development. Development of perception, memory, concepts (e.g., theory of mind, concepts about number), problem solving, and language from infancy to adolescence.

*Prerequisite(s):* Graduate standing or consent of instructor; completion of an undergraduate or graduate course on developmental psychology or human development.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## PSC 212B – Developmental Psychology: Social, Emotional, & Personality Development (4 units)

*Course Description:* Theories and empirical findings concerning human social, emotional, and personality development. Development of emotions, moral reasoning and behavior, personality, self-concept, and social cognition from infancy to adolescence (may include adulthood).

*Prerequisite(s):* Graduate standing or consent of instructor; completion of an undergraduate or graduate course on developmental psychology or human development.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## PSC 217 – Behavioral Genetics (4 units)

*Course Description:* Review basic principles in genetics and select topics in molecular genetics with emphasis on behavior. Use of modern molecular methods to outline complex relationships between genes, environment, and behavior.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to 20 students.

*Credit Limitation(s):* Not open for credit to students who have completed PSC 251.

*Grade Mode:* Letter.

## PSC 218A – Fundamentals of Animal Behavior (5 units)

*Course Description:* Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science.

*Prerequisite(s):* Consent of instructor; upper division undergraduate introduction to the biology of behavior, such as PSC 101, PSC 122, PSC 123, NPB 102, NPB 150, NPB 152, WFC 141, ENT 104, or ANS 105.

*Learning Activities:* Lecture/Discussion 4 hour(s), Discussion 1 hour(s).

*Cross Listing:* ANB 218A.

*Grade Mode:* Letter.

## PSC 218B – Fundamentals of Animal Behavior (5 units)

*Course Description:* Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science.

*Prerequisite(s):* PSC 209A; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s), Discussion 1 hour(s).

*Cross Listing:* ANB 218B.

*Grade Mode:* Letter.

## PSC 220 – History of Psychology (4 units)

*Course Description:* A lecture-seminar on the history of psychology and on the applicability of early psychological theory and research to contemporary investigations.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Seminar 2 hour(s).

*Grade Mode:* Letter.

**PSC 221 – Academic Writing in Psychology (4 units)**

*Course Description:* Strategies for developing and honing academic writing skills and writing productivity, with a particular focus on how to write a clear and compelling empirical journal article in psychology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor when focus is on a substantially different writing project.

*Grade Mode:* Letter.

**PSC 230 – Cognitive Psychology (4 units)**

*Course Description:* Analysis of the mental processes by which knowledge is acquired, manipulated, stored, retrieved and used.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**PSC 231 – Sensation & Perception (4 units)**

*Course Description:* Analysis of the role of sensory processes and perception in experience and their effects on behavior.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**PSC 241 – Attitudes & Social Influence (4 units)**

*Course Description:* Survey of theory and research in the field of attitudes and social influence. Topics include attitude definition and measurement, major theories of attitude formation and change, the relationship between attitudes and behavior, and recent directions and controversies.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 242 – Attraction & Close Relationships (4 units)**

*Course Description:* Social psychological theory and research on attraction and close relationships, with a particular emphasis on romantic relationships. Covers attachment theory, interdependence theory, and evolutionary psychological perspectives.

*Prerequisite(s):* Graduate standing in Psychology, Sociology, Human Development, a related social science, or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 243 – Social Cognition (4 units)**

*Course Description:* Processes underlying the perception, memory, and judgment of social stimuli, the effects of social and affective factors on cognition, and the interpersonal consequences of those processes. Topics include automaticity/control, motivated cognition, person perception, stereotyping, attitudes, and persuasion.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 244 – Stereotyping, Prejudice, & Stigma (4 units)**

*Course Description:* Examines the social psychological underpinnings of stereotyping, prejudice, and stigma, including sociocultural, motivational, and cognitive factors.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**PSC 245 – Social Psychology (4 units)**

*Course Description:* Theory and research in social psychology.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**PSC 247 – Personality (4 units)**

*Course Description:* Theory and research in human personality.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**PSC 251 – Topics in Genetic Correlates of Behavior (4 units)**

*Course Description:* Theory and experiment in the genetic contributions to animal and human behavior.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**PSC 252 – Topics in Psychobiology (4 units)**

*Course Description:* Critical study in a selected area of psychobiology.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**PSC 261 – Cognitive Neuroscience (4 units)**

*Course Description:* Graduate core course for neuroscience.

Neurobiological bases of higher mental function including attention, memory, language. One of three in three-quarter sequence.

*Prerequisite(s):* Graduate student standing in Psychology or Neuroscience or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* NSC 223.

*Grade Mode:* Letter.

**PSC 263 – Topics in Cognitive Psychology (4 units)**

*Course Description:* Selected topics in language processing, memory, perception, problem solving, and thinking, with an emphasis on the common underlying cognitive processes.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

**PSC 264 – Topics in Psycholinguistics (4 units)**

*Course Description:* Discussion of fundamental issues in the psychology of language.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

## PSC 270 – Topics in Personality & Social Psychology (4 units)

*Course Description:* Critical study of a selected area of personality or social psychology.

*Prerequisite(s):* Graduate student standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated when content differs.

*Grade Mode:* Letter.

## PSC 271A – Core Concepts & Methods in Learning, Memory, & Plasticity (2 units)

*Course Description:* Core concepts and methods used in studies of learning, memory and plasticity. Behavioral paradigms and measurement approaches in human and animal studies of learning and plasticity, as well as a consideration of the functional, anatomical and neuronal mechanisms underlying brain plasticity.

*Prerequisite(s):* Graduate Standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 271A, NPB 271A.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 271B – Core Concepts & Methods in Learning, Memory, & Plasticity (2 units)

*Course Description:* Core concepts and detailed survey methods used in studies of learning, memory and plasticity, from the cellular and molecular level to the level of neural circuits. Areas of learning, memory, and plasticity research where recent progress has been made in linking across these levels of analysis.

*Prerequisite(s):* PSC 271A or NPB 271A or NSC 271A.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 271B, NPB 271B.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 271C – Translational Approaches to Learning, Memory, & Plasticity Disorders (2 units)

*Course Description:* Neurological disorders, the effect of these disorders on learning, memory and plasticity, approved therapeutic options and current research designed to improve understanding and treatment of these diseases: (i) the clinical presentation, diagnostic criteria, and existing therapies, (ii) mechanistic studies in humans and animal models, and (iii) molecular pathways involved in the disease and approaches for drug discovery.

*Prerequisite(s):* PSC 271B or NPB 271B or NSC 271B.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* NSC 271C, NPB 271C.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 272 – Topics in Developmental Psychology (4 units)

*Course Description:* Selected topics in developmental psychology, including developmental neuroscience, memory development, infancy, cognitive development, social development, child maltreatment, children and law, perceptual development, emotional development, children at risk, and adolescence, with emphasis on developmental processes and developmental theory.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## PSC 289A – Current Research in Psychology (2 units)

*Course Description:* Contemporary theory and empirical research in specialized topics in psychology. Topics include developmental attachment, social neuroscience, mental health, emotion, sexual orientation and identity.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## PSC 289B – Current Research in Psychology (2 units)

*Course Description:* Intensive examination of contemporary theory and empirical research on a specialized topic in psychology. Sample topics include developmental attachment, social neuroscience, culture and mental health, electrophysiology and cognitive neuroscience, emotion, implicit cognitive processes, sexual orientation and identity, and attention.

*Prerequisite(s):* PSC 289A; graduate standing in Psychology or consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## PSC 290 – Seminar (4 units)

*Course Description:* Seminar devoted to a highly specific research topic in any area of basic psychology. Special topic selected for a quarter will vary depending on interests of instructor and students.

*Prerequisite(s):* Graduate standing in Psychology or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## PSC 298 – Group Study (1-5 units)

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 299 – Research (1-12 units)

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 299D – Dissertation Research (1-12 units)

*Course Description:* Dissertation research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## PSC 390 – The Teaching of Psychology (4 units)

*Course Description:* Methods and techniques of teaching undergraduate psychology. Integration of learning outcomes with effective evaluation. Practical experience in the application of pedagogical principles.

*Prerequisite(s):* Consent of instructor; advanced graduate standing in Psychology or a closely related discipline.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PSC 390A – The Teaching of Psychology (6 units)**

*Course Description:* Methods and problems of teaching psychology at the undergraduate and graduate levels; curriculum design and evaluation. Practical experience in the preparation and presentation of material.

*Prerequisite(s):* Consent of instructor; advanced graduate standing in Psychology or a closely related discipline.

*Learning Activities:* Lecture 6 hour(s), Discussion 6 hour(s), Practice 6 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PSC 390B – The Teaching of Psychology (4 units)**

*Course Description:* Methods and problems of teaching psychology at the undergraduate and graduate levels; curriculum design and evaluation.

Practical experience in the preparation and presentation of material.

*Prerequisite(s):* Consent of instructor; advanced graduate standing in Psychology or a closely related discipline.

*Learning Activities:* Discussion 6 hour(s), Lecture 4 hour(s), Practice 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PSC 391 – Teaching of Psychology Practicum (4 units)**

*Course Description:* Supervised teaching in undergraduate classrooms.

Techniques for delivering content through lectures, discussions, or labs; course administration; communications; assessment of student learning; solving ethical problems; instructional technology.

*Prerequisite(s):* PSC 390; or consent of instructor.

*Learning Activities:* Seminar 1 hour(s), Fieldwork.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**PSC 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Public Health Sciences (SPH)****School of Medicine****SPH 092 – Internship in Community Health (1-12 units)**

*Course Description:* Students apply theory and concepts learned in the classroom through field work in a community health agency.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**SPH 099 – Research in Community & International Health (1-12 units)**

*Course Description:* Work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics.

*Prerequisite(s):* Consent of instructor; undergraduate standing.

*Learning Activities:* Variable 3-35 hour(s).

*Repeat Credit:* May be repeated 12 unit(s) with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**SPH 101 – Introduction to Public Health (3 units)**

*Course Description:* Provide basic concepts and controversies in public health, basic science of public health, social and behavioral factors in health and disease, environmental and occupational health issues, the relationship of public health to the medical care system and health care reform.

*Prerequisite(s):* Undergraduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**SPH 102 – Introduction to Human Epidemiology (4 units)**

*Course Description:* Practice of epidemiology as it relates to human populations. Content is fundamental to the Public Health minor and a required core course.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**SPH 103 – Introduction to Health Economics, Services, Policy, Administration & Management (3 units)**

*Course Description:* American health care system and how public health leaders, administrators, and researchers can make effective contributions to the populations served.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to undergraduates in senior standing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

**SPH 104 – Globalization & Health: Evidence & Policies (3 units)**

*Course Description:* Provides an overview of the evidence on the multiple effects of globalization policies on health.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

**SPH 106 – Intermediate Human Epidemiology (4 units)**

*Course Description:* Principles of epidemiological methods including causal inference, sources of bias such as confounding, effect measure modification, screening, and interpreting statistical tests of significance. Ethics and history of epidemiology.

*Prerequisite(s):* NUT 113 C or better or GDB 101 C or better or SPH 102 C or better.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**SPH 107V – Foundations of Epidemiology (4 units)**

*Course Description:* Foundations of epidemiology. Distribution and determinants of disease and injury in populations. Practice of epidemiology as it relates to human populations. Relationship of epidemiology to public health.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open to students who took SPH 102 or equivalent course from their institution.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **SPH 108 – Introduction to Program Planning & Evaluation (3 units)**

*Course Description:* Appropriate techniques of community assessment, planning strategies, data collection, data analysis & evidence-based decision-making.

*Learning Activities:* Learning/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **SPH 109 – History of Epidemiology in Public Health (2 units)**

*Course Description:* Historic events in public health and the epidemiology that paved the way for disease control and prevention.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Domestic Diversity (DD).

## **SPH 111 – Evaluation & Research Methods in Public Health (3 units)**

*Course Description:* Evaluation of programs for professionals in the healthcare, social science, economic and business fields. Evaluations to be conducted for both internal and external purposes.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **SPH 113 – Health Disparities in the U.S. (3 units)**

*Course Description:* Introduction to the principles and practice of health disparities research.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **SPH 120 – Introduction to Health Informatics (3 units)**

*Course Description:* Introduction to concepts of health informatics and the impacts of the field on healthcare, research and public health.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **SPH 121 – Health Informatics Systems (3 units)**

*Course Description:* Health Informatics with a focus on Information Technology. Data gathering, manipulating, storing, retrieving, and classifying.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 1.5 hour(s), Laboratory 1.5 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **SPH 122 – Data Organization & Visualization in Health Informatics (3 units)**

*Course Description:* Approaches to organizing and representing health data with a focus on visualization. Components of health data, visualization tools, methods and users for decision-making and analysis.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 1.5 hour(s), Laboratory 1.5 hour(s), Extensive Problem Solving, Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **SPH 132 – Health Issues Confronting Asian Americans & Pacific Islanders (4 units)**

*Course Description:* Health issues confronting Asian Americans & Pacific Islanders.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* ASA 132.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SPH 160 – General Health Education & Prevention (5 units)**

*Course Description:* Topics include addiction, substance abuse/prevention, nutrition, stress management, physical fitness, body image, reproductive anatomy & physiology, contraceptive options, safer sex, sexual health, healthy relationships, and other general wellness/health promotion topics. Practice in peer counseling and outreach presentations.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students in the internship program for the Health Education Program only; limited to 50 students.

*Grade Mode:* Pass/No Pass only.

## **SPH 161 – Campus Alcohol/Other Drug Abuse Prevention Program Peer Educator Training (4 units)**

*Course Description:* Preparation for internship in campus and community substance abuse prevention and educational intervention. Addiction and other physiological responses to alcohol and other drugs. Harm-reduction strategies for individuals and target populations. Practice in peer counseling skills and outreach presentations to groups.

*Prerequisite(s):* SPH 160 (can be concurrent); and consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Practice 1 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SPH 162 – Health Advocates Peer Educator Training (4 units)**

*Course Description:* Preparation for internship in campus and community health promotion and risk reduction. Nutrition, stress management, physical fitness, body image and disordered eating, skin cancer prevention, and other general wellness/health promotion topics.

*Prerequisite(s):* SPH 160 (can be concurrent); and consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Practice 1 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SPH 180 – Gun Violence: An Interdisciplinary Perspective (2 units)**

*Course Description:* Interdisciplinary approach to understanding the causes, consequences and prevention of gun violence.

*Prerequisite(s):* Required to read and interpret quantitative studies; previous coursework involving research design or data analysis, such as ECN 102 or SPH 102, highly recommended.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SPH 190 – Topics in Public Health (1 unit)**

*Course Description:* Seminar on key issues and current topics in public health.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Pass one restricted to undergraduate seniors.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**SPH 190C – Research Conference in Community & International Health (1 unit)**

*Course Description:* Weekly conference on research problems, progress, and techniques in Community and International Health. Critical discussion of recent journal articles.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**SPH 192 – Internship in Community Health Practice (1-12 units)**

*Course Description:* The student, through fieldwork in a community health agency, learns to apply theory and concepts learned in the classroom.

*Prerequisite(s):* Consent of instructor. Upper division and graduate students.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**SPH 198 – Study in Community & International Health (1-5 units)**

*Course Description:* Study and experience for undergraduate students in any number of areas in community and international health.

*Prerequisite(s):* Consent of instructor; undergraduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**SPH 199 – Research in Community & International Health (1-5 units)**

*Course Description:* Student will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics.

*Prerequisite(s):* Consent of instructor; undergraduate standing.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**SPH 201 – Introduction to Public Health (3 units)**

*Course Description:* Provides an overview of public health. Covers the history of public health in the U.S.; defines its major functions and constituencies; and, introduces fundamental principles of epidemiology, biostatistics, behavioral sciences, environmental health, infectious diseases, and reducing health disparities.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**SPH 202 – Public Health Issues in California's Central Valley (3 units)**

*Course Description:* Public health issues in California's Central Valley, including the influences of migration, racial and ethnic diversity, the agricultural industry, environmental exposures, and rurality.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**SPH 203 – Learning & Teaching in Public Health Contexts (2 units)**

*Course Description:* Aimed at current and future public health professionals interested in learning more about the educational potential for interactions with community members and other health professionals, all stakeholders in improving the health of communities.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

**SPH 204 – Globalization & Health: Evidence & Policies (3 units)**

*Course Description:* Provides an overview of the evidence on the multiple effects of globalization policies on health.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to graduate student standing.

*Grade Mode:* Letter.

**SPH 205AY – Epidemiology for Health Professionals (4 units)**

*Course Description:* Basic epidemiologic concepts and approaches to epidemiologic research, with examples from human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Web Virtual Lecture 2 hour(s).

*Grade Mode:* Letter.

**SPH 207 – Advanced Epidemiologic Methodology (4 units)**

*Course Description:* In-depth integration of advanced epidemiological concepts. Theory, methods, and applications for observational studies including random and systematic error, confounding, counterfactuals, causal inference, effect modification, internal and external validity, estimability, and interpretation of effect measures, and advanced study designs.

*Prerequisite(s):* EPI 206.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* EPI 207.

*Grade Mode:* Letter.

**SPH 208 – Principles & Applications of Cancer Prevention & Control (2 units)**

*Course Description:* Principles and applications of cancer prevention and control from a public health perspective.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 209 – History of Epidemiology in Public Health (2 units)**

*Course Description:* Introduction to the history of epidemiology in solving major public health problems. Original historical articles will be read/discussed. Topics may include: infectious disease, accidents/adverse events, nutritional deficiencies, community vaccination trials, occupational exposures, cancer, birth defects, cardiovascular disease, and smoking.

*Learning Activities:* Lecture 0.50 hour(s), Discussion 1.50 hour(s).

*Cross Listing:* EPI 209.

*Grade Mode:* Letter.

## **SPH 210 – Public Health Informatics (2 units)**

*Course Description:* Collection, verification, and utilization of data related to populations; infrastructure, functions, and tools used to generate public health knowledge supporting public health practices and policy development/dissemination.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 212 – Migration & Health (3 units)**

*Course Description:* Principles of migration and health. Topics will include demographics, public health invention programs, health care delivery, occupational health, and effects of international migration on the health in communities of origin, transit and destination. Guest presentations by outside experts.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **SPH 213 – Health Disparities in the U.S. (3 units)**

*Course Description:* Introduction to the principles and practice of health disparities research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Students.

*Grade Mode:* Letter.

## **SPH 214 – Scientific Proposal Writing (3 units)**

*Course Description:* Components and writing of research proposals for agencies such as the NIH and NSF.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2.5 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to Public Health Ph.D. students.

*Grade Mode:* Satisfactory/Unsatisfactory Only.

## **SPH 215 – GIS for Public Health (3 units)**

*Course Description:* Concepts and components of a geographic information system (GIS) and essential skills of operating a functional GIS through the use of ArcGIS software package. Operational processes of spatial data acquisition, editing and QA/QC, metadata development, geodatabase design, spatial query and display, spatial analysis and modeling, preliminary GIS application development, cartographic mapping and dynamic visualization, and GIS implementation basics.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **SPH 222 – Social & Behavioral Aspects of Public Health (3 units)**

*Course Description:* Theories and strategies of health behavior change at the individual, group, community, and environmental levels. Examples include: transtheoretical model, social networks, and social marketing. Theories are applied to solve common public health problems (cancer, obesity, smoking, and HIV/AIDS).

*Prerequisite(s):* STA 102; STA 106; and consent of instructor; graduate standing.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **SPH 223 – Obesity Prevention in Community Settings (3 units)**

*Course Description:* Look at causes of the obesity epidemic in the U.S.; identify and critically assess the research literature on various prevention strategies; understand, and apply evidence-based public health strategies to combat obesity; and translate the science to a general audience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **SPH 232 – Health Communication (4 units)**

*Course Description:* Health communication theories and research traditions. Topics include consumer health information seeking; physician-patient interaction; information, social marketing, "edutainment," and media advocacy campaigns; social networks and coping; media influences on health; and new communication technologies in health promotion and healthcare delivery.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Cross Listing:* CMN 232.

*Grade Mode:* Letter.

## **SPH 233 – Persuasive Technologies for Health (4 units)**

*Course Description:* Theorizing, designing and evaluating ethical technology-based health communication interventions. Uses of social media, mobile communication apps, wearable devices, computer-generated tailored messages, educational games, and computational approaches in health promotion and healthcare delivery.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* CMN 233.

*Grade Mode:* Letter.

## **SPH 235 – Health Communication Campaigns (4 units)**

*Course Description:* Principles of health communication campaign planning, implementation and evaluation. Strategies for changing health behaviors, shaping policy, and improving healthcare organizations' relations with stakeholders.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Cross Listing:* CMN 235.

*Grade Mode:* Letter.

**SPH 244 – Introduction to Medical Statistics (4 units)**

*Course Description:* Introduction to statistical methods and software in clinical, laboratory and population medicine. Graphical and tabular presentation of data, probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Only 1 unit of credit for students who have completed STA 100 or MPM 402.

*Cross Listing:* CLH 244.

*Grade Mode:* Letter.

**SPH 245 – Biostatistics for Biomedical Science (4 units)**

*Course Description:* Analysis of data and design of experiments for laboratory data.

*Prerequisite(s):* CLH 244 or SPH 244; or an equivalent course and consent of instructor.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* CLH 245.

*Grade Mode:* Letter.

**SPH 246 – Biostatistics for Clinical Research (4 units)**

*Course Description:* Emphasizes critical biostatistics for clinical research and targets biomedical audience. Students will develop understanding for basic planning and analysis of clinical studies and learn to develop collaborations with biostatisticians.

*Prerequisite(s):* SPH 245 or CLH 245.

*Learning Activities:* Lecture 4 hour(s).

*Repeat Credit:* May be repeated.

*Cross Listing:* CLH 246.

*Grade Mode:* Letter.

**SPH 247 – Statistical Analysis for Laboratory Data (4 units)**

*Course Description:* Statistical methods for experimental design and analysis of laboratory data including gene expression arrays, RNA-Seq, and mass spec.

*Prerequisite(s):* CLH 245 or SPH 245.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* CLH 247.

*Grade Mode:* Letter.

**SPH 252 – Social Epidemiology (2 units)**

*Course Description:* Social determinants of health; psychosocial and physiological pathways; health and social inequality; gender and racial/ethnic disparities in health; social support, social cohesion and health; social gradient in behavioral risk factors; social ecological approaches to health intervention; interventions addressing social determinants.

*Prerequisite(s):* EPI 205A; and consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Cross Listing:* EPI 252.

*Grade Mode:* Letter.

**SPH 255 – Human Reproductive Epidemiology (3 units)**

*Course Description:* Human reproductive effects and risk of reproductive disorders, examined from macro- and micro-environmental exposures in community and occupational settings, epidemiologic study designs and analyses.

*Prerequisite(s):* MPM 405; MPM 406; PHY 220; PGG 222; or equivalents or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**SPH 262 – Principles of Environmental Health Science (3 units)**

*Course Description:* Principles, approaches and issues related to environmental health. Recognizing, assessing, understanding and controlling the impact of people on their environment and the impact of the environment on the public.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**SPH 264 – Public Health Econometrics (2 units)**

*Course Description:* Principles of demand and supply; elasticity; benefits and costs; least squares regression; stepwise regression; economic and statistical significance; fixed and random effects; longitudinal data; non-linear relations; continuous and binary variables; instrumental variables; attrition bias; tobit regression; Two-part cost model.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SPH 266 – Applied Analytic Epidemiology (3 units)**

*Course Description:* Principles and applications in analysis of epidemiologic data. Methods of analyzing stratified and matched data, logistic regression for cohort and case-control studies, Poisson regression, survival-time methods.

*Prerequisite(s):* MPM 404; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 2 hour(s).

*Cross Listing:* PHR 266.

*Grade Mode:* Letter.

**SPH 273 – Health Services Administration (3 units)**

*Course Description:* Structure and function of public and private medical care. Topics include categories and trends in national medical spending, predictors of patient use, causes of death, managed care, HMOs, Medicare, Medicaid, costs of technology, and medical care in other countries.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

**SPH 274 – Economic Evaluation in Health Care (3 units)**

*Course Description:* Cost-effectiveness/cost-benefit analysis (CE/CBA) methods among various economic evaluation methods. CE/CBA is increasingly used to evaluate alternative choices in public health and clinical practice and to enlighten and inform health policy determinations.

*Prerequisite(s):* At least one semester of graduate level Statistics or consent of instructor.

*Learning Activities:* Lecture/Lab 3 hour(s).

*Grade Mode:* Letter.

## **SPH 276 – Critical Assessment in Health Policy & Economics (2 units)**

*Course Description:* Aims to develop critical reading skills of the health policy and health economics literature, mainly following the microeconomic paradigm and analytical techniques. Some basic concepts of micro economic theory will be explained.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

## **SPH 277 – Net Benefit Regression (3 units)**

*Course Description:* Uses regression methods for cost-effectiveness analysis. Focus on methods that create and explain economic information in person-level data.

*Prerequisite(s):* STA 100 or SPH 244 or MPM 202; or consent of instructor.

Graduate student standing.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to graduate students only.

*Grade Mode:* Letter.

## **SPH 280 – Introduction to SAS Programming (3 units)**

*Course Description:* Introduction to SAS, an integrated software system for data retrieval and management, data manipulation and programming.

*Prerequisite(s):* Introductory statistics course; e.g., MPM 402, STA 102.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* EPI 280.

*Grade Mode:* Letter.

## **SPH 281 – Data Management in SAS (1 unit)**

*Course Description:* SAS programming for graduate students in the public health sciences or other fields who plan to use SAS software for data analysis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion/Laboratory 1.50 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 283 – Program Planning & Evaluation (3 units)**

*Course Description:* Assessment of population needs, assets and capacities that affect communities' health. Design and selection of methods for evaluating a population-based program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

## **SPH 290 – Topics in Public Health (1 unit)**

*Course Description:* Key issues and current topics in public health. Begins in August summer session II. Must enroll in August, then Fall and Winter. Course is a series but grades and units are given at end of each quarter.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to Graduate Students.

*Repeat Credit:* May be repeated 10 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 291 – Public Health Sciences Doctoral Seminar (1 unit)**

*Course Description:* Seminar to explore research on translational science and rural health; includes presentations of student research in progress.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 6 time(s) when topic differs; with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 292A – Public Health Translational Science Rotation (1-7 units)**

*Course Description:* Public Health Translational Science Rotation for Ph.D. students in Public Health Sciences.

*Prerequisite(s):* Ph.D. student in Public Health Sciences or consent of instructor.

*Learning Activities:* Variable 1-7 hour(s).

*Repeat Credit:* May be repeated 8 unit(s) with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 292B – Public Health Translational Science Rotation (1-7 units)**

*Course Description:* Public Health Translational Science Rotation for Ph.D. students in Public Health Sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-3 hour(s).

*Enrollment Restriction(s):* Open to Ph.D. students in Public Health Sciences.

*Repeat Credit:* May be repeated 8 unit(s) with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 295 – International Health (2 units)**

*Course Description:* Forum for learning health issues and health care systems in other countries. Topics include health care for refugees, the impact of political strife on health, the health care professional in international settings.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 297 – Public Health Practicum (1-16 units)**

*Course Description:* Practical fieldwork experience in public health.

Placement site will vary based on the interest and experience of each student.

*Prerequisite(s):* Consent of instructor; open to Master of Public Health students.

*Learning Activities:* Variable 3-32 hour(s).

*Repeat Credit:* May be repeated 4 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 298 – Study in Community & International Health (1-5 units)**

*Course Description:* Study and experience for graduate students in any number of areas in community and international health.

*Prerequisite(s):* Consent of instructor; graduate student in good academic standing.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 299 – Research in Community & International Health (1-12 units)**

*Course Description:* Work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 3-36 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 402 – Introductory Medical Spanish (2 units)**

*Course Description:* The vocabulary needed to conduct a basic history and physical examination in Spanish.

*Prerequisite(s):* Medical student or consent of instructor.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SPH 461 – Clerkship in Community Health Group Practice (3-9 units)**

*Course Description:* Overview of local community health in group practice situations. Students participate in treatment at several clinic sites in Yolo County. Topics include primary care, environmental health, maternal and child health, jail health, and preventive health care for the aged.

*Prerequisite(s):* Third-or fourth-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SPH 465 – Community Health Preceptorship (3-18 units)**

*Course Description:* Participate at state or county health department or other public health organization in on-going investigations into current public health problems, e.g., birth defects, cancer control, diabetes, hypertension, injury control, infectious diseases, aging, Alzheimer's disease, and smoking and tobacco use control.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity 5-40 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SPH 466 – Occupational & Environmental Medicine Elective (6-12 units)**

*Course Description:* Participate in activities of Occupational and Environmental Health Unit. Major activity is involvement in an epidemiologic research project of the University. Participate in Occupational and Environmental Medicine Clinic at UC Davis Medical Center and other sites, as arranged.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity, Laboratory, Variable 6-12 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SPH 470 – Clinical Selective in Occupational & Environmental Medicine (3-6 units)**

*Course Description:* Outpatient clinical experience in Occupational and Environmental Medicine at UCDMC and other sites, as arranged. Gain experience in evaluating occ/env medical conditions, use of medical literature resources, the worker's compensation system, and toxicological principles.

*Prerequisite(s):* Consent of instructor; fourth-year medical student in good academic standing.

*Learning Activities:* Clinical Activity 9-18 hour(s).

*Credit Limitation(s):* Students may take up to four weeks for 6 units.

*Grade Mode:* Honors/Pass/Fail.

## **SPH 480 – Insights in Occupational & Environmental Medicine (1-3 units)**

*Course Description:* Observe and participate in research and clinical activities in occupational and environmental medicine which include conferences, occupational and environmental medicine clinical activities and field visits. Develop and present small individual research projects.

*Prerequisite(s):* Consent of instructor; first- or second-year medical student in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Pass/Fail only.

## **SPH 495 – International Health (2 units)**

*Course Description:* Forum for learning health issues and health care systems in other countries. Topics include health care for refugees, the impact of political strife on health, the health care professional in international settings.

*Prerequisite(s):* Consent of instructor; medical student in good academic standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SPH 496 – Current Issues in Public Health (1 unit)**

*Course Description:* Topical issues in public health. Speakers from the local public health community address issues such as disease control programs, access to care.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/Fail only.

## **SPH 498 – Study in Public Health Sciences (1-6 units)**

*Course Description:* Study and experience for medical students in areas in community and international health.

*Prerequisite(s):* Consent of instructor; medical student in good academic standing.

*Learning Activities:* Variable 3-18 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **SPH 499 – Research in Public Health Sciences (1-9 units)**

*Course Description:* Work with faculty member in areas of research interest, including but not limited to public health, injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women's health, and health demographics.

*Prerequisite(s):* Medical students with consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Pulmonary Medicine (PUL)**

## School of Medicine

### **PUL 192 – Internship in Pulmonary Medicine (1-12 units)**

*Course Description:* Supervised work experience in pulmonary medicine.

*Prerequisite(s):* Consent of instructor; upper division standing; approval of project by preceptor prior to internship.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

### **PUL 299 – Pulmonary Disease Research (1-12 units)**

*Course Description:* Pulmonary disease research activity with focus in inhalation toxicity, oxidants or lung biochemistry, and cell and molecular biology.

*Prerequisite(s):* Consent of instructor; by arrangement only.

*Learning Activities:* Laboratory.

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **PUL 460 – Comprehensive Pulmonary Medicine Clerkship (3-6 units)**

*Course Description:* Rotation intended to provide a comprehensive student education in Pulmonary Medicine. Students will participate in hands on clinical education, as well as completing an assigned curricula. Intended for students pursuing Internal Medicine & Primary Care careers.

*Prerequisite(s):* Completion of second year of medical school and/or consent of instructor; completion of Internal Medicine Clerkship.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

### **PUL 461 – Critical Care Clinical Clerkship (3-6 units)**

*Course Description:* Rotation intended to provide student education in the Critical Care Management of sub-specialty patients.

*Prerequisite(s):* Completion of second year of medical school and/or consent of instructor; completion of Internal Medicine and Surgical Clerkships.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PUL 462 – Pulmonary Consult Clerkship (3-6 units)**

*Course Description:* Similar to PUL 460. Rotation designed for students interested in learning pulmonary medicine, but who desire more variety in their clerkships, and do not desire the comprehensive experience offered by a four-week pulmonary rotation.

*Prerequisite(s):* Completion of second year of medical school and/or consent of instructor; completion of Internal Medicine Clerkship.

*Learning Activities:* Clinical Activity 35 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PUL 464 – Away Advanced Clerkship in Pulmonary Medicine (3-12 units)**

*Course Description:* Away advanced clerkship in Pulmonary Medicine.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **PUL 470 – Practicum in Care of the Terminally Ill (3-6 units)**

*Course Description:* Work with hospice interdisciplinary team. Direct experience in the care of patients with illnesses where no cure is possible. Emphasis on symptom relief, end of life issues, physician assisted suicide.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 35 hour(s), Seminar 5 hour(s), Variable 3-6 hour(s).

*Enrollment Restriction(s):* Restricted to fourth-year Medical students in good standing.

*Grade Mode:* Honors/Pass/Fail.

## **PUL 475 – Encounters in Ethics in the ICU (3-6 units)**

*Course Description:* Care for critically ill adults with complex medical disease carries with it unique ethical roles and duties for the physician.

*Prerequisite(s):* Fourth-year Medical Student.

*Learning Activities:* Clinical Activity 12 hour(s), Lecture/Discussion 6 hour(s), Independent Study 6 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **PUL 480 – Pulmonary-Critical Care Medicine Insights (1-3 units)**

*Course Description:* Attend respiratory outpatient clinics and in-patient pulmonary consultation rounds and medical intensive care rounds.

Introduction to diagnosis and treatment of common pulmonary problems.

*Prerequisite(s):* Consent of instructor; student in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **PUL 499 – Research (1-12 units)**

*Course Description:* Research opportunity in Pulmonary Medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Punjabi (PUN)**

## College of Letters & Science

**PUN 001V – Elementary Punjabi (5 units)**

*Course Description:* Introduction to listening, speaking, reading, and writing skills in Punjabi and to Punjabi culture.

*Learning Activities:* Web Electronic Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

**PUN 002V – Elementary Punjabi (5 units)**

*Course Description:* Continuation of PUN 001V. Introduction to listening, speaking, reading, and writing skills in Punjabi and to Punjabi culture.

*Prerequisite(s):* PUN 001V; or consent of instructor.

*Learning Activities:* Web Electronic Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PUN 003V – Elementary Punjabi (5 units)**

*Course Description:* Continuation of PUN 002V. Introduction to listening, speaking, reading, and writing skills in Punjabi and to Punjabi culture.

*Prerequisite(s):* PUN 002V; or consent of instructor.

*Learning Activities:* Web Electronic Discussion 5 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PUN 021 – Intermediate Punjabi (4 units)**

*Course Description:* Integrated listening, speaking, reading, and writing skills in formal and informal contexts in Intermediate Punjabi.

Continuation of fluency acquisition through grammar, vocabulary, and meaningful verbal and written expressions in Punjabi. Short readings and essays in Punjabi literature and culture.

*Prerequisite(s):* PUN 003V; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**PUN 022 – Intermediate Punjabi (4 units)**

*Course Description:* Integrated listening, speaking, reading, and writing skills in formal and informal contexts in Intermediate Punjabi.

Continuation of fluency acquisition in grammar, vocabulary, and meaningful verbal and written expression in Punjabi. Short final essay about topics in Punjabi literature and culture.

*Prerequisite(s):* PUN 021; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**PUN 023 – Intermediate Punjabi (4 units)**

*Course Description:* Integrated listening, speaking, reading, and writing skills in formal and informal contexts in Intermediate Punjabi. Greater comprehension and production of meaningful verbal and written expression in Punjabi. Final research project related to topics in Punjabi literature and culture.

*Prerequisite(s):* PUN 022; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**Radiation Oncology (RON)**

School of Medicine

**RON 199 – Special Study for Advanced Undergraduates: Research in Radiation Biology (1-5 units)**

*Course Description:* Radiation Oncology is a unique discipline combining elements of clinical practice linked to complex physics based dosimetry and treatment planning. Included within this clinical environment is a strong basis in biology that underpins the clinical effectiveness of radiation treatment.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**RON 211 – Introduction to Radiation Oncology Physics (3-6 units)**

*Course Description:* Introduction to radiation oncology physics. Overview of treatment methodologies. Medical physics equipment. Treatment machine dosimetry, including calibration. Machine quality assurance. Patient dosimetry. Treatment planning. Simulation and treatment. Treatment quality assurance, including calculation checks and chart checks. Brachytherapy.

*Prerequisite(s):* Consent of instructor; restricted to physics and engineering graduate students and senior undergraduate physics majors.

*Learning Activities:* Variable.

*Enrollment Restriction(s):* Limited to 3 students.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**RON 299 – Independent Study & Research (1-12 units)**

*Course Description:* Research under supervision of Radiation Oncology faculty. Work must be appropriate to fulfill the requirements for the Ph.D. degree.

*Prerequisite(s):* Enrollment with a graduate group for Ph.D. candidacy and consent of group advisor and sponsor.

*Learning Activities:* Laboratory 3-40 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**RON 420 – Radiobiology Lecture Course (1 unit)**

*Course Description:* Radiobiology lectures are designed to engage the physician residents, physics residents and medical students in learning Radiobiology principles and concepts during the year the Radiation Physics course is taught.

*Prerequisite(s):* BIS 001A; MAT 012; PHY 001A.

*Learning Activities:* Lecture 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail.

**RON 463 – Radiation Oncology Clerkship (3-9 units)**

*Course Description:* Introduction to radiation oncology. Students will participate in workup and treatment planning for radiation oncology patients and will be introduced to the concepts involved in clinical radiation oncology, radiation biology, and radiation physics.

*Prerequisite(s):* MDS 430; MDS 431; third-year clinical clerkship; consent of instructor required.

*Learning Activities:* Clinical Activity 30 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**RON 464 – Radiation Oncology Away Clerkship (3-9 units)**

*Course Description:* Away Advanced Clerkship in Radiation Oncology.

*Learning Activities:* Clinical Activity 30 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **RON 465 – Externship in Radiation Oncology (3-16 units)**

*Course Description:* Externship provides in-depth exposure to the field of Radiation Oncology for students who rotate through an affiliated institution.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **RON 499 – Independent Study & Research in Therapeutic Radiology (1-18 units)**

*Course Description:* Advanced-level research seminar in clinical and/or translational radiation oncology. Work with the course instructor to generate a testable hypothesis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Radiology-Diagnostic (RDI)**

School of Medicine

## **RDI 413 – Radiological Diagnosis II (Physics of Diagnostic Radiology) (5 units)**

*Course Description:* Physics of diagnostic imaging; x-ray production and interaction; image formation; modulation transfer function; fluoroscopy; cine fluoroscopy; stereoscopy; xeroradiography; computerized and geometrical tomography; magnetic resonance and ultrasound. Principles of radiation protection in imaging will be covered.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 49 hour(s), Laboratory 6 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **RDI 414 – Medical Radiation Biology (3 units)**

*Course Description:* Medical radiation biology; molecular cellular and organ system response to acute and chronic irradiation; radiation carcinogenesis and genetic effects; radiation risk assessment; diagnostic ultrasound and magnetic resonance imaging health effects. Medical/legal considerations of radiation exposure.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 27 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **RDI 430 – Introduction to Clinical Radiology (3-9 units)**

*Course Description:* Introduces students to common radiology tests, including limitations and risks by using ACR Appropriateness Criteria and incorporate patient specific clinical data into ordering and interpreting appropriate imaging tests.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **RDI 461 – Advanced Clinical Clerkship in Diagnostic Radiology (3-6 units)**

*Course Description:* Work with clinical Radiologists in image interpretation fluoroscopy angiography image-guided intervention cardiac stress testing radionuclide therapy. Daily conferences in Radiology Diagnosis and Therapy Health Physics Radiation Safety. Prepare two clinical cases for in-class presentation. Assigned readings.

*Prerequisite(s):* Consent of instructor; satisfactory completion of second-year medical school curriculum and of third-year clerkships in Internal Medicine and General Surgery.

*Learning Activities:* Clinical Activity 35 hour(s), Conference 4 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Restricted to eight students per rotation; open to visiting medical students from accredited programs.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **RDI 462 – Diagnostic Imaging of Acquired & Congenital Heart Disease (2 units)**

*Course Description:* Main emphasis on radiology of acquired and congenital heart disease, but also on magnetic resonance, nuclear medicine, and echocardiography of heart diseases.

*Prerequisite(s):* RDI 461 (can be concurrent); fourth-year medical student in good academic standing.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **RDI 473 – Advanced Clinical Clerkship in Neuroradiology (3-6 units)**

*Course Description:* Work with Neuroradiologists in image interpretation of CT, MRI, and fluoroscopy. Opportunity to participate in assessment of Neurointerventional patients, and to observe Neurointerventional procedures. Daily conferences in Neuroimaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings.

*Prerequisite(s):* Fourth-year medical student with interest in Diagnostic Radiology, Neuroradiology, Neurology, Neurosurgery, Psychiatry, Psychology, or related field; satisfactory completion of RDI 461, or the equivalent, is strongly encouraged.

*Learning Activities:* Clinical Activity 35 hour(s), Conference 4 hour(s), Independent Study 1 hour(s), Variable 9-18 hour(s).

*Enrollment Restriction(s):* Restricted to one student per two-week or four-week rotation.

*Credit Limitation(s):* Credit limited to 3 units for two weeks; 6 units for four weeks.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## RDI 474 – Advanced Clinical Clerkship in Pediatric Radiology (3-6 units)

**Course Description:** Participation in the radiological care of Pediatric patients; evaluate the patient receiving the radiographic study, including pertinent historical/physical findings. Student expected to write up case files on interesting cases encountered during their rotation.

**Prerequisite(s):** Fourth-year medical students with interest in Radiology and/or Pediatrics; interested third-year medical students who have successfully completed Pediatrics clinical clerkships may enroll, given availability and consent of the instructor of record; prior completion of PDI 461, or the equivalent, encouraged.

**Learning Activities:** Clinical Activity 30 hour(s), Conference 5 hour(s), Film Viewing 3 hour(s), Independent Study 2 hour(s).

**Enrollment Restriction(s):** Restricted to two students per two-week or four-week rotation.

**Credit Limitation(s):** Credit limited to 3 units for two weeks; 6 units for four weeks.

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## RDI 475 – Advanced Clinical Clerkship in Musculoskeletal Radiology (MSK) (3-6 units)

**Course Description:** Work with Musculoskeletal Radiologists in interpretation of CT, MRI, radiography, and fluoroscopy. Opportunity to assess patients for, and to observe image-guided procedures. Daily conferences in Musculoskeletal Imaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings.

**Prerequisite(s):** Fourth-year medical student with interest in Musculoskeletal Radiology, Orthopedic Surgery, Sports Medicine, PMNR, or related field; satisfactory completion of RDI 461, or the equivalent, is strongly encouraged.

**Learning Activities:** Clinical Activity 35 hour(s), Conference 4 hour(s), Discussion/Laboratory 1 hour(s), Variable 9-18 hour(s).

**Enrollment Restriction(s):** Restricted to one student per two-week or four-week rotation.

**Credit Limitation(s):** Credit limited to 3 units for two weeks; 6 units for four weeks.

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## RDI 476 – Advanced Clinical Clerkship Vascular/Interventional Radiology (IR) (3-6 units)

**Course Description:** Medical student will work with Vascular/Interventional Radiologists in the evaluation of patients for interventional procedures. There will be opportunities to Daily conferences in Neuroimaging, General Radiology, Health Physics, and Radiology Safety. Assigned readings.

**Prerequisite(s):** Fourth-year medical student with interest in Diagnostic Radiology, Vascular/Interventional Radiology, Cardiovascular Imaging, Cardiology, Cardiovascular Surgery, Surgical Oncology, General Surgery, or related field; satisfactory completion of RDI 461, or the equivalent, is strongly encouraged.

**Learning Activities:** Clinical Activity 35 hour(s), Conference 4 hour(s), Discussion/Laboratory 1 hour(s), Variable 9-18 hour(s).

**Enrollment Restriction(s):** Restricted to one student per two-week or four-week rotation.

**Credit Limitation(s):** Credit limited to 3 units for two weeks; 6 units for four weeks.

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## RDI 477 – Advanced Clinical Clerkship in Ultrasound Radiology (3-6 units)

**Course Description:** Participation as an active team member on a busy clinical ultrasound service.

**Prerequisite(s):** Fourth-year medical student with interest in Radiology, OB/GYN, or in other medical or surgical subspecialties employing ultrasound in their clinical practice; prior completion of RDI 461, or the equivalent, is encouraged.

**Learning Activities:** Clinical Activity 30 hour(s), Conference 5 hour(s), Film Viewing 3 hour(s), Variable 9-18 hour(s).

**Enrollment Restriction(s):** Restricted to two students per two-week or four-week rotation.

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## RDI 478 – Advanced Clinical Clerkship Abdominal Imaging (3-6 units)

**Course Description:** Work with clinical Radiologists on abdominal and pelvic CT, MR, ultrasound, digital radiography, gastrointestinal and genitourinary procedures, image-guided intervention. Offered as a two-week rotation for third-year medical students and a two/four-week rotation for fourth-year medical students.

**Learning Activities:** Clinical Activity 35 hour(s), Conference 4 hour(s), Discussion/Laboratory 1 hour(s), Variable 9-18 hour(s).

**Enrollment Restriction(s):** Restricted to one student per two-week or four-week rotation.

**Credit Limitation(s):** Credit limited to 3 units for two weeks; 6 units for four weeks.

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## RDI 479 – Specialty Externship in Radiology (3-16 units)

**Course Description:** Externship provides in-depth exposure to one of a variety of sub-specialties in Radiology.

**Learning Activities:** Clinical Activity 25 hour(s), Discussion 10 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## RDI 480 – Away Acting Internship in Radiology (3-6 units)

**Course Description:** Away Acting Internship rotation for Radiology and Nuclear Medicine.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Clinical Activity 40 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Honors/Pass/Fail.

## RDI 498 – Group Study in Diagnostic Radiology (1-12 units)

**Course Description:** Group study in diagnostic radiology.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Variable.

**Grade Mode:** Honors/Pass/Fail.

## RDI 499 – Research in Diagnostic Radiology (1-12 units)

*Course Description:* Approved for graduate degree credit.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# Radiology-Nuclear Medicine (RNU)

School of Medicine

## RNU 198 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## RNU 199 – Special Study for Advanced Undergraduates (1-5 units)

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## RNU 299 – Research: Special Study for Graduate Students (1-12 units)

*Course Description:* Special study for graduate students.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## RNU 401 – Biomedical Radiochemistry (3 units)

*Course Description:* Approved for graduate degree credit. Designed to combine basic nuclear physics, chemistry, and biology into a comprehensive and vigorous lecture-laboratory experience in biomedical nuclear chemistry. Subjects include choice and purification of appropriate gamma & beta radioisotopes, compounding biological pharmacodynamics and radioimmunoassay.

*Prerequisite(s):* Consent of instructor; open to graduate and medical students.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## RNU 411 – Radiological Physics I (Physics of Nuclear Medicine) (5 units)

*Course Description:* Physics of diagnostic and therapeutic nuclear medicine, nuclear physics, radioactive decay; interaction of ionizing radiation; dosimeters; attenuation; internal and external dosimetry; health physics; radiation detection and imaging, scintillation cameras, computerized planar and tomographic imaging. Offered at UC Davis Medical Center.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 43 hour(s), Laboratory 12 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## RNU 463 – Clinical Clerkship in Nuclear Medicine (3-8 units)

*Course Description:* Clerkship correlates radioisotopic methods with clinical, pathophysiological, and other diagnostic aspects of the patients care. Each patient reviewed with student by faculty member. Reading assignments, informal projects, and research techniques available.

*Prerequisite(s):* Consent of instructor; satisfactory completion of second-year medical school; RDI 461 recommended.

*Learning Activities:* Clinical Activity.

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Honors/Pass/Fail.

## RNU 498 – Group Study in Nuclear Medicine (1-12 units)

*Course Description:* Approved for graduate degree credit.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## RNU 499 – Research in Nuclear Medicine (1-12 units)

*Course Description:* Research in Nuclear Medicine.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# Religious Studies (RST)

College of Letters & Science

## RST 001 – Survey of Religion (4 units)

*Course Description:* Basic concepts introduced through readings of the primary religious literature. Discussion of central ideas (creation, history, law, prophecy, suffering, mysticism, asceticism, karma, reincarnation, moksha, etc.); readings from the Bible, Bhagavad Gita, the Koran, selections from Plato and early Buddhist writings.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## RST 001A – Pilgrimage (4 units)

*Course Description:* Introduction to comparative religion, focusing on the theme of pilgrimage in different religious traditions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken RST 003A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## RST 001B – Death & Afterlife (4 units)

*Course Description:* Introduction to comparative religion, focusing on the theme of death and the afterlife in different religious traditions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken RST 003B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 001C – Sacrifice (4 units)**

*Course Description:* Introduction to comparative religion, focusing on the theme of sacrifice in different religious traditions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken RST 003C.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 001D – Conversion (4 units)**

*Course Description:* Introduction to comparative religion, focusing on the theme of conversion in different religious traditions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken RST 003D.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 001E – Fundamentalism (4 units)**

*Course Description:* Introduction to comparative religion, focusing on the idea of fundamentalism in different religious traditions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* No credit given to students that have taken RST 003E.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**RST 001F – Religion Today (4 units)**

*Course Description:* Introduction to comparative religion, focusing on different religious traditions in the contemporary world.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**RST 001G – Myth, Ritual, & Symbolism (4 units)**

*Course Description:* Myths, rituals and religious symbols found in a variety of religious traditions including examples from ancient and contemporary religious life. Variety of religious phenomena; validity of different approaches to the study of religion.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken and received unit credit for RST 002.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 001H – Sex, Marriage, & Divorce in Medieval & Modern Society (4 units)**

*Course Description:* Methods used in the study of religion, focusing on a particular theme in a number of religious traditions.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**RST 001J – Music, Voice, & the Word (4 units)**

*Course Description:* Exploration of relation between religion and musical traditions in various cultures. Investigation of ways music, vocal performance and sound production reflect and shape modern religious sensibilities. Special attention to gender, ethnicity, race, class, nationalism, secularism and mass media.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**RST 005 – Comparative Religion (2 units)**

*Course Description:* Comparative Religion based on rotating topics such as Dreams and Revelations, Evil, Prophecy, Salvation, and Crime and Punishment.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**RST 006 – Introduction to Health Sciences & the Humanities (4 units)**

*Course Description:* Humanities in the health sciences focusing on illness, the practice of medicine, and the role of culture in biomedical research.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**RST 008 – Healthcare & Religious Ethics (4 units)**

*Course Description:* Ethical dilemmas in healthcare and religion. End of life, illness, responsibility for the common good, humanity's relationship to the natural world, growing up, birth, pregnancy, conception.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**RST 010 – Contemporary Ethical Issues (2 units)**

*Course Description:* Presents challenging, contemporary ethical issues from a multi-cultural perspective. Rotating topics will include Ethical Eating, Capital Punishment, Euthanasia, Poverty, and Animal Rights.

*Learning Activities:* Lecture 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**RST 010A – Contemporary Ethical Issues (2 units)**

*Course Description:* Discussion of the readings assigned for RST 010 and completion of a major research paper.

*Prerequisite(s):* RST 010 (can be concurrent); RST 010 required concurrently; GE topical breadth and diversity credit only with concurrent enrollment in RST 010.

*Learning Activities:* Discussion 1 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Concurrent enrollment in RST 010 required.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**RST 011 – Ethical Eating (4 units)**

*Course Description:* Introduction to the complex and varied ethical, religious, and cultural meanings that food has had across the centuries and globe.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 012 – Emergence of Judaism, Christianity & Islam (4 units)**

*Course Description:* Historical origins, founding figures, and sacred texts of Judaism, Christianity, and Islam. Jewish, Christian, and Muslim beliefs about their own origins. Interpretations of scriptures. Development of traditions over time.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**RST 015Y – Reading War/Fighting War (4 units)**

*Course Description:* Introduction to both classic religious texts about war and a set of actual scenarios drawn from the experience and training of soldiers in recent military conflicts.

*Learning Activities:* Lecture 2 hour(s), Web Electronic Discussion 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 021 – The Bible & Its Interpreters (4 units)**

*Course Description:* Introduction to the Hebrew Bible (Old Testament): key narratives and themes (creation, flood, prophecy, justice, sexuality, etc.); origins in Ancient Israel; diverse ways it has been interpreted in Jewish and Christian communities.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 023 – Introduction to Judaism (4 units)**

*Course Description:* Introduction to the study of religion using examples from the rituals, art and holy texts of Judaism. No prior knowledge of either Judaism or the study of religion is necessary.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**RST 030 – Religions of South Asia (4 units)**

*Course Description:* Introduction to South Asian religions, including Hinduism, Buddhism, Islam, Jainism and Sikhism. Traces historical developments from Vedic texts and their ascetic reformulation by sages such as Yajnavalkya, Siddhartha Gautama, and Mahavira into our global present.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 031 – Introduction to Jainism (4 units)**

*Course Description:* Introduction to topics central to Jain tradition through critical, historical and ethical perspectives.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 032 – History of Yoga (4 units)**

*Course Description:* History of yoga from antiquity to its most recent formulation in American popular and consumer culture.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

**RST 033 – Magic & Demons in South Asia (4 units)**

*Course Description:* Exploration of magic, demons, and other powers in South Asian religions from the ancient to the modern periods.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 034 – Introduction to Buddhism (4 units)**

*Course Description:* Buddhism in its pan-Asian manifestations, from its beginning in India to its development in Sri Lanka and Southeast Asia, Central Asia, China and Japan; teachings and practices, socio-political and cultural impact.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 040 – New Testament (4 units)**

*Course Description:* New Testament literature from critical, historical, and theological perspectives.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 042 – Religion & Science Fiction (4 units)**

*Course Description:* Representations of actual and fictional religious movements in science fiction and fantasy writing and film. Examination of: the characteristics of religion and religiosity in fictional religious movements; the relationship between religion, science, and technology in modern speculative fiction.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

**RST 045 – Christianity (4 units)**

*Course Description:* Major concepts and practices in the Christian tradition. Survey of the history of Christianity and Christian expansion from antiquity to modern times. Pays particular attention to Christianity in China, India, Africa, the Middle East, and Latin America.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 060 – Introduction to Islam (4 units)**

*Course Description:* Introduction to topics central to the Islamic tradition. Muhammad, the Qur'an, Islamic law, theology, philosophy, cosmology, worship, and mysticism. Race and gender in Islam, Islamic revival, and varying experiences of Islam in different historical and cultural settings.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**RST 065C – The Qur'an & Its Interpretation (4 units)**

*Course Description:* The Qur'an, its history, its various functions in the lives of Muslims, and its different interpretations. Quranic themes such as God and humankind, nature and revelation, eschatology and Satan. Islam and other religions; women, gender, and sexuality.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 066 – The Song of God: The Bhagavad Gita (4 units)**

*Course Description:* The Bhagavad Gita, its history and reception, and its significance in the lives of Hindus. Themes explored include Hindu theories of god, self, war, peace, duty, and action.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**RST 067 – Modern Hinduism (4 units)**

*Course Description:* Historical survey of modern Hinduism from the early-19th century to the present. Topics include Rammohun Roy, Sir William Jones, and Mahatma Gandhi, nationalism, post-colonialism and diasporic religion.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 068 – Introduction to Hinduism (4 units)**

*Course Description:* Survey of the diversity of Hindu traditions from ancient to the colonial period, including the development of temple worship, pilgrimage, goddess worship and regional festivals.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 069 – Introduction to Hindu Mythology (4 units)**

*Course Description:* Survey of the major narrative traditions within Hinduism, including epic literature and local stories in oral, textual, visual and performative forms.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 070 – Religion & Language (4 units)**

*Course Description:* Basic toolkit for studying religious discourse in a variety of traditions. Concentration on the sacred and profane, the wondrous and ordinary, and the mystical and reasonable.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 075 – Introduction to Chinese Philosophy (4 units)**

*Course Description:* Introduction to Chinese philosophy from classical pre-modern times; emphasis on basic concepts and their impact on social conduct; the Age of Philosophers, the Han synthesis, the medieval Buddhist contribution.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

**RST 080 – Religion, Gender, Sexuality (4 units)**

*Course Description:* Constructions of gender and sexuality within one or more religious traditions, pre-modern and modern. Emphasis on the interaction between religious, medical, and ethical definitions of the human body and sexual behavior.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**RST 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; primarily for lower division students.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**RST 099 – Special Study for Lower Division Undergraduates (1-5 units)**

*Course Description:* Special study for lower division undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**RST 100 – Study of Religion: Issues & Methods (4 units)**

*Course Description:* Principal issues and methods of Religious Studies and associated fields.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**RST 102 – Christian Origins (4 units)**

*Course Description:* Development of Christianity from the end of the 1st century through the major controversies of the 5th century. Emphasis on the relationship between the new religious movement and the Roman Empire, and issues of early Christian identity and diversity.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 103 – Medieval & Byzantine Christianity (4 units)**

*Course Description:* Christianity in Europe and the Near East from the year 600 to 1450. Focus on the development of Catholic and Orthodox traditions in ritual, art, and thought, with attention to interactions between regional groups, and Christian interaction with Islam.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 104 – Christianity 1450-1700 (4 units)**

*Course Description:* History of Reformation conflicts over the authority of scripture, the nature of man and the universe, and the basis of morality with the goal of understanding how these conflicts laid the foundation for the modern world.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**RST 105 – Christianity & Modernity, 1700-1920 (4 units)**

*Course Description:* Reaction of Christian critics and apologists to the profound cultural and scientific transformations resulting from the Scientific Revolution, the Enlightenment, and the advent of the modern critical study of religion.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 106 – Christianity in the Contemporary World (4 units)**

*Course Description:* Christianity in the 20th and 21st centuries.

Relationship of Christianity to globalization, industrialization, mass media, and the contemporary secular state. Focus on Christianity in America and developing nations, and on the relationship of established Christian institutions to new Christian movements.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); World Cultures (WC); Writing Experience (WE).

**RST 110 – Life, Meaning & Identity (4 units)**

*Course Description:* Study of religious lives, the quest for meaning and for personal identity; how religions frame the problems of life; how cultural and personal crises affect youthful identity; the nature and structure of dreams, myths, and ideals.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**RST 111 – Persuasion & Conviction in Religious Tradition (4 units)**

*Course Description:* Selected topics in religious argument. Familiarizes students with the discourse structures of religious persuasion and enables them to perform analysis of such texts. Covers argument styles and structures used in ethics, theology, and preaching.

*Learning Activities:* Lecture/Discussion 4 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**RST 115 – Mysticism (4 units)**

*Course Description:* Historical and descriptive analysis of selected key figures in mystical traditions and readings of representative mystical texts. Analytic term paper.

*Prerequisite(s):* One lower division Religious Studies course.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 120 – Religion, Magic & Science (4 units)**

*Course Description:* Religion, magic, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Cross Listing:* STS 120.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 122 – Studies in Biblical Texts (4 units)**

*Course Description:* Study of a book from the Prophets or writings from critical, historical, and religious perspectives.

*Prerequisite(s):* RST 021.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**RST 123 – Sex & Gender in the Bible (4 units)**

*Course Description:* Gender and sexuality in the Bible and its interpretation in Judaism and Christianity. Femininity and masculinity; gender roles; homosexuality; sexual violence. Historical origins in the ancient world; influence on contemporary views.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 124 – Topics in Judaism (4 units)**

*Course Description:* Examination of selected aspects of Jewish life, religion, or literature. Potential topics include: Jewish Perspectives on Jesus; The Golem: History and Legend; Sexuality and Gender in Late Antique Judaism and Early Christianity.

*Prerequisite(s):* RST 023; RST 021.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**RST 125 – Dead Sea Scrolls, Apocrypha, & Pseudepigraphy (4 units)**

*Course Description:* Survey of the Dead Sea Scrolls, apocryphal and pseudepigraphical writings of Judaism and Christianity and their historical, social, and religious importance.

*Prerequisite(s):* RST 021; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 126 – The Formation of the Rabbinic Tradition (4 units)**

*Course Description:* Survey of the classical rabbinic Jewish texts such as the Talmud and of the social and historical contexts of their production in Palestine and Babylonia.

*Prerequisite(s):* RST 021; RST 023; (RST 040 or RST 125).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC).

**RST 130 – Topics in Religious Studies (4 units)**

*Course Description:* Thematic study of a phenomenon in more than one religious tradition or of the relationship between religion and another cultural phenomenon. Topics may include archeology and the Bible, women and religion, religion and violence.

*Prerequisite(s):* RST 001 or RST 002 or RST 003A or RST 003B or RST 003C; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC); Writing Experience (WE).

**RST 132 – Topics in Mediterranean Ancient Religion (4 units)**

*Course Description:* Thematic study of specific sociological, literary or theological theme across the religious traditions of the ancient Mediterranean/Near East: Greek and Roman religions, Judaism, Christianity, Zoroastrianism, Manichaeism, etc. Topics may include creation, sacrifice, priesthoods, prophecies, holy books, the afterlife.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 135 – The Bible & Film (4 units)**

*Course Description:* Examination of the uses of the Judeo-Christian Scriptures in film. Topics include dramatic depictions of biblical stories, the tension between science and religion, allegorical treatments of biblical themes, and the problems of religious conviction.

*Prerequisite(s):* HUM 010 recommended.

*Learning Activities:* Lecture 2 hour(s), Term Paper, Film Viewing 3 hour(s).

*Grade Mode:* Letter.

**RST 136 – Topics in Jainism (4 units)**

*Course Description:* Thematic study of specific periods, literary movements, sects and important figures within Jainism from a range of disciplinary perspectives.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 12 unit(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 137 – Topics in Buddhism (4 units)**

*Course Description:* Thematic exploration of historic developments, periods, regions and sects in Buddhism from an interdisciplinary perspective.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 12 unit(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 139 – Topics in Hinduism (4 units)**

*Course Description:* Thematic study of specific periods, movements, leaders, regions, ethics or philosophies within Hinduism from an interdisciplinary perspective.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 12 unit(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 140 – Christian Theology (4 units)**

*Course Description:* Historical and systematic introduction to Christian doctrine, with attention to divergent traditions and the problem of orthodoxy and heresy.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 141A – New Testament Literature: Synoptic Gospels (4 units)**

*Course Description:* Life and thought of the early Church as reflected by the Synoptic Tradition; Matthew, Mark, Luke and Acts. Offered every third year to alternate with RST 141B, RST 141C.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 141B – New Testament Literature: John (4 units)**

*Course Description:* Life and thought of the early Church as reflected by the Johannine Tradition; the Gospel and letters of John. Offered every third year to alternate with RST 141A, RST 141C.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 141C – New Testament Literature: Paul (4 units)**

*Course Description:* Life and thought of the early Church as reflected by the Pauline tradition. The letters of Paul. Offered every third year to alternate with RST 141A, RST 141B.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 143 – New Testament Apocrypha (4 units)**

*Course Description:* Extra-canonical Christian writings and their reception, from antiquity to the present. Emphasis on the importance of New Testament figures both as literary characters and as authors within different Christian traditions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**RST 144 – History of the Bible (4 units)**

*Course Description:* History of the formation of the Christian biblical canon, with emphasis on differences between Christian traditions; survey of translations and adaptations of biblical narrative in Christianity, Judaism, and Islam, as well as in contemporary culture.

*Prerequisite(s):* RST 021 or RST 040.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 145 – Contemporary American Religion (4 units)**

*Course Description:* Examination of several major movements and phenomena in 20th-century American religion.

*Prerequisite(s):* RST 040 and HIS 017B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**RST 150 – Religious Ethics (4 units)**

*Course Description:* Study of the religious bases of ethics through examination of ethical problems that arise in different religious cultures around the world and in nations where multiple religious cultures face similar issues.

*Prerequisite(s):* RST 010 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 152 – Justice, Equity, & Privacy in Medical Humanities (4 units)**

*Course Description:* Global issues of justice, equity, and fairness in healthcare and biomedical research. Emphasis on issues of race, gender, paternalism, and genetic privacy. Texts include scholarly articles, fiction, and film.

*Learning Activities:* Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**RST 153 – Religion & Medicine (4 units)**

*Course Description:* Cross-cultural approach to the relationship between Religion and Medicine from earliest times to the present. How specific religious and philosophical worldviews have shaped and continue to shape attitudes toward physical and mental health.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**RST 154 – The Hindu Temple (4 units)**

*Course Description:* Comparative history of architecture and symbolism of the Hindu Temple in India, Southeast Asia and the United States. Attention to the temple as expression of religious knowledge, political authority, and cultural heritage through the lens of colonialism and postcolonialism.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* AHI 154.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 155A – Bhakti: Indian Devotional Traditions to 1200 CE (4 units)**

*Course Description:* Exploration of Indian devotional traditions through literary, visual, and performance culture. Emphasis on period up to 1200 CE in southern India.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 155B – Bhakti: Indian Devotional Traditions, 1200 CE to Present (4 units)**

*Course Description:* Indian devotional traditions through literary, visual, and performance culture. Emphasis on period 1200 CE to the present.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 156 – Religion & the Performing Arts in India (4 units)**

*Course Description:* Survey of religion and performing arts in India.

Emphasis on the influence of colonialism, nationalism, and regionalism on the history of Indian performing arts.

*Prerequisite(s):* RST 030; RST 068; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 157 – Hindu Women & Goddesses (4 units)**

*Course Description:* Hindu goddesses and the religious lives of Hindu women in India and the diaspora.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **RST 158 – The Ramayana (4 units)**

*Course Description:* Exploration of the Indian epic, Ramayana, through the lens of literature, performance, and visual art. Emphasis on the text's diversity and its contemporary global relevance. Topics include Ramayanas in Southeast Asia, and in various South Asian diaspora communities.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Cross Listing:* COM 156.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 159 – The Mahabharata (4 units)**

*Course Description:* Survey of the Indian epic, the Mahabharata, through textual, oral, and visual culture.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 160 – Introduction to Islamic Thought (4 units)**

*Course Description:* The development of Islamic thought from the first centuries of Islam to the 18th century. Theology, philosophy, ethics, Sufism, historiography, political theory, fundamentalism, al-Farabi, al-Ghazzali, Ibn Rushd, Tusi, Ibn al-Arabi, Rumi, Molla Sadra, Ibn Khaldun, Ibn Abd al-Wahhab.

*Prerequisite(s):* RST 060 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 161 – Modern Islam (4 units)**

*Course Description:* Response of Islam to modernity: secularism, reformism, fundamentalism. Islam and imperialism, women, media and immigration. Islamic modernism, political Islam, Islam in Europe and America.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 161B – Modern Islam: Authority & Tradition In Process (4 units)**

*Course Description:* Survey of Islamic thought, social organization, politics from 18th century through present. Focus on changing notations of moral authority and tradition. Concentration on Middle East and South Asia with sustained treatment of North American engagements with the Islamic world.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **RST 162 – Introduction to Islamic Law (4 units)**

*Course Description:* The development of Islamic law in the formative centuries of Islam, ca. 600-1000, as well as its adaptation to changing economic, social, and political conditions in subsequent periods. Legal schools, legal theory, the Shari'a, reformist movements, human rights.

*Prerequisite(s):* RST 060 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **RST 163 – Social Life of Islam (4 units)**

*Course Description:* Introduction to culture and social life in Muslim societies. Focus on the plurality of traditions in Muslim faith, reason, and everyday practice. Special attention to Muslim rituals, ethical values, verbal genres, family life, sexuality and veiling, and youth culture.

*Prerequisite(s):* RST 060 or HIS 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **RST 165 – Islam in Asia (4 units)**

*Course Description:* Islam as a lived religion in the Indian sub-continent, Central Asia, China, and Southeast Asia. Emphasis is on primary sources studied comparatively and historically.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 166 – Religion & Media in the Arab World (4 units)**

*Course Description:* Exploration of the role and experience of media technologies in the Arab world. Study of digital and electronic media as well as alternative media practices. Investigation of new trends in political activism and identity formation.

*Learning Activities:* Lecture 4 hour(s).

*Cross Listing:* MSA 131C.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 169 – Topics in Islam (4 units)**

*Course Description:* Thematic study of specific periods, movements, leaders, regions, ethics or philosophies within Islam from an interdisciplinary perspective.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* World Cultures (WC); Writing Experience (WE).

**RST 171 – Buddhist Art (4 units)**

*Course Description:* A historical survey of Buddhist art in relation to the development of Buddhist doctrine and philosophy.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* AHI 157.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 172 – Ch'an (Zen) Buddhism (4 units)**

*Course Description:* Doctrines and methods of the Ch'an Buddhism, both ancient and modern. Review of ritual techniques, including meditation.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**RST 175A – Daoist Traditions (4 units)**

*Course Description:* English-language survey of key Daoist texts and scholarship. Topics include Daoist concepts of the cosmos, the natural world, scripture, the body, and immortality; Daoist divinities; Daoism and the state.

*Prerequisite(s):* A course in Chinese history recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* CHN 100A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RST 180 – Popular Religious Art in India (4 units)**

*Course Description:* Survey of Indian popular religious art in prints, trade labels, comics and photographs.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* AHI 158.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 181 – Hindu Gods & Hindu Symbols (4 units)**

*Course Description:* A historical survey of the development of the language of symbolism and iconography in Hinduism.

*Prerequisite(s):* RST 068: Hinduism or RST 069: Hindu Mythology recommended, but not required.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* AHI 153.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 182 – Ramayana, Religion, & the Arts (4 units)**

*Course Description:* Comparative exploration of the visual, theatrical, ritual, performative and religious lives of the Ramayana epic in South and Southeast Asia.

*Prerequisite(s):* Recommended but not required preparation: COM 156/ RST 158 or RST 181 or RST 068 or RST 069.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RST 189 – Senior Colloquium (4 units)**

*Course Description:* Primarily for seniors in Religious Studies. Discussion in depth of a problem in religion which requires the methods of several disciplines and is important in the encounter between religions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**RST 190 – Seminar (4 units)**

*Course Description:* Allows majors to integrate their disciplined study of the field. Emphasis on current scholarly debate about the methods for analyzing and comparing diverse religious traditions.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated up to 1 time(s) when topic and faculty differ.

*Grade Mode:* Letter.

**RST 194HA – Special Study for Honors Students (1-5 units)**

*Course Description:* Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a religious studies topic.

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Open only to majors of senior standing who qualify for honors program.

*Grade Mode:* Pass/No Pass only.

**RST 194HB – Special Study for Honors Students (1-5 units)**

*Course Description:* Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a religious studies topic.

*Learning Activities:* Independent Study.

*Enrollment Restriction(s):* Open only to majors of senior standing who qualify for honors program.

*Grade Mode:* Pass/No Pass only.

**RST 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**RST 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**RST 201 – Methods & Issues in Religious Studies (4 units)**

*Course Description:* Focuses on controversies in the study of comparative religion. How is religion best defined? Are there methods unique to the study of religion? What does the study of religion contribute to the study of society in general?

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

**RST 205 – Religion & Media (4 units)**

*Course Description:* Many communities are finding global media technologies useful for religious practice. Examines how religious revitalization is historically situated. Phenomenological approach will enable students to situate media and religion within the social and material world of practitioners.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**RST 210 – Religion & Postcoloniality, or Savages, Civilization, & Spirituality (4 units)**

*Course Description:* Examines relations between religion and colonialisms. Using specific historical situations it explores some of our thorniest theoretical problems. Acquire a solid understanding of postcolonial theory and the historical tools to critically engage religion in the present.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**RST 212 – Religion & Violence (4 units)**

*Course Description:* Comparative and critical study of the ideological, cultural, and theological relationship between forms of violence and religion and religious practice.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**RST 215 – Topics in the History of Christianity (4 units)**

*Course Description:* Selected topics in the history of Christianity. Intended for graduate students seeking to do advanced work in the study of Christianity. May cover issues in Christian thought from antiquity, the middle ages, the early modern or modern period.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**RST 299 – Directed Research (1-12 units)**

*Course Description:* Directed research.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**RST 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Rheumatology & Allergy (RAL)****School of Medicine****RAL 099 – Directed Research Immunology (1-5 units)**

*Course Description:* Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory.

*Grade Mode:* Pass/No Pass only.

**RAL 192 – Internship in Rheumatology-Allergy (1-12 units)**

*Course Description:* Supervised work experience in rheumatology-allergy.

*Prerequisite(s):* Upper division standing; approval of project by preceptor prior to internship.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**RAL 199 – Directed Research in Immunology (1-5 units)**

*Course Description:* Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory.

*Grade Mode:* Pass/No Pass only.

**RAL 209 – Current Topics in Immunology: From Presentations to Grants (3 units)**

*Course Description:* Current developments in various aspects of immunology and their interrelationships. Focus on areas of immunology not currently covered in the basic and advanced immunology courses. Oral presentation, written review and grant preparation.

*Prerequisite(s):* IMM 201.

*Learning Activities:* Lecture 1 hour(s), Term Paper/Discussion 1 hour(s), Project 1 hour(s).

*Grade Mode:* Letter.

**RAL 298 – Topics in Rheumatology & Clinical Immunology (1-4 units)**

*Course Description:* Library and/or laboratory work as required.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## RAL 299 – Research in Autoimmune Disease (1-18 units)

*Course Description:* Independent research will be encouraged in both animal models of human disease (including congenitally athymic [nude], asplenic, and New Zealand mice) and the cellular immune system of patients with systemic lupus erythematosus, Sjögren's syndrome, polymyositis and drug hypersensitivity.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Laboratory.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## RAL 460 – Rheumatology Clinical Clerkship (1-18 units)

*Course Description:* Participation with members of the subspecialty service in the diagnosis and therapeutic management of patients with rheumatologic diseases.

*Prerequisite(s):* MDS 431 and consent of instructor.

*Learning Activities:* Clinical Activity 2-40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## RAL 461 – Allergy Clinical Clerkship (3-18 units)

*Course Description:* Student will work with practicing allergist in daily work with patients and participate in weekly allergy clinic and teaching conferences. Study of the literature. Will see patients with problems in clinical immunology, immunodeficiency, asthma, allergic rhinitis.

*Prerequisite(s):* Consent of instructor; completion of second year of medical school.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## RAL 480 – Insights in Rheumatology (1-3 units)

*Course Description:* Participation in rheumatology consultation rounds, rheumatic disease clinics and conferences with supervised readings in rheumatology.

*Prerequisite(s):* Consent of instructor; student in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## RAL 499 – Research (1-12 units)

*Course Description:* Part-time participation in active clinical and basic research projects which can involve both patient care and relevant laboratory procedures. Students can gain experience in clinical medicine and clinical investigation.

*Prerequisite(s):* Medical student with consent of instructor.

*Learning Activities:* Variable 2-40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# Russian (RUS)

College of Letters & Science

## RUS 001 – Elementary Russian (5 units)

*Course Description:* Introduction to Russian grammar and development of all language skills in a cultural context with special emphasis on communication.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## RUS 001A – Accelerated Intensive Elementary Russian (15 units)

*Course Description:* Special 12-week accelerated, summer session intensive combining the work of RUS 001, RUS 002, and RUS 003. Introduction to Russian grammar and development of all language skills in a cultural context with emphasis on communication.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open to students who have completed RUS 001, RUS 002, or RUS 003.

*Grade Mode:* Letter.

## RUS 002 – Elementary Russian (5 units)

*Course Description:* Continuation of grammar and language skills developed in RUS 001.

*Prerequisite(s):* RUS 001.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## RUS 003 – Elementary Russian (5 units)

*Course Description:* Continuation of grammar and language skills developed in RUS 002.

*Prerequisite(s):* RUS 002.

*Learning Activities:* Discussion 5 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## RUS 004 – Intermediate Russian (4 units)

*Course Description:* Grammar review and conversational practice in Russian.

*Prerequisite(s):* RUS 003.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## RUS 005 – Intermediate Russian (4 units)

*Course Description:* Grammar review. Introduction to literature in its sociopolitical context. Conversational practice.

*Prerequisite(s):* RUS 004.

*Learning Activities:* Discussion 4 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## RUS 006 – Intermediate Russian (4 units)

*Course Description:* Grammar review. Intermediate conversation and continued reading of literature. Social and cultural practices in contemporary Russia; introduction to Russian history.

*Prerequisite(s):* RUS 005.

*Learning Activities:* Discussion 4 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## RUS 098 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

## RUS 099 – Special Study for Undergraduates (1-5 units)

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## RUS 101A – Advanced Russian (4 units)

*Course Description:* Topics in Russian. Grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversation exercises utilizing literary and colloquial variants of current Russian speech.

*Prerequisite(s):* RUS 006; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## RUS 101B – Advanced Russian (4 units)

*Course Description:* Continuation of RUS 101A. Topics in Russian grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversational exercises utilizing literary and colloquial variants of current Russian speech.

*Prerequisite(s):* RUS 101A; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## RUS 101C – Advanced Russian (4 units)

*Course Description:* Continuation of RUS 101B. Topics in Russian grammar for the advanced student. Reading and discussion of journalistic texts and classic and contemporary literature. Conversational exercises utilizing literary and colloquial variants of current Russian speech.

*Prerequisite(s):* RUS 101B.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## RUS 102 – Russian Composition (4 units)

*Course Description:* Practice in writing Russian. One composition on a different topic each week. Topics include: history, geography, politics, and literature of Russia; comparison of Russian and American lifestyles; current events. Conducted in Russian.

*Prerequisite(s):* RUS 006; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Tutorial 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## RUS 103 – Literary Translation (4 units)

*Course Description:* Translation of Russian literary texts into stylistically equivalent idiomatic English.

*Prerequisite(s):* RUS 101C.

*Learning Activities:* Discussion 3 hour(s).

*Grade Mode:* Letter.

## RUS 105 – Advanced Russian Conversation (4 units)

*Course Description:* Intensive conversational practice and discussion based on current events and contemporary texts.

*Prerequisite(s):* RUS 006.

*Learning Activities:* Discussion 3 hour(s), Practice 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

## RUS 120 – Topics in Russian Literature & Culture (4 units)

*Course Description:* Knowledge of Russian not required. Investigation of significant themes and issues of Russian literature and culture within their European context.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## RUS 122 – 19th-Century Russian Literature (4 units)

*Course Description:* Study of Russian literature (prose fiction, drama, poetry) from the period between 1800 and the end of the 19th century. May include authors like Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, Chekhov. Offered alternately in English or Russian.

*Prerequisite(s):* RUS 101C when offered in Russian; no prerequisite when offered in English.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Not open to students who have taken RUS 121 and RUS 127.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## RUS 124 – 20th-Century Russian Literature (4 units)

This version has ended; see updated course, below.

*Course Description:* Study of Russian literature (prose, drama, poetry) from the period between 1900 and the end of the 20th century. Authors like Y. Olesha, M. Bulgakov, D. Kharms, and L. Petrushevskaya. Taught in Russian.

*Prerequisite(s):* RUS 101C when offered in Russian; no prerequisite when offered in English.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have taken RUS 123 or RUS 128.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## RUS 124 – 20th-Century Russian Literature (4 units)

*Course Description:* Study of Russian literature (prose, drama, poetry) from the period between 1900 and the end of the 20th century. Authors like Y. Olesha, M. Bulgakov, D. Kharms, and L. Petrushevskaya. Taught in Russian.

*Prerequisite(s):* RUS 101C when offered in Russian; no prerequisite when offered in English (every other year).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for credit to students who have taken RUS 123 or RUS 128.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## RUS 126 – The Russian Theater (4 units)

*Course Description:* The main works of Russian dramatists from Fonvizin to the present, including Gogol, Turgenev, Tolstoy, Ostrovsky, Chekhov, Blok, Mayakovsky, Kharms. Conducted in Russian.

*Prerequisite(s):* RUS 101C; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## RUS 129 – Russian Film (4 units)

*Course Description:* History of Russian film; film & social revolution, the cult of Stalin, dissident visions; film & the collapse of the Soviet empire; gender and the nation in Russian film. Taught in English; Russian films with English subtitles.

*Prerequisite(s):* Completion of Subject A requirements.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Cross Listing:* FMS 129.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## RUS 130 – Contemporary Russian Culture (4 units)

This version has ended; see updated course, below.

*Course Description:* Trends in Russian culture and the relationship between artists and the government. Topics: recent changes in the cultural scene, postmodernist trends in literature, visual art, film, and theater.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## RUS 130 – Contemporary Russian Culture (4 units)

*Course Description:* Trends in Russian culture and the relationship between artists and the government. Topics: recent changes in the cultural scene, postmodernist trends in literature, visual art, film, and theater.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

This course version is effective from, and including: Fall Quarter 2023.

## RUS 133 – Post-Soviet Literature (4 units)

*Course Description:* Major authors and trends in Russian literature in post-1991 period. Discussion of impact of economic, social, and cultural turmoil of post-Soviet period on literary marketplace. Analysis of development of literary postmodernism in Russia.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## RUS 139 – Pushkin (4 units)

*Course Description:* Three major periods of Pushkin's poetical works: his early Lyceum verse; his poetry of the early 1820s; and the mature period. Further study of Pushkin's prose fiction, drama, and journalism.

*Prerequisite(s):* RUS 101C; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## RUS 140 – Dostoevsky (in English) (4 units)

*Course Description:* Reading and analysis of Dostoevsky's principal works such as Crime and Punishment, The Idiot, The Brothers Karamazov, and The Diary. Study of social and political views as reflected in Dostoevsky's works.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## RUS 141 – Tolstoy (in English) (4 units)

*Course Description:* Study of Leo Tolstoy's literary evolution and moral quest. Readings include his Confession, a major novel such as War and Peace or Anna Karenina, and representative shorter fiction.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Writing Experience (WE).

**RUS 142 – Women in Russian Culture (4 units)**

**Course Description:** Study of the representation of women in contemporary Russian fiction and film. Exploration of issues such as family dynamics/motherhood, sexuality, work, and women's relationship to the state. Offered in English.

**Learning Activities:** Lecture/Discussion 3 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RUS 143 – Chekhov (in English) (4 units)**

**Course Description:** Examination of Chekhov's short stories and major plays, such as The Seagull, Uncle Vanya, The Three Sisters, The Cherry Orchard, and Ivanov, in the broader cultural context of European and Russian fin de siecle.

**Learning Activities:** Lecture/Discussion 3 hour(s), Extensive Writing.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**RUS 150 – Russian Culture (4 units)**

**Course Description:** Study of Russian culture in 19th and 20th centuries. Brief introduction of the beginnings up to 19th century. Russian art, music, philosophy, church, traditions, and daily life. Knowledge of Russian not required.

**Learning Activities:** Discussion 3 hour(s), Term Paper.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**RUS 192 – Research Essay (2 units)**

**Course Description:** Research essay, based on primary and secondary sources, dealing in depth with a topic arising from or related to the prerequisite literature course.

**Prerequisite(s):** A Russian literature course; may be taken concurrently.

**Learning Activities:** Variable.

**Repeat Credit:** May be repeated.

**Grade Mode:** Letter.

**General Education:** Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**RUS 194H – Special Study for Honors Students (4 units)**

**Course Description:** Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Russian studies.

**Prerequisite(s):** Open only to majors of senior standing who qualify for honors program.

**Learning Activities:** Independent Study 4 hour(s).

**Grade Mode:** Letter.

**RUS 195H – Honors Thesis (4 units)**

**Course Description:** Writing an honors thesis, under the direction of a faculty member, on a topic in Russian studies.

**Prerequisite(s):** RUS 194H.

**Learning Activities:** Independent Study 4 hour(s).

**Grade Mode:** Letter.

**RUS 197T – Tutoring in Russian (1-4 units)**

**Course Description:** Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses.

**Prerequisite(s):** Consent of instructor; upper division standing.

**Learning Activities:** Seminar 1-2 hour(s), Laboratory 1-2 hour(s).

**Repeat Credit:** May be repeated 6 unit(s).

**Grade Mode:** Pass/No Pass only.

**RUS 198 – Directed Group Study (1-5 units)**

**Course Description:** Directed group study.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Variable.

**Grade Mode:** Pass/No Pass only.

**RUS 199 – Special Study for Advanced Undergraduates (1-5 units)**

**Course Description:** Special study for advanced undergraduates.

**Prerequisite(s):** Consent of instructor.

**Learning Activities:** Variable.

**Grade Mode:** Pass/No Pass only.

**RUS 299 – Individual Study (1-12 units)**

**Course Description:** Individual study.

**Prerequisite(s):** Consent of instructor; graduate standing.

**Learning Activities:** Variable.

**Enrollment Restriction(s):** Restricted to graduate students.

**Repeat Credit:** May be repeated.

**Grade Mode:** Satisfactory/Unsatisfactory only.

**RUS 396 – Teaching Assistant Training Practicum (1-4 units)**

**Course Description:** Teaching assistant training practicum.

**Prerequisite(s):** Graduate standing.

**Learning Activities:** Variable 3-20 hour(s).

**Repeat Credit:** May be repeated.

**Grade Mode:** Satisfactory/Unsatisfactory only.

**School of Veterinary Medicine (VET)****School of Veterinary Medicine****VET 299 – Research (1-15 units)**

**Course Description:** Research.

**Prerequisite(s):** First-, second- and third-year standing in the School of Veterinary Medicine.

**Learning Activities:** Variable 1-15 hour(s).

**Repeat Credit:** May be repeated 6 time(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

**VET 400 – Professional & Clinical Skills – Y1 (2-18 units)**

**Course Description:** Outline expectations and skill set required to participate successfully in the DVM curriculum as well as providing learning opportunity in communication, team-building, leadership, conflict management, stress management, critical thinking, professional behaviors, history taking, physical examination skills and medical record keeping.

**Prerequisite(s):** First-year standing in the School of Veterinary Medicine.

**Learning Activities:** Variable 2-18 hour(s).

**Grade Mode:** Satisfactory/Unsatisfactory only.

**VET 401 – Basic Foundations (2-18 units)**

*Course Description:* Essential basic information regarding histology, general pathology, biochemistry, pharmacology and population health that is foundational to all blocks.

*Prerequisite(s):* First-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 402 – Heme/Lymph/Coag (2-18 units)**

*Course Description:* The lexicon, morphology, production, structure and function of peripheral blood cells, their bone marrow precursors and the lymphoid system, the process and regulation of hemostasis, and the laboratory evaluation of all of these in health and disease.

*Prerequisite(s):* First-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 403 – Musculoskeletal (2-18 units)**

*Course Description:* Anatomy, histology, and physiology necessary for understanding form and function of the bones, joints, muscles, and tendons in producing locomotion; and the pathologic processes that produce typical responses to injury of musculoskeletal structures in domestic animals.

*Prerequisite(s):* First-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 404 – Neuroscience/Senses/Behavior (2-18 units)**

*Course Description:* Establish a basis for clinical neurology, ophthalmology, and behavior by providing an integrated study of normal neurobiology, neuroanatomy, neurophysiology, neuropathology, neurpharmacology, neurotoxicology, ophthalmology and behavior.

*Prerequisite(s):* First-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 405 – Gastrointestinal/Metabolism (2-18 units)**

*Course Description:* Examine interrelatedness and functions of the organs associated with the gastrointestinal tract. Applied problems in pharmacology, physical examination, diagnostic testing, and imaging are used to reinforce a basic understanding of organ anatomy, physiology, pathophysiology, and nutrition/metabolism.

*Prerequisite(s):* First-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 406 – Pharmacology/Nutrition/Toxicology (2-18 units)**

*Course Description:* Basic principles of nutrition and toxicology as well as pathophysiologic changes, diagnostic procedures and treatments of nutritional diseases and intoxications of domestic animals and wildlife. Incorporate case examples and directed self-learning to reinforce important concepts.

*Prerequisite(s):* Consent of instructor; first-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 407 – Connections – Y1 (1.5 units)**

*Course Description:* Integrate basic and preclinical material working with senior student in a clinical environment.

*Prerequisite(s):* First-year standing in the School of Veterinary Medicine.

*Learning Activities:* Clinical Activity 15 hour(s).

*Grade Mode:* S/U only.

**VET 408 – Cardiology/Respiratory (2-18 units)**

*Course Description:* Normal cardiovascular and respiratory system biology and the integrated response of those systems to injury or disease.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 409 – Renal/Urinary (2-18 units)**

*Course Description:* Examine and explore the normal morphology (gross and microscopic), physiology, pathology and imaging of the upper and lower urinary tract in multiple species.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 410 – Endocrinology/Reproduction (2-18 units)**

*Course Description:* Anatomy and histology of endocrine glands and reproductive systems in males and females. Understand the physiology and pathology at the molecular, cellular and organismal level.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 411 – Skin (2-18 units)**

*Course Description:* Structure and function of the skin and specialized keratinized structures in veterinary species. Review mechanisms by which skin responds to perturbations and discuss wound healing and skin pathology.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 412 – Oncology (2-18 units)**

*Course Description:* Basic mechanisms, etiology, causes and the approach to diagnosis and treatment of cancer with emphasis on veterinary patients.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 413 – Immunology/Infectious Disease (2-18 units)**

*Course Description:* Integrate immunology, microbiology, virology, parasitology of common infectious, zoonotic and foreign animal diseases.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 414 – Population Health (2-18 units)**

*Course Description:* Principles of evidence-based medicine, study design and inference, and disease transmission in populations. Topics include biostatistics, outbreak investigation and response, diagnostic tests, vaccine strategies, food safety, foreign animal diseases, and impact of environmental health on animals and humans.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 415 – Clinical Foundations (2-18 units)**

*Course Description:* Essential concepts that are shared across year three blocks to include foundational material in anesthesia, surgery and emergency medicine with cases that include interpretation of clinical pathology and imaging.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 416 – Connections – Y2 (1.5 units)**

*Course Description:* Integrate basic and preclinical material working with a senior student in a clinical environment.  
*Prerequisite(s):* Enrollment Restrictions: Credit Limitation(s): Cross Listing: Repeat Credit: General Education: Grade Mode: S/U only.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Description: Learning Activities: Clinical Activity 15 hour(s).

**VET 417 – Professional & Clinical Skills – Y2 (2-18 units)**

*Course Description:* Continue to build on foundations from freshman year in communication, history-taking, client interactions, team-building, conflict and stress management and professional behaviors.

*Prerequisite(s):* Second-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 430 – Core Stream (2-18 units)**

*Course Description:* Longitudinal stream to include law, ethics, regulatory medicine, business, communication and disaster medicine.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 431 – Anesthesia & Surgical Stream (2-18 units)**

*Course Description:* Introduction to surgical anatomy, operative and anesthetic skills.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 432A – Comparative Stream I (2-18 units)**

*Course Description:* Approach commonly encountered diseases and medical problems across multiple species. Development of problem-solving skills related to the medical problems of all species from the level of individual animals to groups/herds/populations.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 432B – Comparative Stream II (2-18 units)**

*Course Description:* Approach commonly encountered diseases and medical problems across multiple species. Development of problem-solving skills related to the medical problems of all species from the level of individual animals to groups/herds/populations.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 432C – Comparative Stream III (2-18 units)**

*Course Description:* Approach commonly encountered diseases and medical problems across multiple species. Development of problem-solving skills related to the medical problems of all species from the level of individual animals to groups/herds/populations.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 433A – Small Animal Stream I (2-18 units)**

*Course Description:* Clinical manifestations, diagnostic methods, and the medical and surgical approaches to the infectious, musculoskeletal, neurologic and ophthalmologic diseases of small animals.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 433B – Small Animal Stream II (2-18 units)**

*Course Description:* Clinical manifestations, diagnostic methods, and the medical and surgical approaches to the dermatologic, dental, and gastrointestinal diseases of small animals as well as preventative medicine and nutrition.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 433C – Small Animal Stream III (2-18 units)**

*Course Description:* Clinical manifestations, diagnostic methods, and the medical and surgical approaches to the cardiorespiratory, endocrine, and urinary medicine as well as diagnosis and therapy of oncologic diseases in small animals. Introduction to companion, avian, and exotic pet medicine and surgery.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 434A – Large Animal Stream I (2-18 units)**

*Course Description:* Fundamentals of entry level large animal medicine and surgery to promote development of problem-solving skills for diagnosis, treatment and control of various disease conditions.

*Prerequisite(s):* Third- and/or fourth-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 434B – Large Animal Stream II (2-18 units)**

*Course Description:* Continuation of fundamentals of entry level large animal medicine and surgery to promote development of problem-solving skills for diagnosis, treatment and control of various disease conditions.

*Prerequisite(s):* Third- and/or fourth-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 435A – Large Animal Stream—Equine Emphasis (2-18 units)**

*Course Description:* Fundamental and advanced levels of equine medicine, surgery, lameness and reproduction. Focus on management of individual equids.

*Prerequisite(s):* Third- and/or fourth-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 435B – Large Animal Stream—Livestock Emphasis (2-18 units)**

*Course Description:* Fundamental and advanced levels of livestock medicine and surgery of individual animals and population health. Focus on all livestock species including cattle, sheep, goats, pigs and poultry.

*Prerequisite(s):* Third- and/or fourth-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 435C – Large Animal Stream—Zoological Medicine Emphasis (2-18 units)**

*Course Description:* Taxon- and topic-based approach to learning zoological medicine. Anatomy, physiology, nutrition, management, anesthesia, medicine, surgery and pathology on non-domestic free-ranging and captive species.

*Prerequisite(s):* Third- and/or fourth-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 436 – Companion Small Mammals (2-18 units)**

*Course Description:* Fundamental understanding of the etiology, clinical presentation, diagnostic evaluation, treatment, prevention, and control of medical diseases of companion small exotic mammals.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 437 – Reptile & Avian Health (2-18 units)**

*Course Description:* Organized by organ systems to present reptile and avian health issues. Overview of applied anatomy, physiology and clinical pathology of common species will be provided through laboratory opportunities and discussion of common diseases and treatments.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 438 – Poultry (2-18 units)**

*Course Description:* Introduction to practical poultry medicine. Gross pathology, biosecurity and basic diagnostic tests. Visits to hatcheries, broiler, layer and turkey farms.

*Prerequisite(s):* Third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 439 – Laboratory Animal (2-18 units)**

*Course Description:* Basics of laboratory animal medicine including diseases, medicine, and surgery and comparative biology of the most common species and introduction to regulations. Combination of lecture, wet labs, and projects.

*Prerequisite(s):* Consent of instructor; third-year standing in the School of Veterinary Medicine.

*Learning Activities:* Variable 2-18 hour(s).

*Grade Mode:* Letter.

**VET 440 – Business & Communication (1.5 units)**

*Course Description:* Develop professional communication and business skills that are directly applicable in veterinary clinical practice by actively participating in a wide variety of interactive learning opportunities.

*Prerequisite(s):* Third- and fourth year standing in the School of Veterinary Medicine.

*Learning Activities:* Discussion 1.50 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 441 – Clinical Pathology (1.5 units)**

*Course Description:* Application of problem-solving and microscopy skills to laboratory data and laboratory specimens. Sections to include hematology, immunology, body fluids, exfoliative cytology, urinalysis, microbiology and clinical chemistry data and interpretation.

*Prerequisite(s):* Third- and fourth year standing in the School of Veterinary Medicine.

*Learning Activities:* Discussion 1.50 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VET 442 – Advanced Clinical Skills & Hospital Operations (3 units)**

*Course Description:* Development of advanced clinical skills using skills learned in years 1–3 of the DVM curriculum as a foundation. Detailed orientation to the VMTH and VMACS, with a focus on global hospital operations that will prepare students for case management in year 4 of the DVM curriculum and for clinical practice following graduation. Some evenings and weekends required.

*Prerequisite(s):* Consent of instructor; third- and fourth-year standing in the School of Veterinary Medicine.

*Learning Activities:* Clinical Activity 10 hour(s).

*Grade Mode:* S/U only.

**VET 492 – Internship (1-12 units)**

*Course Description:* Internship experience off and on campus in the subject of veterinary science. Internships are supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3 to 36 hour(s).

*Repeat Credit:* May be repeated for credit.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Science & Society (SAS)**

College of Agricultural & Environmental Sciences

**SAS 002 – Feeding the World: Influences on the Global Food Supply (3 units)**

*Course Description:* Scientific principles and dynamic interactions involved in food production, food processing, nutrition, and agribusiness. Physical, biological and social science issues influencing the availability and safety of the food supply worldwide.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SAS 002V.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

**SAS 002V – Feeding the World: Influences on the Global Food Supply (3 units)**

*Course Description:* Scientific principles and dynamic interactions involved in food production, food processing, nutrition, and agribusiness. Physical, biological and social science issues influencing the availability and safety of the food supply worldwide.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SAS 002.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

**SAS 003 – Science, Technology & Society (4 units)**

*Course Description:* Impact of developments in science and technology on the individual in society and how economics, politics, culture and values affect technological development.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed former ABS 018.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**SAS 004Y – Water In Popular Culture (3 units)**

*Course Description:* Analysis of the social construction of modern popular culture and its handling of the environment, focusing on water, as revealed through a survey of Hollywood and independent films.

*Learning Activities:* Film Viewing 3 hour(s), Discussion 1 hour(s), Web Virtual Lecture 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Scientific Literacy (SL); World Cultures (WC).

**SAS 005 – Pathways to Discovery: Science & Society (3 units)**

*Course Description:* Highlights a current issue and/or controversy found in contemporary society and looks at how this problem impacts and is affected by the physical, social and biological sciences. Topics vary.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**SAS 006A – Introduction to Career Discovery Groups (1 unit)**

*Course Description:* Overview of campus resources for career exploration and professional development. Intended for first-year students in the College of Agricultural & Environmental Sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to students entering College of Agricultural & Environmental Sciences in their first year of college only.

*Grade Mode:* Pass/No Pass only.

**SAS 006B – Career Discovery Seminar (3 units)**

*Course Description:* Overview of skills needed to find and secure career opportunities, including job searches, professional communication, participation in informational and job interviews as both interviewer and interviewee, preparation of resumes and cover letters. Exploration of diverse career options.

*Prerequisite(s):* SAS 006A; and consent of instructor.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SAS 006C – Career Discovery in the Field (1 unit)**

*Course Description:* Exploration of prospective careers through visits to businesses, institutions, and agencies and discussions with professionals who work there.

*Prerequisite(s):* SAS 006B.

*Learning Activities:* Fieldwork 2 hour(s).

*Grade Mode:* Pass/No Pass only.

**SAS 008 – Water Quality at Risk (3 units)**

*Course Description:* Natural and human threats to water quality. Balance of science and policy in all aspects of attaining, maintaining, and managing water quality, water contamination. Decoding popular media coverage of water quality and water contamination.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Not open to students who have successfully completed ERS 008. (Formerly ERS 008.)

*Cross Listing:* ESM 008.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); Writing Experience (WE).

## **SAS 009 – Crisis in the Environment (3 units)**

*Course Description:* Explores contemporary environmental issues by examining the causes, effects and solutions to a wide range of environmental problems facing the global ecosystem. Integrated discussion of political, societal and economic impact linkages with environmental problems. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Writing Experience (WE).

## **SAS 010 – Water, Power, Society (3 units)**

*Course Description:* Water resources issues. How water has been used to gain and wield socio-political power. Water resources development in California related to current and future sustainability of water quantity and quality. Roles of science and policy in solving water problems.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Cross Listing:* HYD 010.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

## **SAS 012 – Plants & Society (4 units)**

*Course Description:* Dependence of human societies on plant and plant products. Plants as resources for food, fiber, health, enjoyment and environmental services. Sustainable uses of plants for food production, raw materials, bioenergy, and environmental conservation. Global population growth and future food supplies.

*Prerequisite(s):* High school biology.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing 3 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed PLB 012. (Former PLB 012.)

*Cross Listing:* PLS 012.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Writing Experience (WE).

## **SAS 013 – Disease & Society (3 units)**

*Course Description:* Introduction to the concept of disease, the societal and personal impacts of past, present and future diseases, and the science behind disease discoveries, causes, evolution, diagnosis, treatment, and prevention.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

## **SAS 014 – Forests & Society (3 units)**

*Course Description:* Sociology, natural history and current issues of the world's forests. Application of scientific principles in outdoor laboratories and on-campus field trips.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 120 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Oral Skills (OL); Scientific Literacy (SL); Writing Experience (WE).

## **SAS 016 – Soil, Water, & Civilizations (3 units)**

*Course Description:* Exploring past civilizations and examining how management of soil, water, and natural resources allowed them to flourish, decline, or perhaps fail. Important issues include agricultural practices, deforestation, water quality, and land management.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

## **SAS 018 – GIS & Society (3 units)**

*Course Description:* Geographic Information Systems (GIS) as a spatial technology and a tool for change in society. Evaluate physical, biological and social impact of GIS in the context of case studies such as land, water and community planning.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Term Paper/Discussion 0.30 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **SAS 020 – Genetics & Society (4 units)**

*Course Description:* Basic concepts of genetics, modern methods of biotechnology, the process of scientific discovery and the public perception of the process; present and future impact of genetics on society.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed SAS 140.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Scientific Literacy (SL); Writing Experience (WE).

## **SAS 025 – Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences (4 units)**

*Course Description:* Causes of global climate change and the biological, geophysical, and social consequences of such change. Methods used by different scientists for predicting future events. Complexity of global affairs. Decision making under uncertainty.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Tutorial 1 hour(s).

*Credit Limitation(s):* Students cannot take both SAS 025 & SAS 025V for credit.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **SAS 025V – Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences (4 units)**

*Course Description:* Causes of global climate change and the biological, geophysical, and social consequences of such change. Methods used by different scientists for predicting future events. Complexity of global affairs. Decision making under uncertainty.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 1 hour(s), Auto Tutorial 1 hour(s).

*Credit Limitation(s):* Students cannot take both SAS 025 & SAS 025V for credit.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **SAS 030 – Mushrooms, Molds, & Society (3 units)**

*Course Description:* Fungi as organisms with which humans interact daily, societal issues arising from these interactions. Fungi in medicine, religion, agriculture, and industry, as well as cultural perceptions of fungi.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

## **SAS 035 – Germs: The Good, the Bad, & the Ugly (3 units)**

*Course Description:* Impact of microorganisms on Earth, Humans and Society. Historical, scientific, and contemporary issues dealing with microbes on natural and built environments.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 60 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Writing Experience (WE).

## **SAS 040 – Photography: Bridging Art & Science (3 units)**

*Course Description:* Photography is used to explore the common ground between art and science. Photographic processes, creativity and aesthetics, chaos and order, principles of space, time and light. Photographic interpretation and documentation of the natural world. Camera required.

*Learning Activities:* Lecture 2 hour(s), Studio 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **SAS 041 – Understanding Performance: Appreciation of Modern Theatre, Dance, Film & Performance Art (4 units)**

*Course Description:* Relevance of theatre and performance to modern culture, science and society. Approaches to theatre/dance/media/ performance art, integrated into Mondavi Centre for the Arts and Theatre and Dance Department programs.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* DRA 005.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **SAS 042 – Earth, Water, Science, Song (3 units)**

*Course Description:* Fusion of water and soil science with performing arts. Creative communication of scientific concepts and facts through exercises in song writing and poetry. Design, discuss and conduct public performances related to the functioning of the natural world.

*Learning Activities:* Lecture 2 hour(s), Studio 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Oral Skills (OL).

## **SAS 043 – Energy, Materials, & Design Over Time (4 units)**

*Course Description:* Global history of design across time, viewed through the lens of the effects of the creation and discovery of new energy sources, processes, and materials on design.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* DES 040A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SAS 070A – Genetic Engineering in Medicine, Agriculture, & Law (5 units)**

*Course Description:* Historical and scientific study of the impact of genetic engineering in medicine, agriculture, and law, including examination of social, ethical, and legal issues raised. Offered in a distance-learning format.

*Learning Activities:* Lecture 5 hour(s).

*Enrollment Restriction(s):* Not open to students who have completed BIS 002A, BIS 002B, BIS 002C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL).

## **SAS 090A – Issues in Environmental & Resource Sciences (2 units)**

*Course Description:* Discussion of historical and current issues in environmental and resource sciences. Lectures, reading and field trips will provide background for selected topics.

*Prerequisite(s):* Limited to lower division students.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **SAS 090B – Observing & Writing in Biology (2 units)**

*Course Description:* Observe the interactions between microscopic organisms, conduct simple laboratory experiments, describe and analyze observations and discuss scientific observations and writing.

*Learning Activities:* Seminar 1 hour(s), Laboratory 1 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SAS 090E – Biotechnology-a New Era, a New Struggle (2 units)**

*Course Description:* Animal biotechnology and its applications. Discussion topics include potential societal impacts of various technologies, factors shaping public opinion, and ethical and moral questions arising from new biotechnology applications.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **SAS 090F – Food Distribution in a Hungry World (2 units)**

*Course Description:* The biological, technological, environmental, and socioeconomic factors related to food distribution systems at local, regional, national, and international levels. The potential for increasing world food supply by reducing losses between harvest and consumption.

*Learning Activities:* Seminar 2 hour(s).

*Enrollment Restriction(s):* Limited to 15 students.

*Grade Mode:* Letter.

## **SAS 090G – Science, Society & the Environment (2 units)**

*Course Description:* Contemporary environmental issues, scientific approaches to addressing these issues, and accompanying societal and ethical considerations.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Letter.

## **SAS 090X – Lower Division Seminar (1-4 units)**

*Course Description:* Examination of a special topic in Science & Society through shared readings, discussions, written assignments, or special activities such as fieldwork, laboratory work, etc.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Seminar 1-4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **SAS 092 – Internship in Science & Society (1-12 units)**

*Course Description:* Supervised internship on and off campus, in the community, or in institutional settings.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SAS 097T – Tutoring in Science & Society (2-3 units)**

*Course Description:* Tutoring in undergraduate Science & Society courses. Assisting with leading discussion groups under supervision of instructor(s) and teaching assistants. Acting as liaison between the students and course instructor(s) to foster effective communication and interaction.

*Prerequisite(s):* Consent of instructor. Lower division standing; completion of course being tutored.

*Learning Activities:* Discussion/Laboratory 6-9 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **SAS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **SAS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Discussion 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SAS 106 – Career Discovery Groups for Transfer Students (1 unit)**

*Course Description:* Campus resources for career exploration and professional development. Skills needed to find and secure career opportunities, including job searches, professional communication, interviews, and preparation of resumes and cover letters. Intended for transfer students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1.50 hour(s).

*Enrollment Restriction(s):* Open to transfer students entering the College of Agricultural and Environmental Sciences only.

*Grade Mode:* Pass/No Pass only.

## **SAS 109 – Environmental Change, Disease & Public Health (4 units)**

*Course Description:* Analysis of environmental changes from pre-history to the present and their influence on disease distribution, virulence and public health. Focus on critical study of many human-driven environmental changes and the accelerated transformation/spread of pathogens under globalization.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Credit Limitation(s):* Not open for credit to students who have taken HIS 109B.

*Cross Listing:* HIS 109.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS); Scientific Literacy (SL); World Cultures (WC).

## **SAS 110 – Applications of Evolution in Medicine, Human Behavior, & Agriculture (4 units)**

*Course Description:* Applications of evolutionary biology in medicine, human behavior, and agriculture. Examination of the imprint of evolution on the human life cycle from conception to death.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 60 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **SAS 120 – Science & Contemporary Societal Issues (3 units)**

*Course Description:* Study of a contemporary societal issue/problem emphasizing critical thinking with information drawn from several disciplines. Multiple instructors illustrate the necessity of an interdisciplinary and cooperative approach in solving important issues. Topics will vary.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

## **SAS 121 – Global Poverty: Critical Thinking & Taking Action (4 units)**

*Course Description:* Social science and engineering analysis of causes and effects of world poverty and of policies to reduce it via economic growth, foreign aid, and community-level interventions; e.g., in potable water, sanitation, lighting, small scale energy, irrigation, health and microfinance.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **SAS 130 – Contemporary Leadership (4 units)**

*Course Description:* Leadership, including issues, skills, and practices as they relate to individuals, organizations, diverse social settings and communities. Written and verbal communications, personality styles for collaborative work, and ethics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Seminar 1 hour(s).

*Enrollment Restriction(s):* Limited to 40 students.

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL).

## **SAS 145 – Digital Communication in Agricultural, Environmental, & Human Sciences (3 units)**

*Course Description:* Use digital media to communicate a succinct, compelling story. In lecture, discussion and activities, create storyboards and scripts, use video, audio, and editing technology, and produce a short media-rich video to effectively convey a message.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 1.50 hour(s), Studio 1.50 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Visual Literacy (VL).

## **SAS 190X – Science & Society Seminar (1-4 units)**

*Course Description:* In-depth examination at an upper division level of a special topic in Science and Society. Emphasis upon student participation in learning.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Limited to 20 students.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **SAS 192 – Internship in Science & Society (1-12 units)**

*Course Description:* Supervised internship on or off campus, in the community, or in institutional settings.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SAS 197T – Tutoring in Science & Society (1-5 units)**

*Course Description:* Tutoring of students in Science & Society courses. Assistance with discussion groups and laboratory sections under supervision of instructor.

*Prerequisite(s):* Consent of instructor. Upper division standing; completion of course being tutored or the equivalent.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated if tutoring another Science & Society course.

*Grade Mode:* Pass/No Pass only.

## **SAS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **SAS 199 – Special Study in Science & Society (1-5 units)**

*Course Description:* Special study in Science & Society.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **SAS 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SAS 299 – Graduate Research (1-12 units)**

*Course Description:* Graduate research.

*Prerequisite(s):* Consent of instructor; graduate student.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SAS 390 – Teaching Methods in Science & Society (1 unit)**

*Course Description:* Practical experience in methods and problems related to teaching Science & Society courses. Discussion of critical pedagogies specific to teaching of science-societal issues, preparing for and conducting discussion sessions, analyses of texts and supporting material, formulation of assignments, exams.

*Prerequisite(s):* Consent of instructor; graduate level.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Science & Technology Studies (STS)**

**College of Letters & Science**

## **STS 001 – Introduction to Science, Technology & Medicine Studies (4 units)**

*Course Description:* History, philosophy, sociology, politics, and cultural studies of science, technology, and medicine. Emphasis on a broad range of perspectives.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **STS 002 – Introduction to the History of Science & Technology (4 units)**

*Course Description:* Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a long-term historical perspective.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* HIS 002.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Scientific Literacy (SL); World Cultures (WC); Writing Experience (WE).

## **STS 002Y – Introduction to the History of Science & Technology (4 units)**

*Course Description:* Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a long-term historical perspective.

*Learning Activities:* Lecture 2 hour(s); Discussion 1 hour(s); Web Virtual Lecture 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken HIS 002 or STS 002.

*Cross Listing:* HIS 002Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Scientific Literacy (SL); World Cultures (WC); Writing Experience (WE).

## **STS 011 – Science on Trial: Law, Science, & Technology in the United States (4 units)**

*Course Description:* Relationships among law, technology, and science. Scientific evidence and testimony, biology education, patenting, and sterilization.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH).

## **STS 012 – Epidemics & Society (4 units)**

*Course Description:* Epidemics in world history and the cultural impacts of contagious diseases. The roles of science, medicine, media, and the arts in shaping social conceptions of health and illness.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Scientific Literacy (SL); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **STS 016 – Sex, Science, & Society (4 units)**

*Course Description:* Survey of the relationship between sex, science, and society in the history of the modern world. Emphasis on the development of scientific ideas about the human body against broader social, cultural, and political trends and from a global viewpoint.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* HIS 016.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Scientific Literacy (SL); World Cultures (WC); Writing Experience (WE).

## **STS 032 – Drugs, Science & Culture (4 units)**

*Course Description:* Drugs, politics, science, society in a cultural perspective: emphasis on roles of science, government and the media in shifting attitudes toward alcohol, marijuana, Prozac and other pharmaceuticals; drug laws, war on drugs and global trade in sugar, opium, cocaine.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ANT 032.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL); Writing Experience (WE).

## **STS 040A – Media History 1, Gutenberg to Oppenheimer (4 units)**

*Course Description:* History of Media to 1945, with particular focus on mechanically reproduced mass media technologies including the printing press, the newspaper, photography, cinema, radio and early computing technology. Analysis of inter-related cultural and political topics.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Film Viewing 2 hour(s), Extensive Writing.

*Cross Listing:* CTS 040A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **STS 040B – Media History 2 1945-Present (4 units)**

*Course Description:* History of media from 1945 to present, with particular focus on the development of the computer, digital network and Internet technologies in the context of other media infrastructures like radio, television and satellite networks. Analysis of inter-related cultural/political topics.

*Prerequisite(s):* STS 040A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Film Viewing 2 hour(s), Extensive Writing.

*Cross Listing:* CTS 040B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

## **STS 050 – Ancient Science (4 units)**

*Course Description:* Study of science in ancient Greece and Rome; consideration of its social context; concentration on the basic concepts of physics the world of medicine and biology the history of mathematics and the practices of astronomy astrology and meteorology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* CLA 050.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **STS 051 – Ancient Medicine (4 units)**

*Course Description:* Medicine in ancient Greece and Rome; physiological conceptions of the body within scientific and social frameworks; exploration of sanitation technology and health in antiquity; medical treatment of the female body; medicine and the economy.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* CLA 051.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**STS 092 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the program in Science & Technology Studies under the supervision of a member of the faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**STS 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Social Sciences (SS).

**STS 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable 3-15 hour(s).

*Grade Mode:* Pass/No Pass only.

**STS 100 – Methods in Science, Technology, & Medicine Studies (4 units)**

*Course Description:* Methodological approaches for studying science, technology, and medicine in social context. Detailed case studies illustrate different historical, philosophical, sociological, ethical, rhetorical, and political methods of analysis.

*Prerequisite(s):* STS 001 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/Discussion.

*Credit Limitation(s):* Only two units of credit for students who have previously taken STS 020.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL).

**STS 101 – Data & Society (4 units)**

*Course Description:* Basic concepts in data science from a socio-cultural perspective. Identifying data stakeholders and their biases, reading and evaluating data documentation, exploring data through analysis and visualization, identifying knowledge gaps, and assessing data ethics.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

**STS 108 – Intellectual Property in Science (4 units)**

*Course Description:* Historical and conceptual framework for contemporary debates about intellectual property and science. Topics include U.S. patent system and copyright law, interaction between patents and industrial policy, credit in academic and industrial science, role of IP in global knowledge politics.

*Prerequisite(s):* STS 001; or other Social Science or Humanities writing course.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**STS 109 – Visualization in Science: A Critical Introduction (4 units)**

*Course Description:* Anthropological approaches to scientific visualization techniques, informatics, simulations. Examination of different visualization techniques toward understanding the work involved in producing them, critical assessment of their power and limits, especially when visualizations are used socially to make claims.

*Prerequisite(s):* STS 001 or STS 020 or ANT 002 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Cross Listing:* ANT 109.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL); Writing Experience (WE).

**STS 110 – Computing, Data, & Law in the United States (4 units)**

*Course Description:* Introduction to the problems in American law and policy borne out of the creation and use of information technologies. Topics include intellectual property, corporate law, privacy, and emerging problems surrounding big data.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**STS 112 – Visualizing Society with Data (4 units)**

*Course Description:* Analysis and visualization of historical and contemporary data about populations and societies using R. Critical exploration of visual communication of information about people over time and critical assessment of role of data collection and analysis in societies.

*Learning Activities:* Lecture/Lab 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD); Quantitative Literacy (QL).

**STS 113 – Business & Technology in the United States: From Electricity to E-Commerce (4 units)**

*Course Description:* Historical introduction to the joint development of business and technology in the United States from the late-19th century to the present day.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

**STS 114 – The Global Information Age (4 units)**

*Course Description:* Introduction to the global spread of information technologies like computers and smartphones. Special focus on their social, cultural, and commercial impact.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **STS 115 – Data Sense & Exploration: Critical Storytelling with Analysis (4 units)**

*Course Description:* Data science and the communication of data insights through critical storytelling. Attention to the historical and social contexts of data analysis, emphasizing narrative, visualization, and exploration. Introduction to the R computing environment for data analysis.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL).

## **STS 120 – Religion, Magic & Science (4 units)**

*Course Description:* Religion, magic, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Cross Listing:* RST 120.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

## **STS 121 – Special Topics in Medical Anthropology (4 units)**

*Course Description:* Introduction to critical medical anthropology. Topics include anthropological analysis of bio-medicine, psychiatry, systems of knowledge and healing, the body, emotions, and clinical encounters in a cross-cultural perspective.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Cross Listing:* ANT 121.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **STS 122 – Health & Medical Technologies (4 units)**

*Course Description:* Critical/historical examination of medical technologies: imaging, pharmaceuticals, genetics, implants/devices. Exploration of mutually constitutive relationship between health, medical technologies, social difference (race/gender/class/sexuality).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **STS 129 – Health & Medicine in a Global Context (4 units)**

*Course Description:* Recent works in medical anthropology and the science studies of medicine dealing with social and cultural aspects of global health issues such as AIDS, pandemics, clinical trials, cultural differences in illnesses, diabetes, organ trafficking, medical technologies, illness narratives, and others.

*Prerequisite(s):* ANT 002 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* ANT 129.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

## **STS 130A – From Natural History to the History of Nature (4 units)**

*Course Description:* Evolution and demise of natural history as a discipline from Aristotle to Linnaeus. Considers ancient views of nature and its Renaissance rediscovery; the emergence of biology, botany, geology, and zoology; the history of taxonomy and classification.

*Prerequisite(s):* HIS 135A recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Writing Experience (WE).

## **STS 130B – History of Modern Biology (4 units)**

*Course Description:* Development of modern biology from pre-Darwinian roots to the present. Considers emergence of modern biological specialities and consolidation of biological theory around evolutionary ideas. History of allied fields such as genetics, paleontology, embryology, ecology, systematics and molecular biology.

*Prerequisite(s):* STS 130A recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Writing Experience (WE).

## **STS 131 – Darwin (4 units)**

*Course Description:* Students will explore the life and times of Charles Darwin and will trace the development of evolutionary thinking before and after the Origin of Species to appreciate its place in Victorian society and in the corpus of Darwins thought.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Writing Experience (WE).

## **STS 136 – Scientific Revolution (4 units)**

*Course Description:* Rise of modern science in Europe, 1500–1750. Transformation of ideas about nature, knowledge, medicine, and technology in the age of Copernicus, Vesalius, Galileo, Descartes, and Newton.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Cross Listing:* HIS 136.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); World Cultures (WC).

## **STS 140 – Science & Race (4 units)**

*Course Description:* Race and racial formations in science, technology, and medicine. History of racial thought in scientific and medical research; colonial and decolonial modes of knowledge production; the racialization of technology; intersectional approaches to technoscience, social justice, environmental justice, and health care equity.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL).

**STS 150 – Gender & Science (4 units)**

*Course Description:* Interdisciplinary approach to the relations between gender and science. Topics include the biological and cultural construction of sexual difference, the role of women as practitioners of science, and feminist approaches to science.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**STS 151 – Media Theory (5 units)**

*Course Description:* Critical and theoretical approaches to the emergence of new technologies since the invention of photography. Examine various approaches to media (formalist, semiotic, structuralist, Frankfurt School, cybernetics, visual and game theory).

*Prerequisite(s):* CDM 002 or CDM 003 recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Film Viewing 3 hour(s), Extensive Writing.

*Cross Listing:* CDM 151.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**STS 152 – Sounding Data: Critical Approaches to Sonification (4 units)**

*Course Description:* Critical and creative approaches to auditory data and display in art, science, and technology. Practical introduction to sonification techniques through sound studies and sensory ethnography. Heuristic listening and collaborative sound design.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**STS 160 – Ghosts of the Machine: How Technology Rewires our Senses (4 units)**

*Course Description:* Historical, aesthetic and critical approaches to how information technologies produced ghost effects or a sense of terror in response to new media like the photograph, gramophone, film, typewriter, computer, Turing Machine. Focus on technological media transforms sense perception.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Cross Listing:* TCS 160.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

**STS 161 – Time: Mechanism & Measurement (4 units)**

*Course Description:* Cultural concepts of time; units and instruments of time measurement; historical differences in the social organization of time; and time measurement in 20th-century science.

*Prerequisite(s):* STS 001.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**STS 162 – Surveillance Technologies & Social Media (4 units)**

*Course Description:* Study of the ubiquitous presence of CCTV, face recognition software, global tracking systems, biosensors, and data mining practices that have made surveillance part of our daily life. Exploration of the boundary between security and control, information and spying.

*Prerequisite(s):* STS 020 or TCS 001.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s), Term Paper.

*Cross Listing:* CTS 162.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Oral Skills (OL); Visual Literacy (VL); Writing Experience (WE).

**STS 163 – History of Communication Technologies (4 units)**

*Course Description:* History of communication technologies from the late Middle Ages to the 20th century. Questions of technology, knowledge, power and culture. Particular attention to questions about information and truth.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**STS 164 – Writing Science (4 units)**

*Course Description:* Texts and writing practices in the production of scientific knowledge. Surveys the literary structure of scientific arguments; history of scientific genres; rhetoric and semiotics in scientific culture; graphical systems in the experimental laboratory; narratives of science, including science fiction.

*Prerequisite(s):* STS 001 or ENL 003; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Cross Listing:* ENL 164.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Scientific Literacy (SL); Writing Experience (WE).

**STS 165 – Built Environments (4 units)**

*Course Description:* Built environments, which are designed to support forms of life. Their role as carriers of cultural memory and in turning knowledge of nature into social assets. Historical constellations of knowledge, social order, and power.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**STS 172 – Video Games & Culture (4 units)**

*Course Description:* Critical approaches to the study of video games, focusing on formal, historical, and cultural modes of analysis. History of software and hardware in North American and global contexts. Relations of games to society, politics, economics, media, etc.

*Prerequisite(s):* CDM 072 or ENL 072 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken CTS 172 (former course CTS 172).

*Cross Listing:* CDM 172, ENL 172.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

**STS 173 – Science Fiction (4 units)**

*Course Description:* The literary modes and methods of science fiction. Representative texts, authors, and themes of the genre; e.g., time travel, alternative universes, and utopias. Relations of science fiction to science, philosophy, and culture.

*Prerequisite(s):* STS 001 or ENL 003; or equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Cross Listing:* ENL 173.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**STS 175 – Laboratory Studies Lab (4 units)**

*Course Description:* Hands-on training in Science & Technology Studies fieldwork, interviewing, archival research and data analysis. Review of laboratory studies literature, informed consent procedures, ethics, and care of the data. Individual and group projects possible.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

**STS 176 – Sociology of Knowledge, Science, & Scientific Knowledge (4 units)**

*Course Description:* Social, cultural, and historical dimensions of knowledge, especially scientific knowledge. Problems, methods, and theory in sociology of scientific knowledge. Laboratory and historical case studies. Scientific and technical knowledge in institutional and organizational contexts.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* SOC 176.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**STS 180 – Topics in Science & Technology Studies (4 units)**

*Course Description:* In-depth treatment of selected topics in anthropology, history, philosophy, and sociology of science and related fields. Possible topics include science and society, science and power, scientific explanation, technology and culture, theory testing.

*Prerequisite(s):* Course in Science Technology Studies (STS) or other course-work relevant to topic.

*Learning Activities:* Term Paper, Seminar 3 hour(s).

*Repeat Credit:* May be repeated when content varies.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**STS 190 – Seminar in Science, Technology & Medicine Studies (4 units)**

*Course Description:* Intensive reading, discussion, research and writing by small groups in selected topics of science, technology, and medicine studies scholarship. Emphasis on individual research projects.

*Prerequisite(s):* Open to junior and senior Science Technology Studies majors only.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**STS 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the program in Science & Technology Studies under the supervision of a member of the faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 3 time(s) up to 12 units.

*Grade Mode:* Pass/No Pass only.

**STS 194A – Research in Science & Technology Studies (4 units)**

*Course Description:* Directed reading and research in preparation for a thesis project.

*Prerequisite(s):* Consent of instructor; senior standing faculty approval recommended.

*Learning Activities:* Independent Study, Extensive Writing, Tutorial 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**STS 194B – Advanced Research in Science & Technology Studies (4 units)**

*Course Description:* Development of a research thesis, supervised by a faculty member.

*Prerequisite(s):* STS 194A; consent of instructor; senior standing faculty approval recommended.

*Learning Activities:* Term Paper, Tutorial 3 hour(s), Independent Study.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**STS 195 – Research in Data Studies (4 units)**

*Course Description:* Analysis of real-world data in the form of case studies engaging current issues. Emphasizes teamwork in the identification of problems and sources of relevant data; data cleaning, exploration, analysis, and visualization using R; and interpretation and presentation of results to a variety of stakeholders in oral, visual, and textual formats.

*Prerequisite(s):* STS 101; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**STS 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**STS 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**STS 200 – Theories & Methods in Science & Technology Studies (4 units)**

*Course Description:* Theories and methods of Science & Technology Studies as a field of critical and empirical scholarship, and examination of various contexts in which STS has emerged worldwide.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) with consent of instructor.

*Grade Mode:* Letter.

**STS 205 – Contemporary Issues in Science & Technology Studies (4 units)**

*Course Description:* Recent topics, debates, and innovative methods in Science & Technology Studies. Issues may include the governance of technoscience, science and media, data studies, indigenous knowledge, science and globalization, citizen science, new and emerging technologies.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**STS 210 – Digital Technologies: History & Theory (4 units)**

*Course Description:* Introduction to the history and theory of digital technologies. Human-machine interaction, cybernetics, software studies, and global networking.

*Learning Activities:* Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STS 250 – History & Philosophy of Science (4 units)**

*Course Description:* Interdisciplinary seminar in the history and philosophy of science. Focuses on issues such as historiography, methodology, and the conceptual foundations of science.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

**STS 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STS 299 – Research (1-12 units)**

*Course Description:* Research,

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STS 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Social Theory & Comparative History (STH)**

Graduate Studies

**STH 250 – Research in Social Theory & Comparative History (4 units)**

*Course Description:* Theoretically informed research in comparative history. Students read exemplary works and learn to frame their own research projects. Presentations include Center for History, Society, & Culture faculty and visitors discussing current research.

*Prerequisite(s):* Admission to Social Theory Comparative History Designated Emphasis.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STH 290 – Advanced Topics in Social Theory & Comparative History (4 units)**

*Course Description:* Interdisciplinary study of particular substantive problems in social theory and comparative history. Topics vary.

*Prerequisite(s):* HIS 204 or SOC 242A; and consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STH 295 – Advanced Group Research in Social Theory & Comparative History (1 unit)**

*Course Description:* Participation in research workshops sponsored by the Center for Comparative Research for History, Society, & Culture.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **STH 296 – Theory & Society Journal Editorial Workshop (1-4 units)**

*Course Description:* Reading and offering workshop critiques of papers submitted for publication. Reading and discussion of other relevant work in history and the social science.

*Learning Activities:* Workshop 1 hour(s), Independent Study 3 hour(s).

*Repeat Credit:* May be repeated 36 unit(s) with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Sociology (SOC)**

College of Letters & Science

## **SOC 001 – Introduction to Sociology (5 units)**

*Course Description:* Principles and basic concepts of sociology. The study of groups, culture, collective behavior, classes and caste, community and ecology, role, status, and personality.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **SOC 002 – Self & Society (4 units)**

*Course Description:* Exploration of how self and identity are formed and transformed by socialization and social interaction in relation to roles, groups, institutions, power, and social change. Consideration of how people make decisions, fall in love, and come to blows.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **SOC 003 – Social Problems (4 units)**

*Course Description:* General sociological consideration of contemporary social problems in relation to sociocultural change and programs for improvement.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **SOC 004 – Immigration & Opportunity (4 units)**

*Course Description:* Social and demographic analysis of immigration: motives and experiences of immigrants; immigration and social mobility; immigration, assimilation, and social change; multicultural societies. Detailed study of immigration into the U.S., with comparative studies of Europe, Australia, and other host countries.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

## **SOC 005 – Global Social Change: An Introduction to Macrosociology (4 units)**

*Course Description:* Introduction to change and diversity in world history, including the United States. Examines population and family, technological change and economic development, power and status, culture and identity.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); World Cultures (WC).

## **SOC 006 – Health & Illness (4 units)**

*Course Description:* Introduction to the sociology of health and illness, including social determinants of health, social inequalities in health/health disparities, social construction of health, the organization of health care, and the politics of health care reform.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **SOC 007 – Race & Ethnicity (4 units)**

*Course Description:* Introduction to the sociology of race and ethnicity in the U.S., including historical changes in racial and ethnic categories, mechanisms of racism, anti-racist social movements, the role of social policy in shaping patterns of racial inequality.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **SOC 011 – Sociology of Labor & Employment (4 units)**

*Course Description:* Labor and employment issues in the contemporary United States with some use of historical and comparative materials. Topics include strategies pursued by employers and employees, labor market discrimination and the role of social policies in shaping labor markets.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 012Y – Data Visualization in the Social Sciences (4 units)**

*Course Description:* Introduction to quantitative data across the social sciences (Communications, Political Science, Psychology, Sociology, and other disciplines). Transforming data, describing data, producing graphs, visual reasoning, and interpretations.

*Learning Activities:* Lecture 2 hour(s), Laboratory 1.50 hour(s), Web Virtual Lecture 1.50 hour(s).

*Cross Listing:* CMN 012Y, PSC 12Y, POL 012Y.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL); Visual Literacy (VL).

## **SOC 025 – Sociology of Popular Culture (4 units)**

*Course Description:* Social mechanisms that shape modern popular culture. High, folk, and mass culture: historical emergence of popular culture. Mass media, commercialization, ideology and cultural styles. Theories and methods for analyzing cultural expressions in pop music, street art, film, television, and advertising.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Visual Literacy (VL).

**SOC 046 – Introduction to Social Research Methods (4 units)**

*Course Description:* Examination of logic and methods of sociological research. Selection and definition of problems of investigation, data-gathering techniques, and sampling.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SOC 046A.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 056 – Introduction to Social Statistics (5 units)**

*Course Description:* Data-analysis techniques, measurement, scaling, multivariate analysis, and quantitative measures of association.

*Prerequisite(s):* SOC 046 recommended.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SOC 046B.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

**SOC 056Y – Introduction to Social Statistics (5 units)**

*Course Description:* Data-analysis techniques, measurement, scaling, multivariate analysis, and quantitative measures of association.

*Prerequisite(s):* SOC 046 recommended.

*Learning Activities:* Lecture/Discussion 1.5 hour(s), Web Virtual Lecture 1.5 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SOC 046B or SOC 056.

*Grade Mode:* Letter.

*General Education:* Quantitative Literacy (QL).

**SOC 092 – Internship & Research Practicum (1-6 units)**

*Course Description:* Supervised internship and study in an agency, organization, or institution; application of sociological concepts to the work experience.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-18 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Pass/No Pass only.

**SOC 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily intended for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**SOC 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**SOC 100 – Origins of Modern Sociological Theory (4 units)**

*Course Description:* Origins of modern sociological thought. Special emphasis on three major theorists from the classical tradition of 19th-century European social thought: Karl Marx, Max Weber, and Emile Durkheim.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 103 – Evaluation Research Methods (4 units)**

*Course Description:* Surveys applications of research methods to the evaluation of social programs, primarily emphasizing methodological issues, e.g., research design and data collection; uses of evaluation research are also discussed and placed in theoretical context.

Participation in an evaluation project.

*Prerequisite(s):* SOC 001 or SOC 002 or SOC 003 recommended; SOC 046A and SOC 046B recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Scientific Literacy (SL).

**SOC 104 – The Political Economy of International Migration (4 units)**

*Course Description:* Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation.

*Prerequisite(s):* SOC 001, SOC 002, SOC 003, or SOC 004 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* IRE 104.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

**SOC 106 – Intermediate Social Statistics (5 units)**

*Course Description:* Intermediate level course in statistical analysis of social data, emphasizing the logic and use of statistical measures, procedures, and mathematical models especially relevant to sociological analysis.

*Prerequisite(s):* SOC 046B or SOC 056; or consent of instructor.

*Learning Activities:* Lecture 4 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL).

**SOC 118 – Political Sociology (4 units)**

*Course Description:* Relation of social cleavages and social cohesion to the functioning of political institutions; the social bases of local and national power structures; social sources of political movement, analysis of concepts of alienation, revolution, ideology, ruling class, and elite.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 120 – Deviance (4 units)**

*Course Description:* Social structural sources, institutional practices and microprocesses associated with illegality, evil, disease, immorality, disability, racial and class differences, citizenship, and the body. Special emphasis on expert knowledge and the production and management of social difference.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 122 – Sociology of Adolescence (4 units)**

*Course Description:* Chronological age and social status; analysis of social processes bearing upon the socialization of children and adolescents. The emergence of youth cultures. Generational succession as a cultural problem.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 124 – Education & Inequality in the U.S. (4 units)**

*Course Description:* Functions of schooling in contemporary U.S. society. Racial, ethnic, social class, and gender inequalities in student outcomes. Consideration of classic and current controversies in the sociology of education and education policy.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 125 – Sociology of Culture (4 units)**

*Course Description:* Sociological approaches to study of historical and contemporary culture and mass media, and their structuring in relation to social actors, institutions, stratification, power, the production of culture, audiences, and the significance of culture in processes of change.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 126 – Social Interaction (4 units)**

*Course Description:* Everyday interaction in natural settings; ethnographic approaches to the understanding of social meanings, situations, personal identity and human relationships. Particular attention to the work of Erving Goffman and to principles of field observation and qualitative analysis.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 128 – Interracial Interpersonal Dynamics (4 units)**

*Course Description:* Analysis of the influences of cultural differences and racial stratification on interpersonal interaction in instrumental settings (e.g., work, education, political action) and intimate settings (e.g., friendship, love, marriage, family). Minority/majority relationships.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 129 – Sociology of Black Experience in America (4 units)**

*Course Description:* Survey of historical and contemporary theoretical sociological perspectives on the Black experience in United States. Emphasis on comparisons of Black sociological perspectives and mainstream perspectives of specific sociologists.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SOC 130 – Race Relations (4 units)**

*Course Description:* Functions of the social definitions of race and racial groups. Analysis of racial conflict, oppression, and other forms of ethnic stratification. Models of ethnic interaction and social change. Emphasis on racial relationships within the U.S.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SOC 131 – The Family (4 units)**

*Course Description:* Contemporary family life in historical and cross-cultural perspective. How different family forms arose, their significance today and prospects for further family change. Attention to power relations within and beyond the family and to the social implications of family transformation.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SOC 132 – The Sociology of Gender (4 units)**

*Course Description:* Analysis of biological, psychological, cultural and structural conditions underlying the status and roles of men and women in contemporary society, drawing on a historical and comparative perspective.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SOC 133 – Sexual Stratification & Politics (4 units)**

*Course Description:* Analysis of origins, dynamics, and social implications of sexual stratification. Examination of classical and contemporary theorists such as Engels, Freud, J.S. Mill, de Beauvoir, Juliet Mitchell, D. Dinnerstein. Attention to selected issues in social movements for and against sexual equality.

*Prerequisite(s):* Consent of instructor; SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 135 – Social Relationships (4 units)**

*Course Description:* Social and cultural factors influencing friendships and intimate relationships. Topics include relationship development, relationship maintenance, and relationship loss.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 137 – African American Society & Culture 1790 to 1990 (4 units)**

*Course Description:* Political and social transformations of African American communities between 1790 and 1990, as seen through film, literature, and music. Topics include: Black consciousness, Afro-Slave culture, The Harlem Renaissance, and contemporary Hip Hop.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SOC 138 – Economic Sociology (4 units)**

*Course Description:* Overview of the rapidly growing field of economic sociology. Focus on variations in the ways that markets are organized. The relationship between individual and collective rationality will also be emphasized.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); World Cultures (WC).

**SOC 139 – Corporations & Society (4 units)**

*Course Description:* Study of the history and power of the modern corporation; corporate organization; politics, the state, and the corporation; labor unions and the labor process; competition, regulation and international markets; the multinational and conglomerate corporation; and mass markets and consumerism.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH).

**SOC 140 – Social Stratification (4 units)**

*Course Description:* Systems of social ranking, theories of stratification; power, prestige, culture, and styles of life of various social classes; social mobility and its consequences for social structure.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SOC 141 – Industrialization & Social Change (4 units)**

*Course Description:* Selected technological and social factors.

Preconditions of economic development and industrialization. Social, political, and cultural issues at various levels of economic development. Major historical differences and major current trends. Emphasis either on highly industrialized countries or on less developed countries.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 143A – Urban Society (4 units)**

*Course Description:* Theories of city origins. Analysis of the historic process of urbanization and of varying city types.

Comparison of American and European experience of metropolitanization, counterurbanization, and neighborhood change. Consideration of competing theories of urban growth and change and competing visions of the urban future.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 143B – Sociology of City Life (4 units)**

*Course Description:* Critical dissection of the loss of community issue. Analysis of the organization of primary ties in the city, of the culture of urban public life and of the learning of city skills.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 144 – Agriculture & Society (4 units)**

*Course Description:* Development of agriculture as a major enterprise in modern society with the concomitant reduction in the labor force and family farms. Analysis of issues including mechanization, migrant labor, corporate farming, and public resource policy.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 145A – Sociology of Third World Development (4 units)**

*Course Description:* Introduction to theories and contemporary issues in the sociology of development. Topics such as urbanization, rural/agrarian change, class, status groups, international division of labor, sectoral shifts, international capital, informal economy, gender, and political processes are analyzed within a comparative-historical framework.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **SOC 145B – Gender & Rural Development in the Third World (4 units)**

*Course Description:* Political-economic analysis of women and work during the process of socioeconomic change in the world with particular attention to the family/household context.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **SOC 146 – Sociology of Religion (4 units)**

*Course Description:* Relationship between social structures and religions. The social setting of the major world religions. Religious innovators and institutionalization (churches, sects, cults). Secularization in the modern world and the rise of secular ideologies.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 147 – Sociological Perspectives on East Asia (4 units)**

*Course Description:* Sociological theories and concepts applied toward understanding East Asian society. Emphasis on the political structure, stratification, and economy in China and Japan. Analysis of historical and contemporary similarities and differences.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **SOC 148 – Collective Behavior (4 units)**

*Course Description:* Study of behavior of human crowds and masses in extraordinary circumstances, including crowd panics, mass scares, collective protests, riots, revolutionary situations, ecstatic and revivalist gatherings, crazes, fads, and fashions.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 150 – Criminology (4 units)**

*Course Description:* Sociological analysis of criminal behavior in relation to social structure and the criminalization process.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 151 – The Criminal Justice System (4 units)**

*Course Description:* Sociological analysis of the different components of the criminal justice system including the emergence and interpretation of criminal laws, the contemporary roles and functions of the police, criminal courts and correctional institutions.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 152 – Juvenile Delinquency (4 units)**

*Course Description:* Study of juvenile delinquency in relation to the family, peer groups, community, and institutional structures. Consideration of processing of the delinquent by formal agencies of control.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s), Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 153 – The Sociology of Childhood (4 units)**

*Course Description:* Contemporary childhood in historical, cross-cultural, and global perspectives. Examine changes in understanding of the nature of childhood and "best interests of the child" by class, race, gender, geographic region, and historical period.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

## **SOC 155 – Sociology of Law (4 units)**

*Course Description:* Law considered as social control; relation of legal institutions to society as affecting judicial decision making and administration of justice. Lawyers as an occupational group. Legal reform.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 156 – Social Movements (4 units)**

*Course Description:* Analysis of several aspects of social movements: mobilization, forms of organization, ideology, recruitment, leadership, strategies and tactics, development, effects. Frequent use of sound and film materials.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 157 – Social Conflict (4 units)**

*Course Description:* Analysis of the causes, dynamics, and regulation of social conflict within and between various kinds of social groupings with particular reference to nonviolent methods of waging and regulating conflict.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 159 – Work, Employment, & Careers in the 21st Century (4 units)**

*Course Description:* Historical and contemporary overview of employment, work, and occupations in American society. Study of authority and power relations, labor markets, control systems, stratification, and corporate structures, and how these factors shape work in diverse or organizational and employment setting.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 160 – Sociology of the Environment (4 units)**

*Course Description:* Production, consumption, and urban expansion. Basic social logics surrounding current problems of resource scarcity (environmental extractions) and excess wastes (environmental additions). Ways that society can change and re-organize itself to become more environmentally conscious and hence ecologically sustainable.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC).

**SOC 161 – The Civil Justice System (4 units)**

*Course Description:* Empirical studies of the different aspects of the civil justice system in the United States and Global Society including the litigation, juries, civil rights, and international laws relating to trade, the environment, and human rights.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 162 – Society, Culture, & Health (4 units)**

*Course Description:* Analysis of how socio-cultural factors shape illness experience. Evaluation of how certain conditions come to be understood as health conditions; illness identities and biographies; doctor-patient interactions; biomedical cultures; how race, ethnicity, and gender shape health practices.

*Prerequisite(s):* SOC 001, SOC 002, SOC 003, or SOC 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

**SOC 163 – Population Health: Social Determinants & Disparities in Health (4 units)**

*Course Description:* Survey of the social determinants and disparities in health: measurement of population health; health transitions and global disparities; domestic disparities in health by class, race/ethnicity, nativity, gender, and sexual orientation; social determinants including social support, social stress, neighborhoods, and policy.

*Prerequisite(s):* SOC 001, SOC 002, SOC 003, or SOC 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

**SOC 164 – Health Policy & Politics (4 units)**

*Course Description:* Introduction to health policy and politics, including health care access and delivery, and policies related to health inequalities, the social determinants of illness and health behaviors.

*Prerequisite(s):* SOC 001, SOC 002, SOC 003, or SOC 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

**SOC 165 – Death & Dying (4 units)**

*Course Description:* Contemporary social dimensions of death, including cultural and historical variation. Social processes, organization, demographics, and cultural dimensions of death; social meanings of death and dying; medicalization; bereavement; hospice and funeral work; race, class, and gender.

*Prerequisite(s):* SOC 001, SOC 002, SOC 003 or SOC 006 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SOC 127.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SOC 170 – Population (4 units)**

*Course Description:* Introduction to the study of human population, including theories and statistical measures; social causes and consequences of population trends; changes in population structure; geographical distribution, migration, sociopsychological factors affecting fertility.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Quantitative Literacy (QL).

**SOC 171 – Sociology of Violence & Inequality (4 units)**

*Course Description:* How systems of social inequality organize the practice of violence. Definitions of violence and issues affecting the social capacity for violence. Analysis and comparison of different forms of violence associated with race, class, gender relations and social organization.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 172 – Intersections of Race, Gender & Class (4 units)**

*Course Description:* Sociological approaches to the intersections of race, class, gender and other forms of social difference. Theories of racism and racial identities. Application of intersectional analyses to historical and contemporary social problems and social movements.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Domestic Diversity (DD).

## **SOC 173 – Sociology Through Literature (4 units)**

*Course Description:* Introduction to analysis of literature as sociological data. Reading of numerous works on American and other societies by authors such as Steinbeck, Lewis, Dreiser, Schulberg, Orwell, etc.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 174 – American Jewish Identities & Communities (4 units)**

*Course Description:* Sociology of Jewish life, analyzing challenges to Jewish identity and community in the diaspora. Diversity within the Jewish community, Americanization, women, new immigrants, post-Holocaust Jewish identity, and LGBT Jews.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 176 – Sociology of Knowledge, Science, & Scientific Knowledge (4 units)**

*Course Description:* Social, cultural, and historical dimensions of knowledge, especially scientific knowledge. Problems, methods, and theory in sociology of scientific knowledge. Laboratory and historical case studies. Scientific and technical knowledge in institutional and organizational contexts.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* STS 176.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 178 – Punishment & Corrections (4 units)**

*Course Description:* Origins, characteristics, and consequences of various sanctions and punishment regimes including fines, banishment, incarceration, deportation, and execution.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 180A – Complex Organizations (4 units)**

*Course Description:* Develops a sociological approach to organizations theory. Designed to introduce sociological concepts, address the alternative psychological and economic models, and involve students in the practice of organizational analysis.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SOC 185 – Social Policy (4 units)**

*Course Description:* Examination of social policies that affect the well-being of individuals, families and groups, including such policies as old-age pensions, health insurance, and aid to the poor.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **SOC 185Y – Social Policy (Hybrid Version) (4 units)**

*Course Description:* Examination of social policies that affect the well-being of individuals, families and groups, including such policies as old-age pensions, health insurance, and aid to the poor.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Web Virtual Lecture 1.50 hour(s), Lecture 1.50 hour(s), Term Paper/Discussion 1 hour(s).

*Credit Limitation(s):* Students may not take both SOC 185 and SOC 185Y for credit.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

## **SOC 188 – Markets, Culture & Inequality in China (4 units)**

*Course Description:* Economic and political systems and patterns of social interaction and inequality in China. State and corporate structures and practices, market and consumer behaviors, social mobility and stratification, protest and resistance.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC).

## **SOC 192 – Internship & Research Practicum (1-6 units)**

*Course Description:* Supervised internship and study in an agency, organization, or institution; application of sociological concepts to the work experience. Maximum of 4 units may be counted toward the major.

*Prerequisite(s):* Consent of instructor; must have 84 units complete; faculty approval of proposed internship.

*Learning Activities:* Internship 3-18 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Pass/No Pass only.

### **SOC 193 – Workshop in Field Research (2 units)**

*Course Description:* Overview of the process of collecting, recording, analyzing, and reporting qualitative social data. Emphasis on application of principles; each participant completes an original research project.  
*Prerequisite(s):* SOC 046A; (SOC 192 (can be concurrent) or SOC 199 (can be concurrent)); SOC 192 or SOC 199 required concurrently for 2-4 units; senior standing.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed SOC 194HA.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Writing Experience (WE).

### **SOC 194HA – Special Study for Honors Students (4 units)**

*Course Description:* Directed reading and researching in the preparation for writing a Senior Honors Thesis for SOC 194HB.

*Prerequisite(s):* Senior standing and admission to the Honors Program.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

### **SOC 194HB – Special Study for Honors Students (4 units)**

*Course Description:* Under direction of faculty advisor, create a Senior Honors Thesis.

*Prerequisite(s):* SOC 194HA; senior standing and admissions to the Honors Program.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

### **SOC 195 – Special Topics in Sociological Analysis (4 units)**

*Course Description:* In-depth examination of topics in sociology. Emphasis on student research and writing.

*Prerequisite(s):* SOC 001, SOC 002, or SOC 003 recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

### **SOC 197T – Tutoring in Sociology (1-4 units)**

*Course Description:* Activities vary depending on the nature of the course assignment. May include (but not limited to) tutoring on course material, advising on projects and papers, and leading discussion groups.

*Prerequisite(s):* Upper division standing; completion of appropriate course with distinction.

*Learning Activities:* Tutorial 3-12 hour(s).

*Grade Mode:* Pass/No Pass only.

### **SOC 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **SOC 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study.

*Prerequisite(s):* Consent of instructor; must have 84 units complete and faculty approval.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

### **SOC 201 – Social Research (4 units)**

*Course Description:* Comparative survey of sociological inquiry, taught as a practicum. Philosophy of social science; values and research; research agendas and research problem formulations; research process; explanations; interpretation; study design; concept formation, measure, sampling, data acquisition, inference; rhetoric and presentation of findings.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

### **SOC 206 – Quantitative Analysis in Sociology (4 units)**

*Course Description:* Survey of the statistical models and methods that serve as a foundation for quantitative research in sociology, with an emphasis on multivariate regression analysis, as well as measurement theory and time series analysis.

*Prerequisite(s):* SOC 106.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

### **SOC 207A – Methods of Quantitative Research (4 units)**

*Course Description:* Principles of study design, examination of measurement, survey research methods and multivariate analysis. Stresses actual practice of techniques. Carry out quantitative data analysis using packaged computer programs.

*Prerequisite(s):* SOC 106; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 8 unit(s) with instructor approval.

*Grade Mode:* Letter.

### **SOC 208 – Topics in Advanced Quantitative Methods in Social Science (4 units)**

*Course Description:* Analysis of the logic and application of an advanced statistical model; the particular model chosen may vary. Emphasis on the model's assumptions, its strengths and weaknesses, its application for social science inquiry, and the relationship between methods and social theory.

*Prerequisite(s):* SOC 206; or the equivalent and graduate standing; major graduate students.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Letter.

### **SOC 215 – Economy, Polity, & Society (4 units)**

*Course Description:* Introduces students to topics and selected issues in the related fields of economic and political sociology and political economy.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate students in sociology & related disciplines.

*Grade Mode:* Letter.

**SOC 220 – Deviance, Law, & Social Control (4 units)**

*Course Description:* Report and discussions of literature on selected forms of deviance in relation to law and formal social control. Agency contacts and exploratory research projects.

*Prerequisite(s):* SOC 120; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Project.

*Grade Mode:* Letter.

**SOC 224 – Sociology of Education (4 units)**

*Course Description:* Overview of sociological theories accounting for the form, role, and evolution of educational systems. Emphasis on empirical research on education and social stratification and application to educational policy.

*Prerequisite(s):* SOC 206 or equivalent recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students or consent of instructor.

*Grade Mode:* Letter.

**SOC 225 – Cultural Sociology (4 units)**

*Course Description:* Explores the varied ways in which culture is understood in the social sciences and the research questions that follow from contrasting viewpoints. The approach is historically informed and focused on changing cultural forms in relation to industrialization and post-modernism.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 226 – Sociological Social Psychology (4 units)**

*Course Description:* Advanced study of the varying approaches, methods, issues and topical concerns of sociological social psychology. Analysis of central and representative historical and contemporary works.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

**SOC 227 – Sociology of Reproduction (4 units)**

*Course Description:* Recent social science scholarship in such areas as teenage pregnancy, family planning, abortion, adoption, AIDS, and new reproductive technologies; focus on the current situation in the United States.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**SOC 230 – Ethnic (Race) Relations (4 units)**

*Course Description:* Advanced study of the determinants of ethnic groupings and their interrelationships. Major theme will be the patterns of ethnic stratification and causes of ethnic conflict. Specific focus upon dominance and resistance to dominance. Influence of social science research.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 233 – Gender, Culture, & Local/Global Transformation (4 units)**

*Course Description:* Focus on critical approach to women and development; analyze local transformations with global connections within specific cultural contexts. Covers theory, methodological issues, and relationship between theory and practice.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 234 – Gender, Family, & Society (4 units)**

*Course Description:* Major theoretical traditions and concerns in family sociology and sociology of gender. Analysis of selected classical and contemporary works representative of functionalist, Marxist, psychoanalytic, feminist and critical theoretical approaches to these subjects; e.g., Engels, Parsons, Freud, Horkheimer, Goode, Lasch, Mitchell. Emphasis on macro and historical questions.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 242A – Methodologies of Sociohistorical Inquiries (4 units)**

*Course Description:* Introduction to comparative and case methodological approaches to sociohistorical inquiry, theoretical and practical issues, and substantive research agendas ranging from study of large-scale social transformations to close microhistories, including research agendas being developed by students in the course.

*Prerequisite(s):* Consent of instructor not required for graduate students in the Social Sciences Division or the Humanities, Arts, and Cultural Studies Division; required for undergraduates and students from other divisions or colleges.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 243 – Urban Society (4 units)**

*Course Description:* Broad overview of the issues and concerns of the field of urban sociology. Special emphasis on the human experience of urban living in contemporary, cross-cultural or historical settings.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 245 – Developing Societies (4 units)**

*Course Description:* Analysis of social and economic problems of developing societies from the standpoint of theory and research on modernization and underdevelopment. Nature of third world dependency and interdependence in the global political economy.

*Prerequisite(s):* Graduate student status or familiarity with problems of developing societies.

*Learning Activities:* Seminar 3 hour(s), Term Paper, Project.

*Grade Mode:* Letter.

**SOC 248 – Social Movements (4 units)**

*Course Description:* Analysis of current issues in and contributions to the study of collective behavior and social movements; particular focus upon the strategies and tactics of social movements.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SOC 254 – Sociology of Health & Illness (4 units)**

*Course Description:* Sociological perspectives and methods on the study of health and illness. Select topics for supervised research. Research paper required.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Open to graduate or professional students.

*Grade Mode:* Letter.

**SOC 255 – Sociology of Law (4 units)**

*Course Description:* Analysis of the nature of the legal process and its impact on social behavior. Will consider (1) nature and functions of law, (2) the organization and administration of law, and (3) the capacity of law to affect social behavior.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**SOC 265A – Classical Sociological Theory (4 units)**

*Course Description:* Introduces graduate students to the work of the main classical thinkers in the tradition of social theory, such as Marx, Durkheim, Weber, Simmel, Freud, G.H. Mead, and Parsons, locating them within the historical, cultural, and philosophical milieu in which their ideas originated.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**SOC 265B – Theory in Contemporary Sociology (4 units)**

*Course Description:* Explores the uses of theories in contemporary sociology by tracing their connections with classical sociological writings and their relations to broader theoretical concerns of contemporary social thought, with particular emphasis on relevance to the current historical, cultural and social milieu.

*Prerequisite(s):* SOC 265A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**SOC 270 – Social Demography (4 units)**

*Course Description:* How social institutions affect and are affected by the level and variation of mortality, migration, and fertility. Special emphases on the determinants of fertility-related attitudes and behavior, on less-developed countries, and on contemporary empirical studies.

*Prerequisite(s):* SOC 170; or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**SOC 280 – Organizations & Institutions (4 units)**

*Course Description:* Theory of formal organizations and bureaucracy. Methods of research in organizational and institutional studies. Historical and comparative analysis of political, religious, educational, military, and economic structure.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**SOC 288 – Integrative Research Practicum (4 units)**

*Course Description:* Continuing training in field, quantitative, and/or comparative-historical methods. Emphasis on students' research projects and applications of principles related to research design, concept and theory construction causality and interpretation, and data and measurement. Completion of research paper is required.

*Prerequisite(s):* SOC 207A; SOC 242A; SOC 292A; consent of instructor.

*Learning Activities:* Seminar 6 hour(s), Extensive Writing, Term Paper.

*Grade Mode:* Letter.

**SOC 290 – Seminar (4 units)**

*Course Description:* Seminar.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SOC 292A – Field Research (4 units)**

*Course Description:* Introduction to the logic, methods, and practices of field research, with particular emphasis on the ethnographic tradition of participant observation. Interviewing and other qualitative techniques will also be covered. Students will develop original research projects based on their own fieldwork.

*Prerequisite(s):* Graduate standing in Sociology or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Fieldwork.

*Grade Mode:* Letter.

**SOC 293 – Proseminar in Sociology (2 units)**

*Course Description:* Introduction to graduate training in sociology. A seminar designed to introduce students entering graduate work in the department to its ongoing research activities.

*Prerequisite(s):* First-year Sociology graduate students only.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SOC 295 – Special Topics Seminar (4 units)**

*Course Description:* Research topics in Sociology. Specific topic will vary according to faculty interest and student demand.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**SOC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SOC 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SOC 390A – The Teaching of Sociology (2 units)**

*Course Description:* Practical instruction in teaching methods for qualitative and quantitative courses. Pedagogical issues involved in critical sociological analysis.

*Prerequisite(s):* Graduate standing; required for first-time teaching assistants.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SOC 390B – The Teaching of Sociology (2 units)**

*Course Description:* Practical instruction in devising course syllabi, lectures and assignments for Associate-Instructors and others interested in college teaching. Discussion of pedagogical methods of teaching qualitative and quantitative courses.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 1 hour(s), Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SOC 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **SOC 466 – Research Paper Workshop (2 units)**

*Course Description:* A workshop to assist advanced graduate students in the preparation of an original research paper. Students present their research papers and discuss issues in theory, research design, data, empirical inference, and verbal and written presentation of a professional research paper.

*Prerequisite(s):* Master of Arts standing.

*Learning Activities:* Workshop 1.50 hour(s), Discussion 0.50 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Soil Science (SSC)**

College of Agricultural & Environmental Sciences

## **SSC 010 – Soils in Our Environment (3 units)**

*Course Description:* Soils in our global ecosystem; soils as natural bodies formed by interactive environmental processes; soil response to use and management; sustainable use of soil resources; role of soils in agricultural and environmental issues; role of soils in our daily lives.

*Learning Activities:* Lecture 3 hour(s), Independent Study.

*Enrollment Restriction(s):* Limited to 90 students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **SSC 092 – Soil Science Internship (1-12 units)**

*Course Description:* Work experience off and on campus in soil science. Internship supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SSC 100 – Principles of Soil Science (5 units)**

*Course Description:* Soil as part of natural and managed ecosystems and landscapes. Solid, liquid, and gas phases and their interactions in the soil. Water, gas and heat movement in soil. Soil biology. Plant nutrient acquisition and use. Soil development, management and use.

*Prerequisite(s):* College-level courses in each of chemistry, physics, biology, and geology recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

## **SSC 102 – Environmental Soil Chemistry (3 units)**

*Course Description:* Soil chemistry processes related to the fate and transport of contaminants in soil. Soil minerals, natural organic matter, surface charge, soil solution chemistry, redox reactions in soil, and sorption of inorganic and organic contaminants.

*Prerequisite(s):* General chemistry; SSC 100 or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

## **SSC 105 – Field Studies of Soils in California Ecosystems (5 units)**

*Course Description:* Field-based studies of soils in California ecosystems, away from campus, throughout California. Emphasis on description and classification of soils; relationships among soils, vegetation, geology, and climate; physical, chemical, and biological processes in soils on the landscape; and the role of soils in land use.

*Prerequisite(s):* SSC 100 and SSC 120 or equivalent recommended.

*Learning Activities:* .

*Enrollment Restriction(s):* Limited to a minimum of 10 students; maximum of 24.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **SSC 107 – Soil Physics (5 units)**

*Course Description:* Physical properties of soil. Principles of water, gas, heat, and solute movement in soil with selected examples related to soil and water management. Influence of soil properties on transfer processes.

*Prerequisite(s):* SSC 100; ERS 100; MAT 016A; or the equivalent of MAT 016A.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **SSC 109 – Sustainable Nutrient Management (4 units)**

*Course Description:* Availability of nutrients in organic and conventional agricultural, vineyard, orchard and plantation forest soils; management of fertilizers, cover crops, compost, sewage sludge and manures for crop production and to prevent loss to the environment is emphasized.

*Prerequisite(s):* SSC 100; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

## **SSC 111 – Soil Microbiology (4 units)**

*Course Description:* Major groups of microorganisms in soil, their interrelationships, and their responses to environmental variables. Role of microorganisms in cycling of nutrients. Plant-microbe relationships. Transformations of organic and inorganic pollutants.

*Prerequisite(s):* BIS 002C recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Writing Experience (WE).

**SSC 112 – Soil Ecology (3 units)**

*Course Description:* Overview of living constituents of soils, their interactions, importance to, and impact on biogeochemical cycles, decomposition, and soil properties. Practical applications of soil biological diversity are emphasized.

*Prerequisite(s):* SSC 100 or equivalent recommended.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**SSC 118 – Soils in Land Use & the Environment (4 units)**

*Course Description:* Soils are considered as elements in land use planning and environmental quality. Topics include: soil survey reports, remote sensing, land capability classification, soil erosion/conservation, waste disposal on soils and soil reclamation. One one-day field trip.

*Prerequisite(s):* Consent of instructor; SSC 100 or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

**SSC 120 – Soil Genesis, Morphology, & Classification (5 units)**

*Course Description:* Recognition and description of soils; chemical, biological and physical processes of soil formation. Factors of soil formation. Interactions of soils with diverse ecosystems. Introduction to soil classification. Practice using soil taxonomy. Practical experience describing soil properties in the field.

*Prerequisite(s):* SSC 100; GEL 050 recommended.

*Learning Activities:* Lecture 4 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

**SSC 192 – Soil Science Internship (1-12 units)**

*Course Description:* Work experience off and on campus in soil science. Internship supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**SSC 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**SSC 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**SSC 202 – Topics in Advanced Soil Chemistry (4 units)**

*Course Description:* Reviews of current research in soil chemistry. Topics include double layer theory; clay mineral and oxide surface chemistry; adsorption on soil surfaces; speciation and modeling of solution ions; solubility and mineral stability diagrams.

*Prerequisite(s):* Consent of instructor; general chemistry; SSC 100 or equivalent recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to 18 students.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

**SSC 205 – Field Studies of Soils in California Ecosystems (5 units)**

*Course Description:* Field-based soil studies in California ecosystems. Description and classification of soils; relationships among soils, vegetation, geology, and climate; physical, chemical, and biological processes; their role in land use. Similar to SSC 105; requires additional work for graduate credit.

*Prerequisite(s):* SSC 100 and SSC 120 or equivalent recommended.

*Learning Activities:* Fieldwork 50 hour(s), Discussion 15 hour(s), Lecture 5 hour(s).

*Enrollment Restriction(s):* Limited to 24 students.

*Repeat Credit:* May be repeated 1 time(s) when geographic locale differs.

*Grade Mode:* Letter.

**SSC 208 – Soil-Plant Interrelationships (3 units)**

*Course Description:* Plant needs, occurrence and reactions of water and mineral nutrients in soils; root systems and their growth in soils; mass flow and diffusion mechanisms in nutrient acquisition; models relating nutrient uptake to soil and plant characteristics; nutrient assimilation and crop quality.

*Prerequisite(s):* SSC 100; PLB 111; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**SSC 211 – Advanced Soil Microbiology (3 units)**

*Course Description:* Microbial metabolism of organic chemicals in soil, both natural and xenobiotic. Decomposition of organic matter. Kinetics of microbial processes in soil.

*Prerequisite(s):* CHE 008A; CHE 008B; SSC 111; BIS 102, BIS 103 or an equivalent course recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**SSC 219 – Ecosystem Biogeochemistry (4 units)**

*Course Description:* Multidisciplinary analysis of energy and nutrient transfers within terrestrial ecosystems. Examination of processes and inter- and intra-system interactions between the atmosphere, biosphere, lithosphere and hydrosphere. Laboratory section uses biogeochemical simulation models to examine case studies.

*Prerequisite(s):* Introductory courses in ecology/biology and soils recommended; undergraduates accepted with consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Cross Listing:* ECL 219.

*Grade Mode:* Letter.

**SSC 220 – Pedology (3 units)**

*Course Description:* Topics selected from studies of soil-forming processes, soil-geomorphic relations, mineral weathering, new developments in soil classification, and development of pedologic theory. Topics vary from year to year.

*Prerequisite(s):* Consent of instructor; SSC 120 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**SSC 222 – Global Carbon Cycle (3 units)**

*Course Description:* Global carbon cycle from Phanerozoic epoch to modern times. Examination of long and short-term carbon cycles.

Transfer of carbon among ocean, land and life with emphasis on humic substance formation, methods of characterization, reactions with organics and soil carbon stabilization.

*Prerequisite(s):* CHE 008A; CHE 008B; MAT 016A; MAT 016B; SSC 100; or the equivalent of SSC 100.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**SSC 290 – Special Topics in Soil Science (1-4 units)**

*Course Description:* Seminars and critical review of problems, issues, and research in soil science.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 1-4 hour(s), Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SSC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SSC 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SSC 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Spanish (SPA)**

College of Letters & Science

**SPA 001 – Elementary Spanish (5 units)**

*Course Description:* Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 001S; students who have successfully completed SPA 002 or SPA 003 in the 10th or higher grade of high school may receive unit credit for this course on a P/NP grading basis only; although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 001A – Accelerated Intensive Elementary Spanish (15 units)**

*Course Description:* Introduction to Spanish grammar and development of all language skills in a cultural context with emphasis on communication. Special 12-week accelerated, intensive summer session combining the work of SPA 001, SPA 002 and SPA 003.

*Learning Activities:* Lecture/Discussion 15 hour(s).

*Credit Limitation(s):* Not open to students who have completed equivalent SPA 001, SPA 001S, SPA 002, SPA 002S, SPA 002V, SPA 002Y, SPA 003, SPA 003S, SPA 003V or SPA 003Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 001S – Elementary Spanish (5 units)**

*Course Description:* Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication. May be taught abroad in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken equivalent SPA 001.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 001Y – Elementary Spanish (5 units)**

*Course Description:* Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication.

*Learning Activities:* Lecture/Discussion 3 hour(s), Web Virtual Lecture 1 hour(s), Web Electronic Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent courses SPA 001 or SPA 001S; students who have completed SPA 002 or SPA 003 in the 10th grade of high school may receive unit credit for this course on a P/NP basis only; although a passing grade will be charged to the student's P/NP option, no petition is required; all other students will receive a letter grade unless a P/NP petition is filed.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 002 – Elementary Spanish (5 units)**

*Course Description:* Continuation of SPA 001 and SPA 001S in the areas of grammar and basic language skills.

*Prerequisite(s):* SPA 001 or SPA 001S or SPA 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 002S, SPA 002V or SPA 002Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 002S – Elementary Spanish (5 units)**

*Course Description:* Continuation of SPA 001 and SPA 001S in the areas of grammar and basic language skills. May be taught abroad in a Spanish speaking country under the supervision of UC Davis faculty/lecturer.

*Prerequisite(s):* SPA 001 or SPA 001S or SPA 001Y.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SPA 002, SPA 002V or SPA 002Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 002V – Elementary Spanish (5 units)**

*Course Description:* Continuation of SPA 001, SPA 001S, or previous high school experience in the areas of grammar and basic language skills.

Online format combining synchronous chatting with technologically based materials.

*Prerequisite(s):* SPA 001 or SPA 001S or SPA 001Y; or the equivalent.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken equivalent SPA 002, SPA 002S, SPA 002Y, or higher.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 002Y – Elementary Spanish (5 units)**

*Course Description:* Continuation of SPA 001 or SPA 001Y or SPA 001S in the areas of grammar and basic language skills. Hybrid format combining classroom instruction with technologically based materials.

*Prerequisite(s):* SPA 001 or SPA 001S.

*Learning Activities:* Lecture/Discussion 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken equivalent SPA 002, SPA 002S, or SPA 002V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 003 – Elementary Spanish (5 units)**

*Course Description:* Completion of grammar sequence and continuing practice of all language skills using cultural texts.

*Prerequisite(s):* SPA 002 or SPA 002S or SPA 002V or SPA 002Y.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 003S, SPA 003V or SPA 003Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 003S – Elementary Spanish (5 units)**

*Course Description:* Completion of grammar sequence and continuing practice of all language skills using cultural texts. May be taught abroad in a Spanish speaking country under the supervision of UC Davis faculty.

*Prerequisite(s):* SPA 002 or SPA 002S or SPA 002V or SPA 002Y.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 003, SPA 003V or SPA 003Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 003V – Elementary Spanish (5 units)**

*Course Description:* Continuation of SPA 002, SPA 002S, SPA 002V or SPA 002Y. Online format combining synchronous chatting with technologically based materials.

*Prerequisite(s):* SPA 002 or SPA 002S or SPA 002V or SPA 002Y.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 003, SPA 003S, SPA 003Y, or higher.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 003Y – Elementary Spanish (5 units)**

*Course Description:* Completion of grammar sequence and continuing practice of all language skills using cultural texts. Hybrid format combining classroom instruction with technologically based materials.

*Prerequisite(s):* SPA 002 or SPA 002S or SPA 002V or SPA 002Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 003, SPA 003S, or SPA 003V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 021 – Intermediate Spanish (5 units)**

*Course Description:* Review and development of grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts.

*Prerequisite(s):* SPA 003 or SPA 003S or SPA 003V or SPA 003Y.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 021S, SPA 021V or SPA 021Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 021S – Intermediate Spanish (5 units)**

*Course Description:* Review and development of the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. May be taught abroad.

*Prerequisite(s):* SPA 003 or SPA 003S or SPA 003V or SPA 003Y.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 021, SPA 021V or SPA 021Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SPA 021V – Intermediate Spanish I (5 units)**

*Course Description:* Continuation of SPA 003, SPA 003V, SPA 003Y, SPA 003S, or previous high school experience in the areas of grammar and intermediate language skills. Online format combining synchronous chatting with technologically based materials.

*Prerequisite(s):* SPA 003 or SPA 003Y or SPA 003V; or the equivalent from previous high school language experience.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken equivalent SPA 021, SPA 021Y or SPA 021S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 021Y – Intermediate Spanish (5 units)**

*Course Description:* Continuation of SPA 003, SPA 003S, SPA 003V and SPA 003Y in the areas of grammar and basic language skills. Hybrid format combining classroom instruction with technologically based materials where learning takes place both face-to-face and online.

*Prerequisite(s):* SPA 003 or SPA 003S or SPA 003V or SPA 003Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken equivalent SPA 021, SPA 021S or SPA 021V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SPA 022 – Intermediate Spanish (5 units)**

*Course Description:* Development of all language skills through exercises and reading of modern texts. Development on more difficult grammar concepts and further practice on composition.

*Prerequisite(s):* SPA 021 or SPA 021S or SPA 021V or SPA 021Y.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 022S, SPA 022V or SPA 022Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SPA 022S – Intermediate Spanish (5 units)**

*Course Description:* Development of all language skills through exercises and reading of modern texts. Development of more difficult grammar concepts and further practice on composition. May be taught abroad.

*Prerequisite(s):* SPA 021 or SPA 021S or SPA 021V or SPA 021Y.

*Learning Activities:* Lecture/Discussion 5 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 022, SPA 022V or SPA 022Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SPA 022V – Intermediate Spanish II (5 units)**

*Course Description:* Continuation of SPA 021, SPA 021V, SPA 021Y, SPA 022S, or previous high school experience in the areas of grammar and intermediate language skills. Online format combining synchronous chatting with technologically based materials.

*Prerequisite(s):* SPA 021 or SPA 021S or SPA 021V or SPA 021Y; or equivalent from previous high school language experience.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SPA 022, SPA 022Y, or SPA 022S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 022Y – Intermediate Spanish (5 units)**

*Course Description:* Continuation of SPA 021, SPA 021S, or SPA 021V in the areas of grammar and basic language skills. Online format combining synchronous chatting with technologically based materials.

*Prerequisite(s):* SPA 021 or SPA 021S or SPA 021V or SPA 021Y.

*Learning Activities:* Lecture/Discussion 3 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 022, SPA 022S or SPA 022V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SPA 023 – Spanish Composition I (4 units)**

*Course Description:* Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Composition, journals, individual and group projects.

*Prerequisite(s):* SPA 022 or SPA 022S or SPA 022V or SPA 022Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for students who have completed equivalent SPA 023S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **SPA 023S – Spanish Composition I (4 units)**

*Course Description:* Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Composition, journals, individual and group projects. May be taught abroad in Spanish speaking country.

*Prerequisite(s):* SPA 022 or SPA 022S or SPA 022V or SPA 022Y.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have completed equivalent SPA 023.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **SPA 024 – Spanish Composition II (4 units)**

*Course Description:* Development of advanced level writing skills, with emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects.

*Prerequisite(s):* SPA 023 or SPA 023S.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit for students who have completed equivalent SPA 024S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **SPA 024S – Spanish Composition II (4 units)**

*Course Description:* Development of advanced level writing skills, with emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects. May be taught abroad.

*Prerequisite(s):* SPA 023 or SPA 023S.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have completed equivalent SPA 024.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **SPA 031 – Intermediate Spanish for Native Speakers I (5 units)**

*Course Description:* First course of a three-quarter series designed to provide bilingual students whose native language is Spanish with the linguistic and learning skills required for successfully completing upper division courses in Spanish. Intensive review of grammar and composition.

*Prerequisite(s):* SPA 003 or SPA 003V or SPA 003Y; or equivalent course or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Tutorial 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 032 – Intermediate Spanish for Native Speakers II (5 units)**

*Course Description:* Continuation of SPA 031, intensive review of grammar and composition. Development of all language skills through reading of modern texts, presentation/discussion of major ideas, vocabulary expansion, and writing essays on topics discussed. Designed for students whose native language is Spanish.

*Prerequisite(s):* SPA 031; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Tutorial 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 033 – Intermediate Spanish for Native Speakers III (5 units)**

*Course Description:* Development of writing skills, with emphasis on experimenting with various writing styles: analytical, argumentative, and creative. Analytical review of literary genres. Written essays will be assigned. Students will develop a research paper. Designed for students whose native language is Spanish.

*Prerequisite(s):* SPA 032; consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Tutorial 1 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 098 – Directed Group Study (1-5 units)**

*Course Description:* Primarily for lower division students. May be taught abroad.

*Prerequisite(s):* Consent of instructor and department chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **SPA 098F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SPA 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **SPA 100 – Principles of Hispanic Literature & Criticism (4 units)**

*Course Description:* Principles of literary criticism applied to the study of fiction, drama, poetry, and essay of major literary writers of the Hispanic world.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken SPA 100S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 100S – Principles of Hispanic Literature & Criticism (4 units)**

*Course Description:* Principles of literary criticism applied to the study of fiction, drama, poetry and essay of major literary writers of the Hispanic world. May be taught abroad in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer.

*Prerequisite(s):* SPA 024 or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 100.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 110 – Advanced Spanish Composition (4 units)**

*Course Description:* Practice in expository writing with emphasis on clarity and idiomatic expression. Practical application and review of selected grammar topics. (Part of former SPA 110A & SPA 110B.)

*Prerequisite(s):* SPA 024 or SPA 033.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **SPA 111N – The Structure of Spanish: Sounds & Words (3 units)**

*Course Description:* Linguistic description of the sound patterns of Spanish and how those sounds can be used to form larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages. (Former SPA 132.)

*Prerequisite(s):* (SPA 024 or SPA 033); or consent of instructor. LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SPA 112N – The Structure of Spanish: Words & Phrases (3 units)**

*Course Description:* Study of Spanish word and phrase structure, with special emphasis on the constituent structure of noun and verb phrases. Theoretical and practical comparisons with English and with other Romance languages. (Former SPA 131.)

*Prerequisite(s):* SPA 111N; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SPA 113 – Spanish Pronunciation (4 units)**

*Course Description:* Sound structure of modern Spanish; theoretical analysis of selected problems in pronunciation. Strongly recommended for prospective teachers of Spanish.

*Prerequisite(s):* (SPA 024 or SPA 033); LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SPA 114N – Contrastive Analysis of English & Spanish (4 units)**

*Course Description:* Contrastive analysis of English and Spanish, error analysis, introduction to structuralist and transformational linguistics. Individual and group conferences. (Former SPA 137.)

*Prerequisite(s):* SPA 024 or SPA 033; or consent of instructor. SPA 111N and SPA 112N recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

## **SPA 115 – History of the Spanish Language (4 units)**

*Course Description:* Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization.

*Prerequisite(s):* SPA 024 or SPA 033; or consent of instructor. LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have completed equivalent SPA 115S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## **SPA 115S – History of the Spanish Language (4 units)**

*Course Description:* Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization. Taught abroad in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer.

*Prerequisite(s):* SPA 024 or SPA 033; or consent of instructor. LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have completed equivalent SPA 115.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS).

## **SPA 116 – Applied Spanish Linguistics (4 units)**

*Course Description:* Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career.

*Prerequisite(s):* SPA 024 or SPA 033; or consent of instructor; LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 116S.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SPA 116S – Applied Spanish Linguistics (4 units)**

*Course Description:* Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career. May be taught abroad in a Spanish speaking country, in Spanish, under the supervision of UC Davis faculty.

*Prerequisite(s):* SPA 024 or SPA 033; or consent of instructor. LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken SPA 116.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SPA 117 – Teaching Spanish as a Native Tongue in the U.S.: Praxis & Theory (4 units)**

*Course Description:* Designed for students interested in teaching Spanish to native speakers. Focus on cultural diversity of the Spanish speaking population in the United States; applied language teaching methodologies in the context of teaching Spanish to native speakers at different levels.

*Prerequisite(s):* SPA 024 or SPA 033; or consent of instructor. LIN 001 recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Oral Skills (OL).

**SPA 118 – Topics in Spanish Linguistics (4 units)**

*Course Description:* Study of specialized topics in Spanish linguistics, for example: language and use; text and context; language and society; bilingualism; Spanish dialectology; syntax and semantics.

*Prerequisite(s):* SPA 111N; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS).

**SPA 123 – Creative Writing in Spanish (4 units)**

*Course Description:* Intensive writing of poetry or fiction in Spanish or in a bilingual (Spanish/English) format. Students will write both in prescribed forms and in experimental forms of their own choosing.

*Prerequisite(s):* SPA 024 or SPA 033; or consent of instructor.

*Learning Activities:* Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

**SPA 130 – Survey of Spanish Literature to 1700 (4 units)**

*Course Description:* Survey of Spanish literature (narrative, poetry and drama) to 1700, Emphasis on the multicultural birth of the Spanish culture, the formation and growth of the Spanish language and letters through its written records and the literature of the early period.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 131N – Survey of Spanish Literature: 1700 to Present (4 units)**

*Course Description:* Survey of modern Spanish literature, providing an overview of main literary movements (romanticism, realism, naturalism, modernism, avantgarde). Emphasis on the philosophical and historical background and on the European context for modern Spanish literature. (Part of former SPA 104A & SPA 104B.)

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 132 – Golden Age Drama & Performance (4 units)**

*Course Description:* Golden Age drama: text and performance. Study of Spanish Baroque drama as performance art. Close reading of plays and related aspects of 17th-century theater: theatrical spaces, staging, performance, actors, public, language, costumes. Final project is performance of a play.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 1.50 hour(s), Performance Instruction 1.50 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Visual Literacy (VL); World Cultures (WC).

**SPA 133N – Golden Age Literature of Spain (4 units)**

*Course Description:* Introduction to the study of the principal authors and literary movements of 16th- and 17th-century Spain and Spanish American colonial literature.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 3 time(s) with consent of instructor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**SPA 134A – Don Quijote I (4 units)**

*Course Description:* Critical interpretation of Don Quijote Part One by Cervantes. Focused study of key elements within the socio-cultural context of Golden Age Spain. Don Quijote as prototype for the modern novel.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**SPA 134B – Don Quijote II (4 units)**

*Course Description:* Critical interpretation of Don Quijote Part Two by Cervantes. Focused study of key elements within the socio-cultural context of Golden Age Spain. Don Quijote as prototype for the modern novel.

*Prerequisite(s):* SPA 134A.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**SPA 135N – Spanish Romanticism (4 units)**

*Course Description:* Romanticism as a philosophical concept, and as a literary movement in Spain, with emphasis on its distinctive, specific "romantic" qualities and its literary expression in five leading authors of the early-19th century. (Former SPA 114.)

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 136N – The Spanish Novel of the 19th Century (4 units)**

*Course Description:* Literary realism in Spain, focusing on Leopoldo Alas (Clarín), Emilia Pardo Bazán and Benito Pérez Galdós unique characteristics of Spanish realism and its historical roots in Cervantes and the picaresque.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**SPA 137N – 20th-Century Spanish Fiction (4 units)**

*Course Description:* Study of the main literary trends and authors of the modern Spanish novel and short story. Selected works by Unamuno, Valle-Inclán, Sender, Cela, Matute, Ayala and others.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**SPA 138N – Modern & Contemporary Spanish Poetry (4 units)**

*Course Description:* Study of the main literary trends and authors of modern and contemporary Spanish poetry. Selected works by Machado, Juan Ramón Jiménez, García Lorca, Guillén, Aleixandre, Hernández Hierro and others. Offered in alternate years. (Former SPA 120C.)

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC).

**SPA 139 – Modern Spanish Theater (4 units)**

*Course Description:* Study of the main dramatic trends and playwrights of modern Spanish theater. Selected works by Valle Inclán, García-Lorca, Mihura, Buero-Vallejo, Arrabal and others. Offered in alternate years.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 140N – Modern Spanish Essay (4 units)**

*Course Description:* Ortega, Unamuno and the modern Spanish essay. Their concept of Spain and their relations with other movements and thinkers.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**SPA 141 – Introduction to Spanish Culture (4 units)**

*Course Description:* Introduction to history, geography and culture of Spain. Art, history of ideas, and everyday cultural manifestations.

Introduction to critical reading and textual analysis.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open for students who have completed equivalent SPA 141S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**SPA 141S – Introduction to Spanish Culture (4 units)**

*Course Description:* Introduction to history, geography and culture of Spain. Art, history of ideas, and everyday cultural manifestations.

Introduction to critical reading and textual analysis. May be taught abroad in a Spanish speaking country under the supervision of UC Davis faculty.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 141.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**SPA 142 – Special Topics in Spanish Cultural & Literary Studies (4 units)**

*Course Description:* Special topics in the study of Spanish literature and culture. May be taught abroad.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**SPA 143 – Spanish Art (4 units)**

*Course Description:* Spanish art and the different historical, sociological and political manifestations that frame it. History of art, including Paleolithic, Roman, Visigothic, Romanesque, Goth, Renaissance, Baroque, Neoclassic and Contemporary art. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s), Term Paper, Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**SPA 144 – Topics in Spanish Cultural Studies (4 units)**

*Course Description:* Study of specific historical tendencies in Spanish culture(s) from the Romans to the present. Sources studied may include literature, film, art, journalism, and performance. Approaches to material may address issues of aesthetics, politics, identity, and globalization.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Project 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 147 – Anglos, Latinos, & Spanish Black Legend: Anti-Hispanic Prejudice Origins & Educational Implications (4 units)**

*Course Description:* Examination of anti-Hispanic prejudice in the United States focusing on the "Black Legend," a 16th-century, anti-Spanish myth underpinning the doctrine of "Manifest Destiny." Exploration of the Legend's presence in contemporary American society through interviews and analysis of school textbooks.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork, Term Paper.

*Cross Listing:* EDU 147.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**SPA 148 – Cinema in the Spanish-Speaking World in Translation (4 units)**

*Course Description:* Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required.

Films with subtitles.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Credit Limitation(s):* Not open for students who have completed equivalent SPA 148S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**SPA 148S – Cinema in the Spanish-Speaking World in Translation (4 units)**

*Course Description:* Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required. Films with subtitles. May be taught abroad in a Spanish speaking country, in Spanish, under the supervision of UC Davis faculty.

*Prerequisite(s):* SPA 024 or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 148.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**SPA 149 – Latin-American Literature in Translation (4 units)**

*Course Description:* Reading, lectures and discussions in English of works by Borges, Cortázar, Fuentes, García Márquez, Paz and others.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

**SPA 150N – Survey of Latin American Literature to 1900 (4 units)**

*Course Description:* Latin American literature from preconquest texts and the chronicles of the Conquest to romanticism and modernism. Reading selections include fiction, poetry, drama and essays.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 151 – Survey of Latin American Literature 1900 to Present (4 units)**

*Course Description:* Latin American literature from 1900 to the present. Reading selections include fiction, poetry, drama, essays, testimonio, etc.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 153 – Latin American Short Story (4 units)**

*Course Description:* Evolution of the Latin American short story from the 19th century to the present. Emphasis on the contemporary period.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 154 – Latin American Novel (4 units)**

*Course Description:* Evolution of the Latin American novel from the 19th century to the present. Emphasis on significant contemporary works.  
*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 155 – Mexican Novel (4 units)**

*Course Description:* Evolution of the Mexican novel from the 19th century to the present. Emphasis on the narrative of the Revolution and significant contemporary works.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 156 – Latin American Literature of the Turn of the 20th Century (4 units)**

*Course Description:* Modernism as an authentic expression of Latin American literature and its influence on 20th-century poetry and prose. In depth analysis of the works of Dario and other major writers of the era. Offered in alternate years.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 157 – Great Works of Latin American Literature/Culture (4 units)**

*Course Description:* Study of major works of Latin American literature/culture and their cultural and literary milieus. May include novels, poetry, film, etc. Works may be analyzed in terms of style, influence, cultural significance, political importance, and/or commercial success.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 158 – Latin American Poetry: From Vanguardism to Surrealism & Beyond (4 units)**

*Course Description:* Study of vanguardism, surrealism, and more recent movements of Latin American poetry. An in-depth analysis of the works of such major poets as Neruda, Vallejo, and Paz.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 159 – Special Topics in Latin American Literature & Culture (4 units)**

*Course Description:* Special topics in the study of Latin American literature and culture.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic or subject differs; students may take any SPA 159 course two times total in combination.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 159S – Special Topics in Latin American Literature & Culture (4 units)**

*Course Description:* Special topics in the study of Latin American literature and culture. May be taught abroad in a Spanish speaking country under the supervision of UC Davis faculty.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic or subject differs; students may take any SPA 159 course two times total in combination.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 159Y – Special Topics in Latin American Literature & Culture (4 units)**

*Course Description:* Special topics in the study of Latin American literature and culture. Hybrid format combining classroom instruction with technologically based materials.

*Prerequisite(s):* SPA 100 or SPA 100S or SPA 141 or SPA 141S or SPA 170 or SPA 170S.

*Learning Activities:* Web Virtual Lecture 3 hour(s), Lecture/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic or subject differs; students may take any SPA 159 course two times total in combination.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

**SPA 160 – Latin American Women Writers in Translation (4 units)**

*Course Description:* Latin American women writers from the 19th and 20th centuries. Recent theoretical approaches to literature by women in Latin America. Discussions in English of works by Matto de Turner, Avellaneda, Storni, Ocampo, Agustini, Mistral, Castellanos, and others.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SPA 167 – Borders of the Spanish Speaking World (4 units)**

*Course Description:* Analysis of cultural dynamics of border contexts (contact zones) in which Spanish speaking populations are prominent. Contexts may include one or more of the following: US-Mexico, US-Caribbean, Mexico-Central America, Dominican Republic-Haiti, Spain-Portugal, Colombia-Venezuela, Argentina-Brazil, among others.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); World Cultures (WC).

## **SPA 168 – Introduction to Latinx Culture (4 units)**

*Course Description:* Introduction to histories and cultures of Latinx (Mexican American, Puerto Rican, Salvadoran American, Ecuadorian American, etc.) populations of the US. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Introduction to critical analysis across multiple genres of cultural production (literature, visual culture, media culture, etc.).

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD); Writing Experience (WE).

## **SPA 169 – Special Topics in Chicanx/Latinx Studies (4 units)**

*Course Description:* Special topics in the study of Chicanx and/or Latinx literature and culture.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Project.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Domestic Diversity (DD).

## **SPA 170 – Introduction to Latin American Culture (4 units)**

*Course Description:* Introduction to history, geography and culture of Latin America. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Introduction to critical reading and textual analysis.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Credit Limitation(s):* Not open for students who have completed equivalent SPA 170S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **SPA 170S – Introduction to Latin American Culture (4 units)**

*Course Description:* Introduction to history, geography and culture of Latin America. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Introduction to critical reading and textual analysis. May be taught abroad in a Spanish-speaking country.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Project.

*Credit Limitation(s):* Not open for students who have completed equivalent SPA 170.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **SPA 171 – Music from Latin America (4 units)**

*Course Description:* Examination of music from Latin America.

Characteristic music (i.e. tango, bossa nova, salsa, musica motena, musica andina) as well as its implications in other musical genres. Taught in English or Spanish depending on instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken SPA 171S or MUS 127S.

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Cross Listing:* MUS 127.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **SPA 171S – Music from Latin America (4 units)**

*Course Description:* Examination of music from Latin America.

Characteristic music (i.e. tango, bossa nova, salsa, musica motena, musica andina) as well as its implications in other musical genres. May be taught abroad in English or Spanish depending on instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken SPA 171 or MUS 127.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Cross Listing:* MUS 127S.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **SPA 172 – Mexican Culture (4 units)**

*Course Description:* Study of Mexican culture through a diversity of cultural expression, including elite, popular and mass media culture. Focus on national icons and archetypes, multiculturalism, transnationalism.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**SPA 173 – Cinema & Latin American Culture (4 units)**

*Course Description:* Understanding Latin American cultures through cinema. History and critical analysis of Latin American film. Focus on a national cinematic tradition. Comparative experiences in different parts of Latin America and/or a particular era. Conducted entirely in Spanish.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC).

**SPA 174 – Chicano Culture (4 units)**

*Course Description:* Interdisciplinary survey of Chicano culture. Topics include literature, art, folklore, oral tradition, music, politics, as well as everyday cultural manifestations. Conducted in Spanish. (Former SPA 124.)

*Prerequisite(s):* SPA 024 or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SPA 175 – Topics in Latin American Cultural Studies (4 units)**

*Course Description:* Specific historical tendencies and issues in Latin American culture(s) from precolombian times to present. Studies of literature, film, art, journalism and performance. Focus on issues of aesthetics, politics, identity, and globalization. May be taught abroad.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Project 1 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**SPA 176 – Literature in Spanish Written in the United States (4 units)**

*Course Description:* Survey of the literary and cultural contributions of the main Spanish-speaking populations present in the U.S.: Chicanos, Puerto Ricans, Cuban-Americans, Central Americans, and other Latinos.

*Prerequisite(s):* SPA 024 or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SPA 177 – California & Latin America (4 units)**

*Course Description:* Interdisciplinary survey on the relationship between California and Latin America (1500s-present). Latin American representations of California and Californian representations of Latin America, as well as borderlands texts, with a special focus on Mexican-American perspectives. Conducted in Spanish.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**SPA 178A – Spanish for the Professions (4 units)**

*Course Description:* For students with an advanced level of Spanish interested in the use of Spanish in the health care, legal and law enforcement and marketing and business professions. Field trips documenting the use of Spanish in the public context.

*Prerequisite(s):* SPA 024 or SPA 024S or SPA 033.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**SPA 179 – Science & Politics of the Human Body in the Spanish-Speaking World (4 units)**

*Course Description:* Interaction between the interpretations of scientific ideas, philosophical issues, and politics concerning the human body in the Spanish-speaking world through different historical periods.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Credit Limitation(s):* Not open to students who have taken equivalent SPA 179Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS).

**SPA 179Y – Science & Politics of the Human Body in the Spanish-Speaking World (4 units)**

*Course Description:* Interaction between the interpretations of scientific ideas, philosophical issues, and politics concerning the human body in the Spanish-speaking world through different historical periods.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Discussion 2 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken equivalent SPA 179.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE) or Social Sciences (SS).

**SPA 180 – Senior Seminar in Spanish Linguistics (4 units)**

*Course Description:* Group study of a special topic drawn from Spanish linguistics. Independent research project.

*Prerequisite(s):* Senior standing; a major in Spanish or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

**SPA 181 – Senior Seminar in Spanish Literature/Culture (4 units)**

*Course Description:* Group study of a special topic drawn from Spanish literary or cultural studies. Independent research project.

*Prerequisite(s):* Senior standing; a major in Spanish or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); Writing Experience (WE).

## **SPA 182 – Senior Seminar in Latin American Literature/Culture (4 units)**

*Course Description:* Group study of a special topic drawn from Latin American literary or cultural studies. Independent research project.

*Prerequisite(s):* Senior standing; a major in Spanish or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper 1 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated 1 time(s) when content differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **SPA 192I – Internship in Spanish (1-12 units)**

*Course Description:* Internships in fields where Spanish language skills can be used and perfected (teaching, counseling, translating-interpreting). May be taught abroad.

*Prerequisite(s):* SPA 023; and consent of instructor; junior standing; major in Spanish, Chicano Studies, or a related field.

*Learning Activities:* Independent Study 3-36 hour(s).

*Repeat Credit:* May be repeated 8 unit(s) however, units do not count toward the Spanish major.

*Grade Mode:* Pass/No Pass only.

## **SPA 194H – Special Study for Honors Students (1-5 units)**

*Course Description:* Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Spanish literature, civilization, or language studies.

*Prerequisite(s):* Consent of instructor; senior standing and qualification for the Spanish honors program.

*Learning Activities:* Independent Study 3-15 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **SPA 197T – Tutoring in Spanish (1-4 units)**

*Course Description:* Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses.

*Prerequisite(s):* Upper division standing and permission of the chairperson.

*Learning Activities:* Tutorial 1-4 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

## **SPA 197TC – Tutoring in the Community (2-4 units)**

*Course Description:* Tutoring in public schools under the guidance of a regular teacher and supervision by a departmental faculty member.

*Prerequisite(s):* Upper division standing and permission of the chairperson.

*Learning Activities:* Tutorial 2-4 hour(s).

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

## **SPA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor and department chairperson.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **SPA 198F – Student Facilitated Course (1-4 units)**

*Course Description:* Student facilitated course intended primarily for upper division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SPA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study of a topic or an author to be determined in consultation with an individual faculty member. May be taught abroad.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 6 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); World Cultures (WC); Writing Experience (WE).

## **SPA 199FA – Student Facilitated Course Development (1-2 units)**

*Course Description:* Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 098F/198F.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Enrollment Restriction(s):* Open to upper division Spanish majors only.

*Grade Mode:* Pass/No Pass only.

## **SPA 199FB – Student Facilitated Teaching (1-4 units)**

*Course Description:* Student-facilitated course under the supervision of a faculty member, an undergraduate student teaches a course under 098F/198F.

*Prerequisite(s):* SPA 199FA; consent of instructor.

*Learning Activities:* Variable 1-4 hour(s).

*Enrollment Restriction(s):* Must have completed SPA 199FA, and be teaching a SPA 098F or SPA 198F; open to upper division Spanish majors only.

*Grade Mode:* Pass/No Pass only.

## **SPA 201 – Literary Theory I (4 units)**

*Course Description:* Basic theories and practical approaches to modern and contemporary Hispanic literature. Emphasis on formalism, poststructuralism, socio-cultural discourses, and ideologies.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 202 – Literary Theory II (4 units)**

*Course Description:* Major contemporary critical theories including recent, innovative approaches to Hispanic literature and culture. Readings from Semiotics and Deconstructionism to Psychological and Socio-ideological approaches. Emphasis on Postmodern and Neo-colonial discourse.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 203 – Research Methodologies (1 unit)**

*Course Description:* Introduction to the range of scholarly research methodologies currently being realized in Spanish linguistics, literary and cultural studies: archival research, textual analysis, discourse analysis, statistics for linguistics, etc.; introduction to scholarly writing (MLA style) and scholarly publishing.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SPA 205 – Spanish Phonology (4 units)**

*Course Description:* Analyzes the sound patterns of Spanish from both linear and non-linear perspectives. Students will develop a clear understanding of what phonology is and the nature of Spanish phonology, as defined by modern linguistic analysis.

*Prerequisite(s):* Some knowledge of phonetics is required and consent of instructor; LIN 109 and LIN 139 highly recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 206 – Spanish Syntax (4 units)**

*Course Description:* An examination of Spanish word order within the framework of general linguistic theory. The student will investigate how to write a grammar of Spanish with particular attention to the structure of noun and verb clauses.

*Prerequisite(s):* LIN 165; LIN 140.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 207 – History of the Spanish Language (4 units)**

*Course Description:* History of the Spanish language. (Former SPA 220A.)

*Prerequisite(s):* LAT 001.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 208 – Old Spanish Texts (4 units)**

*Course Description:* An in-depth linguistic examination of Old Spanish texts from the 12th to the 15th centuries, with particular attention to the significance of orthographic changes.

*Prerequisite(s):* SPA 207.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 211 – Hispanic Dialectology (4 units)**

*Course Description:* Descriptive and historical study of the distinctive features of Peninsular and American Spanish dialects. (Former SPA 221.)

*Prerequisite(s):* SPA 220; or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 212 – Applied Linguistics (4 units)**

*Course Description:* Focuses on the relevant linguistic aspects of teaching Spanish. Designed for graduate students who have an interest in second-language learning and teaching.

*Prerequisite(s):* Graduate standing and SPA 215 and SPA 216 recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 215 – Special Topics in Hispanic Linguistics (4 units)**

*Course Description:* Specialized topics in Hispanic linguistics (e.g., pragmatics, sociolinguistics, topics in syntax, semantics, or diachronic studies). May be repeated for credit when topic differs.

*Prerequisite(s):* Consent of instructor. SPA 205 and SPA 206 recommended.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**SPA 217 – Sociolinguistics: Spanish of the United States (4 units)**

*Course Description:* Descriptive and critical overview of the linguistic practices of the different Spanish-speaking communities in the United States. Sociohistorical migration patterns and settlements; bilingualism; linguistic characteristics of Spanish in contact with English, code-switching, Spanish/English language use and attitude patterns.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* S/U only.

**SPA 220 – Catalan Language & Culture (4 units)**

*Course Description:* Foundation for the acquisition of Catalan oral, reading and elementary writing level skills for students of Spanish (Iberianists or Hispanists), with the capacity to interpret educated written language. Emphasis on weekly review of grammar and all language skills.

*Prerequisite(s):* Consent of instructor; good command of Spanish, Portuguese, French or Italian and graduate level of studies in any of these languages.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 1 hour(s).

*Enrollment Restriction(s):* Open to advanced undergraduate students, with notions of Catalan, can be admitted with consent of instructor; designed for graduate students.

*Grade Mode:* Letter.

**SPA 222 – Critical Approaches to Spanish Literature I: Prose & Essay (4 units)**

*Course Description:* Critical approaches to Spanish narrative and essay.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

**SPA 223 – Critical Approaches to Spanish Literature II: Poetry & Drama (4 units)**

*Course Description:* Critical approaches to Spanish poetry and drama.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

## **SPA 224 – Studies of a Major Writer, Period, or Genre in Spanish Literature (4 units)**

*Course Description:* Artistic development of a major Spanish writer and his/her intellectual and literary milieu or study of a special topic, period, or genre. May be repeated for credit with consent of instructor.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **SPA 230 – Topics in Latin American Cultural Studies (4 units)**

*Course Description:* Discussion of select contemporary theoretical debates in Latin American Cultural Studies. Application of critical questions to the analysis of cultural texts.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

## **SPA 231 – Interamerican Studies (4 units)**

*Course Description:* Survey of methodologies of investigation for crosscultural or comparative projects in the geographical context of the Americas. Focus on particular problems of language, discipline, national definitions, and global hierarchies of knowledge that complicate such projects. Readings of interamerican cultural texts.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 232 – Topics in Latinx Cultural & Literary Studies (4 units)**

*Course Description:* Discussion of select contemporary theoretical debates in Latinx Cultural and Literary Studies. Application of critical questions to the analysis of literary and cultural texts.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when content differs.

*Grade Mode:* Letter.

## **SPA 252 – Medieval Spanish Literature: Prose (4 units)**

*Course Description:* An exploration of the major genres of Medieval Spanish prose from its origins to 1450.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 253 – Medieval Spanish Literature: Epic (4 units)**

*Course Description:* Medieval Spanish epic narratives. Major theoretical perspectives on the genesis, diffusion, and character of the Medieval epic. Relationship of epic to ballad literature.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 254 – Medieval Hispanic Lyric (4 units)**

*Course Description:* Analysis of the most representative lyric poetry in the various Peninsular languages and in provencal, troubadour poetry, kharjas, villancicos, cantigas de amigo, and courtly lyric.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 255 – Spanish Literature of the Early Renaissance (4 units)**

*Course Description:* Spanish Literature, 1450-1550, with emphasis on La Celestina. (Former SPA 229.)

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 256 – Spanish Literature of the Renaissance & Golden Age: Poetry (4 units)**

*Course Description:* Extensive critical study of the main currents of Renaissance and Baroque Spanish poetry through its language structures, styles (Culteranismo-Conceptismo), rhetorical devices, myths, and themes (love, death, time).

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 257 – Spanish Literature of the Renaissance & Golden Age: Drama (4 units)**

*Course Description:* Exploration of major 16th and 17th century literary and cultural developments through the study of selected dramas.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 258 – Spanish Literature of the Renaissance & Golden Age: Prose (4 units)**

*Course Description:* Origins and development of the Spanish novel during the Renaissance and the Spanish Golden Age.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 259 – Cervantes & the Novel (4 units)**

*Course Description:* Narrative works of Miguel de Cervantes with special emphasis on Don Quijote.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 260 – Modern Spanish Literature (4 units)**

*Course Description:* Topics of Spanish literature, from 1700-1920.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 261 – Contemporary Spanish Literature: Poetry (4 units)**

*Course Description:* Critical analysis of modern Spanish poetry from a wide spectrum of poetic currents.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 262 – Contemporary Spanish Literature: Narrative (4 units)**

*Course Description:* Study of the 20th-century novel and short story with emphasis on the avant-garde, existentialism, social realism, and postmodern trends.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs and with consent of instructor.

*Grade Mode:* Letter.

## **SPA 263 – Contemporary Spanish Literature: Drama (4 units)**

*Course Description:* The Spanish theatrical production of the last 70 years.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 264 – Contemporary Spanish Literature: Essay (4 units)**

*Course Description:* Major thinkers from Ganivet to Unamuno and Ortega y Gasset. Emphasis will be placed on the relationships between Spanish thought and European philosophical currents.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 265 – Women Writers of Spain (4 units)**

*Course Description:* Introduction to the development of a feminine consciousness in the Spanish contemporary literary scene. Selected texts represent particularly innovative typologies of feminine discourse in the realm of the historical, psychoanalytical, and metafictional, erotic, and allegorical fiction.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 272 – Critical Approaches to Latin American Literature: Narrative (4 units)**

*Course Description:* Development of Latin American literary periods and currents in narrative (novel, short story, and essay), from early colonial times to the present.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when material differs.

*Grade Mode:* Letter.

## **SPA 273 – Critical Approaches to Latin American Literature: Poetry & Drama (4 units)**

*Course Description:* Development of Latin American literary periods and currents in poetry and drama, from early Colonial times to the present.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

## **SPA 274 – Studies of a Major Writer, Period, or Genre in Latin American Literature (4 units)**

*Course Description:* Artistic development of a major Latin American writer and his/her intellectual and literary milieu or study of a special topic, period, or genre.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Letter.

## **SPA 275 – Colonial Literature (4 units)**

*Course Description:* An examination of pre-Hispanic and Colonial narrative, poetry and theatre. Emphasis on historical, anthropological, and ethnographic approaches to Colonial discourse.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 276 – 20th-Century Latin American Drama (4 units)**

*Course Description:* Major Latin American dramatists from Florencio Sánchez to the present. (Former SPA 240.)

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

## **SPA 277 – Latin American Novel, 1900-1950 (4 units)**

*Course Description:* Study of main trends and key authors in Latin America in the first half of the 20th century. (Former SPA 241A.)

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 278 – New Trends in Latin American Fiction (4 units)**

*Course Description:* Recent developments in Latin American narrative. Emphasis on innovative language and structure. (Former SPA 241B.)

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 279 – Mexican Narrative (4 units)**

*Course Description:* Study of the evolution of Mexican narrative. Emphasis on the narrative of the Revolution and significant contemporary works.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 280 – Latin American Short Story (4 units)**

*Course Description:* Works by major writers with emphasis on 20th-century authors such as Quiroga, Borges, García Márquez, Cortázar, and Rulfo. (Former SPA 243.)

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **SPA 281 – Latin American Women Writers (4 units)**

*Course Description:* Study of feminist critical theories, gender construction, and self-representation within the history of socio-cultural changes in Latin America.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 282 – Darío & Modernism (4 units)**

*Course Description:* Study of poetry and prose of Spanish-American

Modernism (1880-1916). (Former SPA 245.) Offered in alternate years.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 283 – New Directions in Latin American Poetry (4 units)**

*Course Description:* New trends in Latin American poetry.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 284 – The Latin American Essay (4 units)**

*Course Description:* Major Latin American essayists from Sarmiento to contemporary essayists.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 285 – Multicultural Approaches to Cuban Literature & Culture (4 units)**

*Course Description:* Study of main trends in Cuban literature. Emphasis on historical, geographic, social and cultural context (including music and film). Taught in English; some readings in Spanish.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**SPA 291 – Foreign Language Learning in the Classroom (4 units)**

*Course Description:* Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages.

*Learning Activities:* Seminar 3 hour(s), Project.

*Cross Listing:* GER 291, FRE 291.

*Grade Mode:* Letter.

**SPA 298 – Group Study (1-4 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SPA 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**SPA 300 – The Teaching of Spanish (3 units)**

*Course Description:* Teaching of Spanish.

*Prerequisite(s):* Senior or graduate standing; a major or minor in Spanish.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**SPA 390 – The Teaching of Spanish in College (4 units)**

*Course Description:* Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of graduate teaching assistants.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Grade Mode:* Letter.

**SPA 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Statistics (STA)**

College of Letters & Science

**STA 010 – Statistical Thinking (4 units)**

*Course Description:* Statistics and probability in daily life. Examines principles of collecting, presenting and interpreting data in order to critically assess results reported in the media; emphasis is on understanding polls, unemployment rates, health studies; understanding probability, risk and odds.

*Prerequisite(s):* Two years of high school algebra.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 012 – Introduction to Discrete Probability (4 units)**

*Course Description:* Random experiments; countable sample spaces; elementary probability axioms; counting formulas; conditional probability; independence; Bayes theorem; expectation; gambling problems; binomial, hypergeometric, Poisson, geometric, negative binomial and multinomial models; limiting distributions; Markov chains. Applications in the social, biological, and engineering sciences.

*Prerequisite(s):* Two years of high school algebra.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 013 – Elementary Statistics (4 units)**

*Course Description:* Descriptive statistics; basic probability concepts; binomial, normal, Student's t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two means and proportions. Regression.

*Prerequisite(s):* Two years of high school algebra or Mathematics D.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit for students who have completed STA 013V, or higher.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 013Y – Elementary Statistics (4 units)**

*Course Description:* Descriptive statistics; basic probability concepts; binomial, normal, Student's t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two means and proportions. Regression.

*Prerequisite(s):* Two years of high school algebra or Mathematics D.

*Learning Activities:* Lecture 1 hour(s), Web Virtual Lecture 2 hour(s); Discussion 1 hour(s).

*Credit Limitation(s):* No credit if student has taken STA 013, or higher.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 015A – Introduction to Statistical Data Science I (4 units)**

*Course Description:* Principles of descriptive statistics. Concepts of randomness, probability models, sampling variability, hypothesis tests and confidence interval.

*Prerequisite(s):* Two years of high school algebra or Mathematics D.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken STA 013 or STA 032 or STA 100.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 015B – Introduction to Statistical Data Science II (4 units)**

*Course Description:* Programming in R; Summarization and visualization of different data types; Concepts of correlation, regression, classification and clustering.

*Prerequisite(s):* STA 015A C- or better or STA 013 C- or better or STA 032 C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**STA 015C – Introduction to Statistical Data Science III (4 units)**

*Course Description:* Classical and Bayesian inference procedures in parametric statistical models. Nonparametric methods; resampling techniques; missing data. Use of statistical software.

*Prerequisite(s):* STA 015B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 032 – Gateway to Statistical Data Science (4 units)**

*Course Description:* Probability concepts; programming in R; exploratory data analysis; sampling distribution; estimation and inference; linear regression; simulations; resampling methods. Alternative to STA 013 for students with a background in calculus and programming.

*Prerequisite(s):* MAT 016B C- or better or MAT 021B C- or better or MAT 017B C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed to students who have taken STA 013; not open for credit to students who have taken STA 100.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 035A – Statistical Data Science I (4 units)**

*Course Description:* Principles of descriptive statistics; basic R programming; probability models; sampling variability; hypothesis tests; confidence intervals; statistical simulation.

*Prerequisite(s):* MAT 016A (can be concurrent) or MAT 017A (can be concurrent) or MAT 021A (can be concurrent).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken STA 032 or STA 100. Only 2 units credit for students who have taken STA 013.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 035B – Statistical Data Science II (4 units)**

This version has ended; see updated course, below.

*Course Description:* Advanced programming and data manipulation in R. Principles of data visualization. Concepts of correlation, regression, analysis of variance, nonparametrics.

*Prerequisite(s):* (STA 035A C- or better or STA 032 C- or better or STA 100 C- or better); (MAT 016B (can be concurrent) or MAT 017B (can be concurrent) or MAT 021B (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**STA 035B – Statistical Data Science II (4 units)**

*Course Description:* Advanced programming and data manipulation in R. Principles of data visualization. Concepts of correlation, regression, analysis of variance, nonparametrics.

*Prerequisite(s):* (STA 013 C- or better or STA 013Y C- or better, ECS 032A C- or better) or (STA 035A C- or better or STA 032 C- or better or STA 100 C- or better); (MAT 016B (can be concurrent) or MAT 017B (can be concurrent) or MAT 021B (can be concurrent)).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

This course version is effective from, and including: Winter Quarter 2024.

**STA 035C – Statistical Data Science III (4 units)**

*Course Description:* Introduction to statistical learning; Bayesian paradigm; model selection; simultaneous inference; bootstrap and cross validation; classification and clustering methods; PCA; nonparametric smoothing techniques.

*Prerequisite(s):* STA 035B C- or better; (MAT 016B C- or better or MAT 017B C- or better or MAT 021B C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

**STA 090X – Seminar (1-2 units)**

*Course Description:* Examination of a special topic in a small group setting.

*Prerequisite(s):* Consent of instructor; high school algebra.

*Learning Activities:* Seminar 1-2 hour(s).

*Grade Mode:* Letter.

**STA 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**STA 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**STA 100 – Applied Statistics for Biological Sciences (4 units)**

*Course Description:* Descriptive statistics, probability, sampling distributions, estimation, hypothesis testing, contingency tables, ANOVA, regression; implementation of statistical methods using computer package.

*Prerequisite(s):* MAT 016B C- or better or MAT 017B C- or better or MAT 021B C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Only 2 units credit allowed to students who have taken STA 013, STA 032 or 103; not open for credit to students who have taken STA 102.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 101 – Advanced Applied Statistics for the Biological Sciences (4 units)**

This version has ended; see updated course, below.

*Course Description:* Basic experimental designs, two-factor ANOVA without interactions, repeated measures ANOVA, ANCOVA, random effects vs. fixed effects, multiple regression, basic model building, resampling methods, multiple comparisons, multivariate methods, generalized linear models, Monte Carlo simulations.

*Prerequisite(s):* STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 101 – Advanced Applied Statistics for the Biological Sciences (4 units)**

*Course Description:* Basic experimental designs, two-factor ANOVA without interactions, repeated measures ANOVA, ANCOVA, random effects vs. fixed effects, multiple regression, basic model building, resampling methods, multiple comparisons, multivariate methods, generalized linear models, Monte Carlo simulations.

*Prerequisite(s):* STA 035B C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

This course version is effective from, and including: Winter Quarter 2024.

**STA 103 – Applied Statistics for Business & Economics (4 units)**

This version has ended; see updated course, below.

*Course Description:* Descriptive statistics; probability; random variables; expectation; binomial, normal, Poisson, other univariate distributions; joint distributions; sampling distributions, central limit theorem; properties of estimators; linear combinations of random variables; testing and estimation; Minitab computing package. May be taught abroad.

*Prerequisite(s):* (STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 100 C- or better); (MAT 016B C- or better or MAT 017B C- or better or MAT 021B C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units credit to students who have completed STA 100.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 103 – Applied Statistics for Business & Economics (4 units)**

*Course Description:* Descriptive statistics; probability; random variables; expectation; binomial, normal, Poisson, other univariate distributions; joint distributions; sampling distributions, central limit theorem; properties of estimators; linear combinations of random variables; testing and estimation; Minitab computing package. May be taught abroad.

*Prerequisite(s):* (STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 035B C- or better or STA 100 C- or better); (MAT 016B C- or better or MAT 017B C- or better or MAT 021B C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units credit to students who have completed STA 100.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL). This course version is effective from, and including: Winter Quarter 2024.

**STA 104 – Applied Statistical Methods: Nonparametric Statistics (4 units)**

This version has ended; see updated course, below.

*Course Description:* Sign and Wilcoxon tests, Walsh averages. Two-sample procedures. Inferences concerning scale. Kruskal-Wallis test. Measures of association. Chi square and Kolmogorov-Smirnov tests.

*Prerequisite(s):* STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 104 – Applied Statistical Methods: Nonparametric Statistics (4 units)**

*Course Description:* Sign and Wilcoxon tests, Walsh averages. Two-sample procedures. Inferences concerning scale. Kruskal-Wallis test. Measures of association. Chi square and Kolmogorov-Smirnov tests.

*Prerequisite(s):* STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 035B C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

This course version is effective from, and including: Winter Quarter 2024.

## **STA 106 – Applied Statistical Methods: Analysis of Variance (4 units)**

This version has ended; see updated course, below.

*Course Description:* Basics of experimental design. One-way and two-way fixed effects analysis of variance models. Randomized complete and incomplete block design. Multiple comparisons procedures. One-way random effects model.

*Prerequisite(s):* STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

### **STA 106 – Applied Statistical Methods: Analysis of Variance (4 units)**

*Course Description:* Basics of experimental design. One-way and two-way fixed effects analysis of variance models. Randomized complete and incomplete block design. Multiple comparisons procedures. One-way random effects model.

*Prerequisite(s):* STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 035B C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

This course version is effective from, and including: Winter Quarter 2024.

## **STA 108 – Applied Statistical Methods: Regression Analysis (4 units)**

This version has ended; see updated course, below.

*Course Description:* Simple linear regression, variable selection techniques, stepwise regression, analysis of covariance, influence measures, computing packages.

*Prerequisite(s):* STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

### **STA 108 – Applied Statistical Methods: Regression Analysis (4 units)**

*Course Description:* Simple linear regression, variable selection techniques, stepwise regression, analysis of covariance, influence measures, computing packages.

*Prerequisite(s):* STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 035B C- or better or STA 100 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

This course version is effective from, and including: Winter Quarter 2024.

## **STA 109 – Fundamentals of Statistical Learning (4 units)**

*Course Description:* Principles of supervised and unsupervised statistical learning. Regularization and cross validation; classification, clustering and dimension reduction techniques; nonparametric smoothing methods.

*Prerequisite(s):* STA 015C C- or better or STA 106 C- or better or STA 108 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken STA 142A or ECS 171; only 2 units credit for students who have taken STA 035C.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **STA 130A – Mathematical Statistics: Brief Course (4 units)**

*Course Description:* Basic probability, densities and distributions, mean, variance, covariance, Chebyshev's inequality, some special distributions, sampling distributions, central limit theorem and law of large numbers, point estimation, some methods of estimation, interval estimation, confidence intervals for certain quantities, computing sample sizes.

*Prerequisite(s):* (MAT 016C C- or better or MAT 017C C- or better or MAT 021C C- or better); (STA 013 C- or better or STA 013Y C- or better or STA 032 C- or better or STA 100 C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units of credit allowed to students who have taken STA 131A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **STA 130B – Mathematical Statistics: Brief Course (4 units)**

*Course Description:* Transformed random variables, large sample properties of estimates. Basic ideas of hypotheses testing, likelihood ratio tests, goodness-of-fit tests. General linear model, least squares estimates, Gauss-Markov theorem. Analysis of variance, F-test. Regression and correlation, multiple regression. Selected topics.

*Prerequisite(s):* STA 130A C- or better or STA 131A C- or better or MAT 135A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **STA 131A – Introduction to Probability Theory (4 units)**

*Course Description:* Fundamental concepts of probability theory, discrete and continuous random variables, standard distributions, moments and moment-generating functions, laws of large numbers and the central limit theorem.

*Prerequisite(s):* MAT 021C C- or better; (MAT 022A C- or better or MAT 027A C- or better or MAT 067 C- or better); MAT 021D strongly recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Not open for credit to students who have completed MAT 135A.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **STA 131B – Introduction to Mathematical Statistics (4 units)**

*Course Description:* Sampling, methods of estimation, bias-variance decomposition, sampling distributions, Fisher information, confidence intervals, and some elements of hypothesis testing.

*Prerequisite(s):* STA 131A C- or better or MAT 135A C- or better; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **STA 131C – Introduction to Mathematical Statistics (4 units)**

*Course Description:* Testing theory, tools and applications from probability theory, Linear model theory, ANOVA, goodness-of-fit.

*Prerequisite(s):* STA 131B C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **STA 135 – Multivariate Data Analysis (4 units)**

This version has ended; see updated course, below.

*Course Description:* Multivariate normal distribution; Mahalanobis distance; sampling distributions of the mean vector and covariance matrix; Hotellings T<sub>2</sub>; simultaneous inference; one-way MANOVA; discriminant analysis; principal components; canonical correlation; factor analysis. Intensive use of computer analyses and real data sets.

*Prerequisite(s):* (STA 130B C- or better or STA 131B C- or better); (MAT 022A C- or better or MAT 027A C- or better or MAT 067 C- or better).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **STA 135 – Multivariate Data Analysis (4 units)**

*Course Description:* Multivariate normal distribution; Mahalanobis distance; sampling distributions of the mean vector and covariance matrix; Hotellings T<sub>2</sub>; simultaneous inference; one-way MANOVA; discriminant analysis; principal components; canonical correlation; factor analysis. Intensive use of computer analyses and real data sets.

*Prerequisite(s):* (STA 130B C- or better or STA 131B C- or better); (MAT 022A C- or better or MAT 027A C- or better or MAT 067 C- or better); MAT 167 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

This course version is effective from, and including: Winter Quarter 2024.

## **STA 137 – Applied Time Series Analysis (4 units)**

This version has ended; see updated course, below.

*Course Description:* Time series relationships; univariate time series models: trend, seasonality, correlated errors; regression with correlated errors; autoregressive models; autoregressive moving average models; spectral analysis: cyclical behavior and periodicity, measures of periodicity, periodogram; linear filtering; prediction of time series; transfer function models.

*Prerequisite(s):* STA 108 C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **STA 137 – Applied Time Series Analysis (4 units)**

*Course Description:* Time series relationships; univariate time series models: trend, seasonality, correlated errors; regression with correlated errors; autoregressive models; autoregressive moving average models; spectral analysis: cyclical behavior and periodicity, measures of periodicity, periodogram; linear filtering; prediction of time series; transfer function models.

*Prerequisite(s):* STA 108 C- or better; (MAT 022A C- or better or MAT 027A C- or better or MAT 067 C- or better).

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

This course version is effective from, and including: Winter Quarter 2024.

## **STA 138 – Analysis of Categorical Data (4 units)**

*Course Description:* Varieties of categorical data, cross-classifications, contingency tables, tests for independence. Multidimensional tables and log-linear models, maximum likelihood estimation; tests of goodness-of-fit. Logit models, linear logistic models. Analysis of incomplete tables. Packaged computer programs, analysis of real data.

*Prerequisite(s):* (STA 130B or STA 131B) or (STA 106, STA 108).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

## **STA 141A – Fundamentals of Statistical Data Science (4 units)**

*Course Description:* Introduction to computing for data analysis & visualization, and simulation, using a high-level language (e.g. R). Computational reasoning, computationally intensive statistical methods, reading tabular & non-standard data.

*Prerequisite(s):* STA 108 C- or better or STA 106 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One & Pass Two: open to Statistics Majors, Biostatistics & Statistics graduate students; registration open to all students during schedule adjustment.

*Credit Limitation(s):* Not open for credit to students who have taken STA 141 or STA 242.

*Grade Mode:* Letter.

## **STA 141B – Data & Web Technologies for Data Analysis (4 units)**

*Course Description:* Essentials of using relational databases and SQL. Processing data in blocks. Scraping Web pages and using Web services/APIs. Basics of text mining. Interactive data visualization with Web technologies. Computational data workflow and best practices. Statistical methods.

*Prerequisite(s):* STA 141A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One and Pass Two restricted to Statistics majors and graduate students in Statistics and Biostatistics. Open to all students during Open Registration.

*Grade Mode:* Letter.

## **STA 141C – Big Data & High Performance Statistical Computing (4 units)**

*Course Description:* High-performance computing in high-level data analysis languages; different computational approaches and paradigms for efficient analysis of big data; interfaces to compiled languages; R and Python programming languages; high-level parallel computing; MapReduce; parallel algorithms and reasoning.

*Prerequisite(s):* STA 141B C- or better or (STA 141A C- or better, (ECS 010 C- or better or ECS 032A C- or better)).

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One and Pass Two restricted to Statistics majors and graduate students in Statistics and Biostatistics; open to all students during Open registration.

*Grade Mode:* Letter.

## **STA 142A – Statistical Learning I (4 units)**

This version has ended; see updated course, below.

*Course Description:* Fundamental concepts and methods in statistical learning with emphasis on supervised learning. Principles, methodologies and applications of parametric and nonparametric regression, classification, resampling and model selection techniques.

*Prerequisite(s):* STA 141A C- or better; (STA 130A C- or better or STA 131A C- or better or MAT 135A C- or better); STA 131A or MAT 135A preferred.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Statistics majors.

*Credit Limitation(s):* Only 2 units of credit for students who have previously taken ECS 171.

*Grade Mode:* Letter.

## **STA 142A – Statistical Learning I (4 units)**

*Course Description:* Fundamental concepts and methods in statistical learning with emphasis on supervised learning. Principles, methodologies and applications of parametric and nonparametric regression, classification, resampling and model selection techniques.

*Prerequisite(s):* STA 141A C- or better; (STA 130A C- or better or STA 131A C- or better or MAT 135A C- or better); (MAT 022A C- or better or MAT 027A C- or better or MAT 067 C- or better); STA 131A or MAT 135A preferred; MAT 167 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Statistics majors.

*Credit Limitation(s):* Only 2 units of credit for students who have previously taken ECS 171.

*Grade Mode:* Letter.

This course version is effective from, and including: Winter Quarter 2024.

## **STA 142B – Statistical Learning II (4 units)**

This version has ended; see updated course, below.

*Course Description:* Fundamental concepts and methods in statistical learning with emphasis on unsupervised learning. Principles, methodologies and applications of clustering methods, dimension reduction and manifold learning techniques, graphical models and latent variables modeling.

*Prerequisite(s):* STA 142A C- or better; (STA 130B C- or better or STA 131B C- or better); STA 131B preferred.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Statistics majors.

*Grade Mode:* Letter.

## **STA 142B – Statistical Learning II (4 units)**

*Course Description:* Fundamental concepts and methods in statistical learning with emphasis on unsupervised learning. Principles, methodologies and applications of clustering methods, dimension reduction and manifold learning techniques, graphical models and latent variables modeling.

*Prerequisite(s):* STA 141A C- or better; (STA 130A C- or better or STA 131A C- or better or MAT 135A C- or better); (MAT 022A C- or better or MAT 027A C- or better or MAT 067 C- or better; STA 131A or MAT 135A preferred; MAT 167 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Statistics majors.

*Grade Mode:* Letter.

This course version is effective from, and including: Winter Quarter 2024.

## **STA 144 – Sampling Theory of Surveys (4 units)**

*Course Description:* Simple random, stratified random, cluster, and systematic sampling plans; mean, proportion, total, ratio, and regression estimators for these plans; sample survey design, absolute and relative error, sample size selection, strata construction; sampling and nonsampling sources of error.

*Prerequisite(s):* (STA 130B or STA 131B) or (STA 106, STA 108).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 145 – Bayesian Statistical Inference (4 units)**

This version has ended; see updated course, below.

*Course Description:* Subjective probability, Bayes Theorem, conjugate priors, non-informative priors, estimation, testing, prediction, empirical Bayes methods, properties of Bayesian procedures, comparisons with classical procedures, approximation techniques, Gibbs sampling, hierarchical Bayesian analysis, applications, computer implemented data analysis.

*Prerequisite(s):* STA 130B C- or better or STA 131B C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**STA 145 – Bayesian Statistical Inference (4 units)**

*Course Description:* Subjective probability, Bayes Theorem, conjugate priors, non-informative priors, estimation, testing, prediction, empirical Bayes methods, properties of Bayesian procedures, comparisons with classical procedures, approximation techniques, Gibbs sampling, hierarchical Bayesian analysis, applications, computer implemented data analysis.

*Prerequisite(s):* STA 130A C- or better or STA 131A C- or better or MAT 135A C- or better.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

This course version is effective from, and including: Winter Quarter 2024.

**STA 160 – Practice in Statistical Data Science (4 units)**

This version has ended; see updated course, below.

*Course Description:* Principles and practice of interdisciplinary, collaborative data analysis; complete case study review and team data analysis project.

*Prerequisite(s):* STA 106 C- or better; STA 108 C- or better; (STA 130B C- or better or STA 131B C- or better); STA 141A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Open to undergraduate Statistics majors.

*Grade Mode:* Letter.

**STA 160 – Practice in Statistical Data Science (4 units)**

*Course Description:* Principles and practice of interdisciplinary, collaborative data analysis; complete case study review and team data analysis project.

*Prerequisite(s):* STA 141A C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Enrollment Restriction(s):* Open to undergraduate Statistics and Data Science majors.

*Grade Mode:* Letter.

This course version is effective from, and including: Winter Quarter 2024.

**STA 190X – Seminar (1-2 units)**

*Course Description:* In-depth examination of a special topic in a small group setting.

*Prerequisite(s):* STA 013 or STA 013Y or STA 032 or STA 100 or STA 103.

*Learning Activities:* Seminar 1-2 hour(s).

*Grade Mode:* Letter.

**STA 192 – Internship in Statistics (1-12 units)**

*Course Description:* Work experience in statistics.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s), Term Paper.

*Grade Mode:* Pass/No Pass only.

**STA 194HA – Special Studies for Honors Students (4 units)**

*Course Description:* Directed reading, research and writing, culminating in the completion of a senior honors thesis or project under direction of a faculty advisor.

*Prerequisite(s):* Senior qualifying for honors.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**STA 194HB – Special Studies for Honors Students (4 units)**

*Course Description:* Directed reading, research and writing, culminating in the completion of a senior honors thesis or project under direction of a faculty advisor.

*Prerequisite(s):* Senior qualifying for honors.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**STA 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**STA 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**STA 200A – Introduction to Probability Theory (4 units)**

*Course Description:* Fundamental concepts of probability theory, discrete and continuous random variables, standard distributions, moments and moment-generating functions, laws of large numbers and the central limit theorem.

*Prerequisite(s):* MAT 021A; MAT 021B; MAT 021C; MAT 022A; consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**STA 200B – Introduction to Mathematical Statistics I (4 units)**

*Course Description:* Sampling, methods of estimation, bias-variance decomposition, sampling distributions, Fisher information, confidence intervals, and some elements of hypothesis testing.

*Prerequisite(s):* STA 200A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**STA 200C – Introduction to Mathematical Statistics II (4 units)**

*Course Description:* Testing theory, tools and applications from probability theory, Linear model theory, ANOVA, goodness-of-fit.

*Prerequisite(s):* STA 200B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **STA 201 – SAS Programming for Statistical Analysis (3 units)**

*Course Description:* Introductory SAS language, data management, statistical applications, methods. Includes basics, graphics, summary statistics, data sets, variables and functions, linear models, repetitive code, simple macros, GLIM and GAM, formatting output, correspondence analysis, bootstrap. Prepare SAS base programmer certification exam.

*Prerequisite(s):* Introductory, upper division statistics course; some knowledge of vectors and matrices; STA 106 or STA 108 or the equivalent suggested.

*Learning Activities:* Lecture 2 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **STA 205 – Statistical Methods for Research with SAS (4 units)**

*Course Description:* Focus on linear statistical models widely used in scientific research. Emphasis on concepts, methods and data analysis using SAS. Topics include simple and multiple linear regression, polynomial regression, diagnostics, model selection, variable transformation, factorial designs and ANCOVA.

*Prerequisite(s):* An introductory upper division statistics course and some knowledge of vectors and matrices; STA 100, or STA 102, or STA 103 suggested or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **STA 206 – Statistical Methods for Research I (4 units)**

*Course Description:* Focus on linear statistical models. Emphasis on concepts, method and data analysis. Topics include simple and multiple linear regression, polynomial regression, diagnostics, model selection, factorial designs and analysis of covariance. Use of professional level software.

*Prerequisite(s):* Introductory statistics course; some knowledge of vectors and matrices.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **STA 207 – Statistical Methods for Research II (4 units)**

*Course Description:* Linear and nonlinear statistical models emphasis on concepts, methods/data analysis using professional level software. Topics include linear mixed models, repeated measures, generalized linear models, model selection, analysis of missing data, and multiple testing procedures.

*Prerequisite(s):* STA 206; knowledge of vectors and matrices.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **STA 208 – Statistical Methods in Machine Learning (4 units)**

*Course Description:* Focus on linear and nonlinear statistical models. Emphasis on concepts, methods, and data analysis. Topics include resampling methods, regularization techniques in regression and modern classification, cluster analysis and dimension reduction techniques. Use of professional level software.

*Prerequisite(s):* STA 206; STA 207; STA 135; or their equivalents.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

## **STA 209 – Optimization for Big Data Analytics (4 units)**

*Course Description:* Optimization algorithms for solving problems in statistics, machine learning, data analytics. Review computational tools for implementing optimization algorithms (gradient descent, stochastic gradient descent, coordinate descent, Newton's method.)

*Prerequisite(s):* STA 200A; STA 208.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **STA 220 – Data & Web Technologies for Data Analysis (4 units)**

*Course Description:* Essentials of using relational databases and SQL. Processing data in blocks. Scraping Web pages and using Web services/APIs. Basics of text mining. Interactive data visualization with Web technologies. Computational data workflow and best practices. Statistical Methods.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **STA 221 – Big Data & High Performance Statistical Computing (4 units)**

*Course Description:* High-performance computing in high-level data analysis languages; different computational approaches and paradigms for efficient analysis of big data; interfaces to compiled languages; R and Python programming languages; high-level parallel computing; MapReduce; parallel algorithms and reasoning.

*Prerequisite(s):* STA 220.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

## **STA 222 – Biostatistics: Survival Analysis (4 units)**

*Course Description:* Incomplete data; life tables; nonparametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics.

*Prerequisite(s):* STA 131C.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* BST 222.

*Grade Mode:* Letter.

## **STA 223 – Biostatistics: Generalized Linear Models (4 units)**

*Course Description:* Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs.

*Prerequisite(s):* STA 131C.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* BST 223.

*Grade Mode:* Letter.

## **STA 224 – Analysis of Longitudinal Data (4 units)**

*Course Description:* Standard and advanced methodology, theory, algorithms, and applications relevant for analysis of repeated measurements and longitudinal data in biostatistical and statistical settings.

*Prerequisite(s):* ((STA 222, STA 223) or (BST 222, BST 223)); STA 232B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* BST 224.

*Grade Mode:* Letter.

**STA 225 – Clinical Trials (4 units)**

*Course Description:* Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials.

*Prerequisite(s):* STA 223 or BST 223; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* BST 225.

*Grade Mode:* Letter.

**STA 226 – Statistical Methods for Bioinformatics (4 units)**

*Course Description:* Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of -omics data.

*Prerequisite(s):* STA 131C; or consent of instructor; data analysis experience recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* BST 226.

*Grade Mode:* Letter.

**STA 231A – Mathematical Statistics I (4 units)**

*Course Description:* First part of three-quarter sequence on mathematical statistics. Emphasizes foundations. Topics include basic concepts in asymptotic theory, decision theory, and an overview of methods of point estimation.

*Prerequisite(s):* STA 131A; STA 131B; STA 131C; MAT 025; MAT 125A; or equivalent of MAT 025 and MAT 125A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**STA 231B – Mathematical Statistics II (4 units)**

*Course Description:* Second part of a three-quarter sequence on mathematical statistics. Emphasizes hypothesis testing (including multiple testing) as well as theory for linear models.

*Prerequisite(s):* STA 231A.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**STA 231C – Mathematical Statistics III (4 units)**

*Course Description:* Third part of three-quarter sequence on mathematical statistics. Emphasizes large sample theory and their applications. Topics include statistical functionals, smoothing methods and optimization techniques relevant for statistics.

*Prerequisite(s):* STA 231A; STA 231B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**STA 232A – Applied Statistics I (4 units)**

*Course Description:* Estimation and testing for the general linear model, regression, analysis of designed experiments, and missing data techniques.

*Prerequisite(s):* STA 106; STA 108; STA 131A; STA 131B; STA 131C; MAT 167.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

**STA 232B – Applied Statistics II (4 units)**

*Course Description:* Alternative approaches to regression, model selection, nonparametric methods amenable to linear model framework and their applications.

*Prerequisite(s):* STA 106; STA 108; STA 131A; STA 131B; STA 131C; STA 232A; MAT 167.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

**STA 232C – Applied Statistics III (4 units)**

*Course Description:* Multivariate analysis: multivariate distributions, multivariate linear models, data analytic methods including principal component, factor, discriminant, canonical correlation and cluster analysis.

*Prerequisite(s):* STA 106; STA 108; STA 131C; STA 232B; MAT 167.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

**STA 233 – Design Experiments (3 units)**

*Course Description:* Topics from balanced and partially balanced incomplete block designs, fractional factorials, and response surfaces.

*Prerequisite(s):* STA 131C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**STA 235A – Probability Theory (4 units)**

*Course Description:* Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from: martingales, Markov chains, ergodic theory.

*Prerequisite(s):* (MAT 125B, MAT 135A) or STA 131A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* MAT 235A.

*Grade Mode:* Letter.

**STA 235B – Probability Theory (4 units)**

*Course Description:* Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from: martingales, Markov chains, ergodic theory.

*Prerequisite(s):* STA 235A or MAT 235A; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* MAT 235B.

*Grade Mode:* Letter.

**STA 235C – Probability Theory (4 units)**

*Course Description:* Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from: martingales, Markov chains, ergodic theory.

*Prerequisite(s):* STA 235B or MAT 235B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Cross Listing:* MAT 235C.

*Grade Mode:* Letter.

**STA 237A – Time Series Analysis (4 units)**

*Course Description:* Advanced topics in time series analysis and applications. Models for experimental data, measures of dependence, large-sample theory, statistical estimation and inference. Univariate and multivariate spectral analysis, regression, ARIMA models, state-space models, Kalman filtering.

*Prerequisite(s):* STA 131B; or the equivalent of STA 131B.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STA 237B – Time Series Analysis (4 units)**

*Course Description:* Advanced topics in time series analysis and applications. Models for experimental data, measures of dependence, large-sample theory, statistical estimation and inference. Univariate and multivariate spectral analysis, regression, ARIMA models, state-space models, Kalman filtering.

*Prerequisite(s):* STA 131B; STA 237A; or the equivalent of STA 131B.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STA 238 – Theory of Multivariate Analysis (4 units)**

*Course Description:* Multivariate normal and Wishart distributions, Hotellings T-Squared, simultaneous inference, likelihood ratio and union intersection tests, Bayesian methods, discriminant analysis, principal component and factor analysis, multivariate clustering, multivariate regression and analysis of variance, application to data.

*Prerequisite(s):* STA 131B; STA 135.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STA 240A – Nonparametric Inference (4 units)**

*Course Description:* Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, robustness, nonparametric estimation of a distribution function from incomplete data, curve estimation, and theory of resampling methodology.

*Prerequisite(s):* STA 231C; STA 235A, STA 235B, STA 235C recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STA 240B – Nonparametric Inference (4 units)**

*Course Description:* Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, robustness, nonparametric estimation of a distribution function from incomplete data, curve estimation, and theory of resampling methodology.

*Prerequisite(s):* STA 231C; STA 235A, STA 235B, STA 235C recommended.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STA 241 – Asymptotic Theory of Statistics (4 units)**

*Course Description:* Topics in asymptotic theory of statistics chosen from weak convergence, contiguity, empirical processes, Edgeworth expansion, and semiparametric inference.

*Prerequisite(s):* STA 231C; STA 235A, STA 235B, STA 235C desirable.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**STA 242 – Introduction to Statistical Programming (4 units)**

*Course Description:* Essentials of statistical computing using a general-purpose statistical language. Topics include algorithms; design; debugging and efficiency; object-oriented concepts; model specification and fitting; statistical visualization; data and text processing; databases; computer systems and platforms; comparison of scientific programming languages.

*Prerequisite(s):* STA 130A; STA 130B; or equivalent of STA 130A and STA 130B.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

**STA 243 – Computational Statistics (4 units)**

*Course Description:* Numerical analysis; random number generation; computer experiments and resampling techniques (bootstrap, cross validation); numerical optimization; matrix decompositions and linear algebra computations; algorithms (markov chain monte carlo, expectation-maximization); algorithm design and efficiency; parallel and distributed computing.

*Prerequisite(s):* (STA 130A, STA 130B); (MAT 067 or MAT 167); or equivalent of STA 130A and 130B, or equivalent of MAT 167 or MAT 067.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Grade Mode:* Letter.

**STA 250 – Topics in Applied & Computational Statistics (4 units)**

*Course Description:* Resampling, nonparametric and semiparametric methods, incomplete data analysis, diagnostics, multivariate and time series analysis, applied Bayesian methods, sequential analysis and quality control, categorical data analysis, spatial and image analysis, computational biology, functional data analysis, models for correlated data, learning theory.

*Prerequisite(s):* STA 131A; STA 232A recommended, not required.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Repeat Credit:* May be repeated with consent of graduate advisor.

*Grade Mode:* Letter.

**STA 251 – Topics in Statistical Methods & Models (4 units)**

*Course Description:* Topics may include Bayesian analysis, nonparametric and semiparametric regression, sequential analysis, bootstrap, statistical methods in high dimensions, reliability, spatial processes, inference for stochastic process, stochastic methods in finance, empirical processes, change-point problems, asymptotics for parametric, nonparametric and semiparametric models, nonlinear time series, robustness.

*Prerequisite(s):* STA 231B; or the equivalent of STA 231B.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated when topic differs and only with consent of graduate advisor.

*Grade Mode:* Letter.

**STA 252 – Advanced Topics in Biostatistics (4 units)**

*Course Description:* Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics.

*Prerequisite(s):* (STA 222 or BST 222); (STA 223 or BST 223).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Repeat Credit:* May be repeated when topic differs and only with consent of graduate advisor.

*Cross Listing:* BST 252.

*Grade Mode:* Letter.

**STA 260 – Statistical Practice & Data Analysis (3 units)**

*Course Description:* Principles and practice of interdisciplinary collaboration in statistics, statistical consulting, ethical aspects, and basics of data analysis and study design. Emphasis on practical consulting and collaboration of statisticians with clients and scientists under instructor supervision.

*Prerequisite(s):* STA 207 or STA 232B; working knowledge of advanced statistical software and the equivalent of STA 207 or STA 232B.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Enrollment Restriction(s):* Open to students enrolled in the graduate program in Statistics or Biostatistics, as the class also serves to provide professional service to clients and collaborators who work with the students.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

**STA 280 – Orientation to Statistical Research (2 units)**

*Course Description:* Guided orientation to original statistical research papers, and oral presentations in class of such papers by students under the supervision of a faculty member.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STA 290 – Seminar in Statistics (1-6 units)**

*Course Description:* Seminar on advanced topics in probability and statistics.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STA 292 – Graduate Group in Statistics Seminar (1-2 units)**

*Course Description:* Advanced study in various fields of statistics with emphasis in applied topics, presented by members of the Graduate Group in Statistics and other guest speakers.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Seminar 1-2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STA 298 – Directed Group Study (1-5 units)**

*Course Description:* Special topics in Statistics appropriate for study at the graduate level.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**STA 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STA 299D – Dissertation Research (1-12 units)**

*Course Description:* Research in Statistics under the supervision of major professor.

*Prerequisite(s):* Consent of instructor; advancement to candidacy for Ph.D.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STA 390 – Methods of Teaching Statistics (2 units)**

*Course Description:* Practical experience in methods/problems of teaching statistics at university undergraduate level. Lecturing techniques, analysis of tests and supporting material, preparation and grading of examinations, and use of statistical software. Emphasis on practical training.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**STA 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**STA 401 – Methods in Statistical Consulting (3 units)**

*Course Description:* Introduction to consulting, in-class consulting as a group, statistical consulting with clients, and in-class discussion of consulting problems. Clients are drawn from a pool of University clients.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Students must be enrolled in the graduate program in Statistics or Biostatistics.

*Repeat Credit:* May be repeated with consent of graduate advisor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Study of Religion (REL)**

College of Letters & Science

## **REL 200A – Historical Roots of the Study of Religion (4 units)**

*Course Description:* Consideration of the historical and philosophical formation of religion as a concept. Treats the emergence of religion as a category of analysis and understanding from the Reformation through the Enlightenment.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **REL 200B – Foundational Theories of Religion (4 units)**

*Course Description:* Survey of classical 19th and 20th century approaches to the study of religion.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **REL 200C – Contemporary Approaches to the Study of Religion (4 units)**

*Course Description:* Consideration of major themes, issues and methods in the contemporary study of religion. Perspectives from diverse cultural settings employed to consider modern historical, philosophical, and social contexts that inform understandings of religion.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Grade Mode:* Letter.

## **REL 200D – Field Profile Seminar I & II (1-2 units)**

*Course Description:* Individually guided research to survey the field of study, under the supervision of a faculty member. Four units total over two or more quarters are required by the end of the second year.

*Learning Activities:* Project.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **REL 210A – Special Topics in American Religious Cultures (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of specific topics in American religious cultures.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 210B – Special Topics in Asian Religious Cultures (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of specific topics in Asian religious cultures.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 210C – Special Topics in Mediterranean Religious Cultures (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of specific topics in Mediterranean religious cultures.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 230A – Thematic Topics: Body & Praxis (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of religion through specific topics and themes relating to the body and praxis.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 230B – Thematic Topics: Language, Rhetoric, & Performance (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of religion through specific topics and themes relating to language, rhetoric, and performance.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 230C – Thematic Topics: Modernity, Science, & Secularism (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of religion through specific topics and themes relating to modernity, science, and secularism.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 230D – Thematic Topics: Theory & Method (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of religion through specific topics and themes relating to theory and method.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 230E – Thematic Topics: Values, Ethics, & Human Rights (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of religion through specific topics and themes relating to values, ethics, and human rights.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 230F – Thematic Topics: Visual Culture, Media, & Technology (4 units)**

*Course Description:* Comparative, interpretive study of the treatment of religion through specific topics and themes relating to visual culture, media, and technology.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

## **REL 231B – Theories of Language (4 units)**

*Course Description:* Focuses on historical theories of language that precede and accompany post-structuralist theory. Intended to introduce graduate students to the context of modern theory formation. May cover structuralism, integrationism, and grammaticalization.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Grade Mode:* Letter.

## **REL 231E – History, Theory & Criticism of Human Rights (4 units)**

*Course Description:* Introduces the advanced study of Human Rights and the theoretical and practical elaboration of the international Human Rights system. Seminar engages with criticism of Human Rights and develops research and teaching within disciplinary and interdisciplinary frameworks.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to graduate students.

*Cross Listing:* HMR 200A.

*Grade Mode:* Letter.

## **REL 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **REL 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **REL 299D – Dissertation Writing (1-12 units)**

*Course Description:* Dissertation Writing.

*Prerequisite(s):* Consent of instructor; advanced to candidacy for the Ph.D. program.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# **Surgery (SUR)**

School of Medicine

## **SUR 099 – Cardiovascular Tissue Engineering Research (1-5 units)**

*Course Description:* Multidisciplinary research in cardiovascular tissue engineering and regeneration for acquired and congenital cardiovascular disease.

*Learning Activities:* Laboratory 3-15 hour(s).

*Grade Mode:* Letter.

## **SUR 192 – Internship in General Surgery (1-12 units)**

*Course Description:* Supervised work experience in general surgery and related fields.

*Prerequisite(s):* Consent of instructor. Upper division standing; approval of project prior to period of internship by preceptor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

## **SUR 199 – Special Study in General Surgery for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study in general surgery for advanced undergraduates.

*Prerequisite(s):* Advanced undergraduate student with consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

## **SUR 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **SUR 430 – Surgery Clerkship (3-12 units)**

*Course Description:* Eight week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCDMC. Daily core material presentations and reading assignments. Student involvement includes work-up and care of surgical patients.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SUR 430F – SJVP Surgery Clerkship at UCSF (6-12 units)**

*Course Description:* General surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCSF Fresno. Student involvement includes work-up and care of surgical patients.

*Prerequisite(s):* Approval by School of Medicine Committee on Student Progress.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SUR 430R – Rural PRIME Surgery Longitudinal Clerkship (2 units)**

*Course Description:* Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SUR 430RA – Rural PRIME Surgery Longitudinal Clerkship (3 units)**

*Course Description:* Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SUR 430RB – Rural PRIME Surgery Longitudinal Clerkship (3 units)**

*Course Description:* Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SUR 430RC – Rural PRIME Surgery Longitudinal Clerkship (3 units)**

*Course Description:* Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SUR 430RD – Rural PRIME Surgery Longitudinal Clerkship (1 unit)**

*Course Description:* Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 45 hour(s).

*Grade Mode:* Honors/Pass/Fail.

## **SUR 439D – Directed Clinical Studies in Surgery (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence.

*Prerequisite(s):* Consent of instructor; partial completion of a Clinical Rotation.

*Learning Activities:* Clinical Activity 40 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **SUR 439R – Directed Studies in Surgery (1-12 units)**

*Course Description:* Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 30 hour(s), Independent Study 10 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/Fail only.

## **SUR 450 – Surgical Skills Boot Camp (3-6 units)**

*Course Description:* Goal of the surgical skills boot camp didactic is to enable students to demonstrate competence in basic surgical skills and theory, using analytical thinking and hands-on simulation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Workshop 10 hour(s), Independent Study 30 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 461 – Surgery Burn Unit Clerkship (6-9 units)**

*Course Description:* Rotation through Surgery Specialty Clinics: Vascular, GI, GU, Thoracic, Plastic, Radiotherapy. Student works up one new and two return visit patients. Presents consult to on-site faculty. Weekly review with preceptor and course director. Reading assignments to add perspective for in-depth discussions.

*Prerequisite(s):* SUR 430; and consent of instructor; fourth-year medical student or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 462 – Surgery Trauma Service Clerkship (6-9 units)**

*Course Description:* Student works as an extern on one of the two general surgery Trauma teams, participating in resuscitation and management of critically injured patients. Team hours consist of 24 hours on, and 24 hours off.

*Prerequisite(s):* SUR 430; and consent of instructor; fourth-year medical student, or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 463 – Surgery Intensive Care Unit (6-9 units)**

*Course Description:* Student participates in direct supervision of critically ill surgical patients in a twelve-bed surgery ICU. Each student is closely supervised. Provides in-depth experience with management of critically ill patients.

*Prerequisite(s):* SUR 430; and consent of instructor; fourth-year medical student, or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 465 – Surgery Intensive Care Unit (3-8 units)**

*Course Description:* Focuses on single family, attached, detached, multi-family, and light commercial development. Study factors which make up successful real estate developments. Consider financial aspects involved in land acquisition, land development, construction, and project lending.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Honors/Pass/Fail Only.

## **SUR 466 – Clinical Plastic Surgery Elective (3-9 units)**

*Course Description:* Total involvement in patient care involving surgical preparation, treatment, operative care, and follow-up. Developing and understanding reconstruction and aesthetic plastic surgery. Microvascular surgery included. Student rotation.

*Prerequisite(s):* SUR 430; and consent of instructor; third- or fourth-year medical students.

*Learning Activities:* Clinical Activity 50 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**SUR 467 – Surgical Oncology (3-9 units)**

*Course Description:* Students actively participate in management of patients requiring surgery for cancer, endocrine disease and selected general surgical problems. Cases include malignant melanoma, sarcomas, gastrointestinal cancer, head and neck pathology, and metastatic malignancies. Attending rounds daily. Four teaching conferences weekly.

*Prerequisite(s):* SUR 430; and consent of instructor; fourth-year medical student, or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**SUR 468 – Cardiothoracic Surgery Clerkship (6-9 units)**

*Course Description:* Student works as an extern on the Cardiothoracic Surgical Service, participating in perioperative management and operations on the heart, lungs, mediastinum, and other thoracic structures. Regularly scheduled teaching conferences are conducted.

*Prerequisite(s):* SUR 430; and consent of instructor; fourth-year medical student, or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**SUR 471 – Gastrointestinal Surgery (3-9 units)**

*Course Description:* Student participates on the GI Surgery Service, working under the immediate supervision of the faculty and surgical housestaff, involving the full spectrum of gastrointestinal diseases performed by the medical student.

*Prerequisite(s):* SUR 430; IMD 430; PED 430; and consent of instructor. Fourth-year medical student or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**SUR 472 – Vascular Surgery (3-9 units)**

*Course Description:* Student participates on the vascular surgery service and in the management and operations of arterial and venous system, exclusive of diseases that require cardiopulmonary bypass for treatment. Includes patient care responsibilities with appropriate supervision.

*Prerequisite(s):* SUR 430; IMD 430; PED 430; and consent of instructor; fourth-year medical student or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**SUR 474 – Colorectal Surgery (3-6 units)**

*Course Description:* Students actively participate in clinic and the operating room on colon and rectal patients. This includes medical and surgical management. Assignments involve work up and care of the surgical patients.

*Prerequisite(s):* Consent of instructor; fourth-year medical student.

*Learning Activities:* Clinical Activity.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**SUR 475 – Pediatric Surgery (6-9 units)**

*Course Description:* Care of patients with neonatal congenital surgical problems. Fluid and electrolyte management in infants. General experience with acquired surgical diseases in children.

*Prerequisite(s):* SUR 430; and consent of instructor; fourth-year medical student or third-year medical student.

*Learning Activities:* Clinical Activity 4-6 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**SUR 476 – Surgical Consult Service (6-9 units)**

*Course Description:* Students function as acting interns working in parallel with the interns on the service. They consult on all non-trauma patients in the emergency room and on the wards and also participate in the operating room.

*Prerequisite(s):* SUR 430; and consent of instructor; fourth-year medical student or third-year medical student.

*Learning Activities:* Clinical Activity.

*Grade Mode:* Honors/Pass/Fail.

**SUR 477 – Clinically Oriented Anatomy (3 units)**

*Course Description:* Anatomy of selected regions of the body using cadaver dissection, prosections and interactive CD ROMs. Anatomical relationships relevant to common surgical procedures. Surgical and interventional radiology procedures.

*Prerequisite(s):* Completion of three years of medical school.

*Learning Activities:* Clinical Activity 40 hour(s).

*Enrollment Restriction(s):* Restricted to fourth-year medical student only.

*Grade Mode:* Pass/No Pass only.

**SUR 478 – Surgical Preceptorship: Off Campus (3-18 units)**

*Course Description:* Student participates in the preoperative, operative and postoperative care of surgical patients under the supervision of attending staff.

*Prerequisite(s):* Consent of instructor; fourth-year medical student.

*Learning Activities:* Clinical Activity 60 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**SUR 480 – Insights in Surgery (1-3 units)**

*Course Description:* Individualized activities, including ward rounds, subspecialty clinics and conferences, grand rounds, and observation of a variety of surgical procedures.

*Prerequisite(s):* Consent of instructor; medical student in good academic standing.

*Learning Activities:* Clinical Activity 3-9 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**SUR 481 – Interactive Clinical Case Presentation (ICCP) (4 units)**

*Course Description:* Case presentation of common clinical scenarios (i.e. chestpain/MI; fever/pneumonia; abdo pain/chlecy stites, etc.) from various discipline held in an auditorium with real patients exposure.

Interactive session to review history, physical findings and case management. Students will be asked to perform H&P.

*Prerequisite(s):* Fourth-year medical students; however, course is open for third- and fourth-year student observers.

*Learning Activities:* Clinical Activity 1 hour(s).

*Enrollment Restriction(s):* Course taught as one session (4 hours) per month for three quarters (July to March); students who enroll can earn up to three credits and the minimum requirements will be to attend at least six sessions; students can do all nine sessions and work toward an honor; for the written part students will have to pick two of the nine case presentations and write a detailed paper with a literature review on "The Current management" of that disease-this can in fact be a manuscript submitted for publication with a faculty member as an advisor; maximum of 10-15 students in good standing.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 482 – Vascular Surgery Virtual External Rotation (3 units)**

*Course Description:* Vascular surgery is the field of medical and surgical management of vascular pathology ranging from lower extremity claudication to aortic aneurysms. Rotation brings a level of understanding pursuant of an intern. Instruction through daily virtual rounding and self-directed learning through readings and operation videos; direct patient care is not included.

*Learning Activities:* Web Virtual Lecture.

*Grade Mode:* Pass/Fail only.

## **SUR 483 – General Thoracic Surgery Acting Internship (6 units)**

*Course Description:* This four-week Acting Internship (AI) with the Division of General Thoracic Surgery is designed to be an initial comprehensive exposure to adult general thoracic surgery, including preoperative assessment, perioperative management and postoperative care.

*Learning Activities:* Internship.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 484 – Multidisciplinary Experience in Endocrine Neoplasia (3 units)**

*Course Description:* Consists predominately of multidisciplinary clinical experiences focusing on the diagnosis and management of patients with benign and malignant thyroid disease, parathyroid disorders, benign and malignant adrenal disease, pituitary neoplasia, and multiple endocrine neoplasia syndromes.

*Learning Activities:* Clinical Activity, Web Virtual Lecture.

*Grade Mode:* P/NP only.

## **SUR 493B – Critically Ill Surgical Patients SSM (6 units)**

*Course Description:* Special Study Module, a four-week course on the topic: Application of Basic Cardiopulmonary Physiology to Problems Encountered in Critically Ill Surgical Patients.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 493C – Physiological Principles in SICU SSM (6 units)**

*Course Description:* Special Study Module, a four-week course on the topic: Care of the Critically Ill Surgical Patient: Use of Physiological Principles to Guide Treatment of Patients with Common Surgical Problems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Lecture/Lab 10 hour(s), Laboratory 16 hour(s), Clinical Activity 4 hour(s).

*Enrollment Restriction(s):* Restricted to UC Davis School of Medicine students only.

*Cross Listing:* HPH 493.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 493D – Interdisciplinary Study of Gastrointestinal Cancer (6 units)**

*Course Description:* In-depth study of gastrointestinal, hepatic and pancreatic cancer. Emphasis on an integration of basic science and clinical medicine. Participating departments include pathology, surgical oncology, medical oncology, gastroenterology, radiology and radiotherapy.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 5 hour(s), Clinical Activity 12 hour(s), Laboratory 3 hour(s), Discussion/Laboratory 20 hour(s).

*Cross Listing:* PMD 493.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 494H – Fourth-Year Surgical Honors Program (18 units)**

*Course Description:* To provide intensive and comprehensive training in surgery to students interested in a postgraduate surgical career, that would enable them to succeed during the internship and residency training.

*Prerequisite(s):* SUR 430; and consent of instructor; completion of third year of medical school with superior performance on SUR 430.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 495 – Intense Introduction to Cardiac Surgery (3 units)**

*Course Description:* Close contact with vascular surgeon for two-week period. Includes Sunday mornings. Physiology of going on and off cardiopulmonary bypass. Atherosclerotic cardiovascular disease, structural and valvular heart disease and electrical and rhythmic heart disease.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Clinical Activity 16 hour(s), Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to between first- and second-year medical student; 100% mandatory attendance.

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Pass/Fail only.

## **SUR 498 – Group Study (1-5 units)**

*Course Description:* Directed reading and discussion and/or laboratory investigation on selected topics.

*Prerequisite(s):* Consent of instructor; medical student.

*Learning Activities:* Variable.

*Grade Mode:* Honors/Pass/Fail.

## **SUR 499 – Laboratory Research (1-12 units)**

*Course Description:* Laboratory research on surgically related problems. Participation in projects to include the following: burn, nutrition, oncology, transplant and others.

*Prerequisite(s):* Consent of instructor; completion of second year of medical school.

*Learning Activities:* Laboratory 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

# **Surgical & Radiological Sciences (VSR)**

**School of Veterinary Medicine**

**VSR 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**VSR 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**VSR 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**VSR 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

# Sustainable Agriculture & Food Systems (SAF)

## College of Agricultural & Environmental Sciences

**SAF 090 – SA & FS Seminar (1-2 units)**

*Course Description:* Introductory or survey topics within Sustainable Agriculture & Food Systems.

*Learning Activities:* Seminar 1-3 hour(s).

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

**SAF 090X – SA & FS Portfolio (1-4 units)**

*Course Description:* SA&FS Portfolios are designed to complement interdisciplinary, academic coursework by supporting student development of each of the SA&FS Student Learning Outcomes: Systems Thinking, Experimentation & Inquiry, Understanding Values, Interpersonal Communication, Strategic Management, Civic Engagement and Personal Development.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Workshop 3-12 hour(s).

*Enrollment Restriction(s):* Restricted to Sustainable Agriculture & Food Systems majors with lower-division standing or consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**SAF 092 – Internship (1-12 units)**

*Course Description:* Lower-division internship for students enrolled in the Sustainable Agriculture & Food Systems program of study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s), Variable 1 hour(s).

*Enrollment Restriction(s):* Restricted to Sustainable Agriculture & Food Systems majors or with consent of instructor; non-majors by consent of instructor.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

**SAF 098 – Directed Group Study (1-5 units)**

*Course Description:* Group study on focused topics in Sustainable Agriculture & Food Systems. Varies according to instructor. Course plan is adapted to student need and interest in conjunction with the expertise of the instructor.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 3-15 hour(s).

*Enrollment Restriction(s):* Restricted to Sustainable Agriculture & Food Systems major or with consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**SAF 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Under faculty supervision, students pursue a special or individualized course of study related to Sustainable Agriculture & Food Systems.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Independent Study 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**SAF 165 – Irrigation Practices for an Urban Environment (3 units)**

*Course Description:* Basic design, installation, and operation principles of irrigation systems for turf and landscape: golf courses, parks, highways, public buildings, etc. Emphasis on hardware association with sprinkler and drip/trickle systems.

*Prerequisite(s):* PHY 001A.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project.

*Cross Listing:* ABT 165.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

**SAF 192 – Internship (1-12 units)**

*Course Description:* Upper-division internship for students enrolled in the Sustainable Agriculture & Food Systems program of study.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Internship 3-36 hour(s), Variable 1 hour(s).

*Enrollment Restriction(s):* Restricted to Sustainable Agriculture & Food Systems majors or non-majors by consent of instructor.

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **SAF 197T – Tutoring in Sustainable Agriculture & Food Systems (1-5 units)**

*Course Description:* Undergraduates assist the instructor by tutoring students in regularly scheduled courses that fulfill SA&FS major requirements.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **SAF 197TC – SA&FS Tutoring in the Community (1-5 units)**

*Course Description:* Undergraduates assist the instructor by tutoring in the community in settings related to Sustainable Agriculture & Food Systems.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **SAF 198 – Directed Group Study (1-5 units)**

*Course Description:* Group study on focused topics in Sustainable Agriculture & Food Systems. Varies according to instructor. Course plan is adapted to student need and interest in conjunction with the expertise of the instructor.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Variable 3-15 hour(s).

*Enrollment Restriction(s):* Restricted to Sustainable Agriculture & Food Systems major or with consent of instructor.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **SAF 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Under faculty supervision, advanced students pursue a special or individualized course of study related to Sustainable Agriculture & Food Systems.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Independent Study 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Technocultural Studies (TCS)**

College of Letters & Science

## **TCS 112 – New Radio Features & Documentary (4 units)**

*Course Description:* New feature and documentary production for radio and other audiophonic media, including audio streaming websites and installation. Emphasis on new and experimental approaches to audio production for broadcast on community radio and in international arts programming.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **TCS 155 – Introduction to Documentary Studies (4 units)**

*Course Description:* Recent evolution of the documentary. The personal essay film; found-footage/appropriation work; non-linear, multi-media forms; spoken word; storytelling; oral history recordings; and other examples of documentary expression.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL).

## **TCS 159 – Media Subcultures (4 units)**

*Course Description:* Relationships between subcultural groups and media technologies. Media as the cohesive and persuasive force of subcultural activities. List-servs, websites, free radio, fan 'zines, and hip-hop culture.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* American Cultures, Governance, & History (ACGH); Visual Literacy (VL).

## **TCS 160 – Ghosts of the Machine: How Technology Rewires our Senses (4 units)**

*Course Description:* Historical, aesthetic and critical approaches to how information technologies produced ghost effects or a sense of terror in response to new media like the photograph, gramophone, film, typewriter, computer, Turing Machine. Focus on technological media transforms sense perception.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Cross Listing:* STS 160.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Visual Literacy (VL); Writing Experience (WE).

## **TCS 175 – Small Scale Film Production (4 units)**

*Course Description:* Lecture and intensive workshop teaching small-scale film production. Appointments as a(n) director, director of photography, actor, writer, lighting designer, sound designer and other critical positions are used to produce and submit a short film to a film festival.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Cross Listing:* DRA 175.

*Grade Mode:* Letter.

## **TCS 191 – Writing Across Media (4 units)**

*Course Description:* Introduction to experimental approaches to writing for different media and artistic practices. How written texts relate to the images, sounds, and performances in digital and media production.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

# **Textiles & Clothing (TXC)**

College of Agricultural & Environmental Sciences

**TXC 098 – Directed Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**TXC 099 – Special Study for Lower Division Students (1-5 units)**

*Course Description:* Special study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**TXC 165 – Textile Processes (3 units)**

*Course Description:* Physical processes involved in the production of textiles from the individual fiber to the finished fabric. Includes spinning, texturing, yarn formation, weaving preparation, weaving and knitting, tufting and fabric finishing.

*Prerequisite(s):* TXC 006.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**TXC 171 – Clothing Materials Science (4 units)**

*Course Description:* The properties, characterization, and performance evaluation of clothing materials and structures for specific functional applications. Principles and methods related to wetting and transport properties, fabric hand and aesthetic properties, clothing comfort, and material and assembly technology.

*Prerequisite(s):* TXC 006; TXC 008; senior standing.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**TXC 192 – Internship in Textiles & Clothing (1-12 units)**

*Course Description:* Work-learn experience off campus in a textiles or clothing-related area. Supervision by a member of the Textiles & Clothing faculty.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**TXC 197T – Tutoring in Textiles & Clothing (1-5 units)**

*Course Description:* Tutoring of students in Textiles & Clothing courses. Assistance with discussion groups and laboratory sections under supervision of instructor.

*Prerequisite(s):* Consent of instructor; upper division textiles-related major.

*Learning Activities:* Tutorial 3-15 hour(s).

*Repeat Credit:* May be repeated when tutoring another textiles course.

*Grade Mode:* Pass/No Pass only.

**TXC 198 – Directed Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**TXC 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**TXC 230 – Behavioral Science Concepts in Textiles (3 units)**

*Course Description:* Examination of theories and research concerning relationships between clothing and human behavior with emphasis on research techniques, including methods of measuring clothing variables.

*Prerequisite(s):* TXC 107; upper division or graduate course in statistics (e.g., AMR 120) and one in a behavioral science (e.g., PSC 145).

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**TXC 290 – Seminar (1 unit)**

*Course Description:* Critical review of selected topics of current interest in textiles.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TXC 290C – Research Conference (1 unit)**

*Course Description:* Individual faculty members meet with their graduate students. Critical presentations of original research are made by graduate students. Research activities are planned. Discussions are led by major professors for their research groups.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TXC 293 – Recent Advances in Textiles (3 units)**

*Course Description:* Critical reading and evaluation on selected topics of current interest in textiles. Multidisciplinary aspects of the topics selected will be stressed.

*Prerequisite(s):* Two upper division courses in Textiles Clothing (TXC) or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**TXC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**TXC 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TXC 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant, training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

**Transportation Technology & Policy (TPP)**

**Graduate Studies**

**TTP 200 – Transportation Survey Methods (4 units)**

*Course Description:* Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling, experimental design, and survey design issues. Analysis methods, including factor, discriminant and cluster analysis.

*Prerequisite(s):* STA 013 or STA 013Y; ECI 251 recommended.

*Learning Activities:* Lecture 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken ECI 255.

*Cross Listing:* GEO 281.

*Grade Mode:* Letter.

**TTP 201 – Applied Data Analysis (4 units)**

*Course Description:* Skills for examining, parsing, and analyzing datasets to answer research questions. Application of concepts from econometrics, statistics, and machine learning.

*Prerequisite(s):* STA 108, STA 141A, and STA 141B recommended.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**TTP 210 – Fundamentals of Transportation Technology (4 units)**

*Course Description:* Designed to prepare in the basics of thermodynamics, fluid mechanics and heat transfer as they relate to transportation.

*Prerequisite(s):* MAT 021A; MAT 021B; MAT 022A; and consent of instructor; graduate or junior/senior undergraduate as a technical elective.

*Learning Activities:* Lecture 2 hour(s), Discussion 2 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Credit Limitation(s):* Not open for credit to students who have completed TTP 289. (Former TTP 289.)

*Grade Mode:* Letter.

**TTP 211 – Energy & Transportation Modeling for Policy Analysis (4 units)**

*Course Description:* Development of energy and transportation models for policy analysis. Methods for modeling transportation, electricity, fuels, resources, and infrastructure systems.

*Learning Activities:* Lecture 4 hour(s).

*Grade Mode:* Letter.

**TTP 220 – Transportation Planning & Policy (4 units)**

*Course Description:* Transportation planning process at the regional level, including the role of federal policy in shaping regional transportation planning, tools and techniques used in regional transportation planning, issues facing regional transportation planning agencies, pros and cons of potential solutions and strategies.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Credit Limitation(s):* Students having taken this course previously as TTP 289 cannot repeat it for credit; having taken other TTP 289 offerings does not preclude taking this course for credit.

*Cross Listing:* GEO 236.

*Grade Mode:* Letter.

**TTP 221 – Pavement for Managers (3 units)**

*Course Description:* Concepts and knowledge needed by policy-makers, planners, and managers to understand pavements, including all urban hardscapes. Materials production, design, construction, maintenance and rehabilitation, use, and end-of-life. Implications for costs, environmental impacts, and societal impacts. Communicating pavement issues with decision-makers and the public.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

**TTP 281 – ITS Transportation Seminar Series (1 unit)**

*Course Description:* Transportation seminars by guest speakers, on varied topics.

*Learning Activities:* Seminar 1.50 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TTP 282 – Transportation Orientation Seminar (1 unit)**

*Course Description:* Ten weeks of seminars, introducing various topics in transportation research and education, focusing on topics of particular interest at UC Davis.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TTP 283 – Professionalism, Leadership, & Ethics (1 unit)**

*Course Description:* Speakers from industry, government, academia, and NGOs will lead discussions about succeeding and performing in the professional world. They will address leadership, ethics, and other workplace issues.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TTP 289A – Selected Topics in Transportation Technology & Policy (1-5 units)**

*Course Description:* Directed group study of special topics with instruction carried out through lecture or laboratory, or a combination of both.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**TTP 289B – Selected Topics in Transportation Technology & Policy (1-5 units)**

*Course Description:* Directed group study of special topics with instruction carried out lecture or laboratory, or a combination of both.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture, Laboratory.

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TTP 290C – Graduate Research Group Conference (1 unit)**

*Course Description:* Research problems, progress, and techniques in transportation.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TPP 292 – Internship in TPP (1-5 units)**

*Course Description:* Supervised work experience in transportation studies.

*Prerequisite(s):* Consent of instructor; second year standing; approval of project prior to period of internship.

*Learning Activities:* Internship.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TPP 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1-5 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TPP 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1-12 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**TPP 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## UC Davis Washington Center (WAS)

College of Letters & Science

**WAS 187 – Gun Violence (4 units)**

*Course Description:* Gun violence, viewed from the perspectives of criminology and public health. Topics include personal and societal contributing factors and critical assessment of potential solutions.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to students attending UC Washington Center program.

*Grade Mode:* Letter.

**WAS 192 – Internship in the UC Davis Washington Program (6 units)**

This version has ended; see updated course, below.

*Course Description:* Internship in Washington, DC with associated, supervised research project.

*Prerequisite(s):* WAS 193 (can be concurrent); junior or senior standing, admission in the UC Davis Washington Program. WAS 193 required concurrently.

*Learning Activities:* Internship 32 hour(s).

*Grade Mode:* Pass/No Pass only.

**WAS 192 – Internship in the UC Davis Washington Program (8 units)**

*Course Description:* Internship in Washington, DC with associated, supervised research project.

*Prerequisite(s):* WAS 193 (can be concurrent); junior or senior standing, admission in the UC Davis Washington Program. WAS 193 required concurrently.

*Learning Activities:* Internship 32 hour(s).

*Grade Mode:* Pass/No Pass only.

This course version is effective from, and including: Fall Quarter 2023.

**WAS 193 – Washington Center Research Seminar (4 units)**

*Course Description:* Core academic component of Washington Program offered every quarter. Topics coordinated with internships. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper.

*Prerequisite(s):* WAS 192 (can be concurrent).

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper/Discussion.

*Cross Listing:* POL 193W.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); Oral Skills (OL); Writing Experience (WE).

## University Writing Program (UWP)

College of Letters & Science

**UWP 001 – Introduction to Academic Literacies (4 units)**

*Course Description:* Introduction to reading and composing processes and key rhetorical concepts for academic literacies. Multiple drafts of composing projects in a variety of genres and modes with feedback from peers and the instructor.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken UWP 001Y or UWP 001V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 001A – Writers' Workshop (2 units)**

*Course Description:* Writing course focuses on the development of writing and revision strategies, exploring ways to understand a writing task; to develop appropriate content for a writing task; to revise content to reflect competence as a communicator.

*Learning Activities:* Discussion/Laboratory 2 hour(s).

*Enrollment Restriction(s):* Concurrent enrollment in a lower division writing course required, preferably UWP 001; if necessary, based upon demand and academic advisor approval, students may concurrently enroll in an equivalent course instead; e.g., ENL 003 or NAS 005.

*Grade Mode:* Letter.

**UWP 001V – Introduction to Academic Literacies: Online (4 units)**

*Course Description:* Introduction to reading and composing processes and key rhetorical concepts for academic literacies. Multiple drafts of composing projects in a variety of genres and modes with feedback from peers and the instructor.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open to students who have taken UWP 001 or UWP 001Y.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 001Y – Introduction to Academic Literacies (4 units)**

*Course Description:* Introduction to reading and composing processes and key rhetorical concepts for academic literacies. Multiple drafts of composing projects in a variety of genres and modes with feedback from peers and the instructor.

*Prerequisite(s):* Completion of Entry Level Writing Requirement (ELWR).

*Learning Activities:* Lecture/Discussion 2 hour(s), Web Electronic Discussion 2 hour(s).

*Credit Limitation(s):* Not open to students who have taken UWP 001 or UWP 001V.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 007 – Practices in College Reading & Writing (4 units)**

*Course Description:* Development of skills required for success in college-level writing across genres and disciplines. Integrates reading, critical thinking, and written communication, using texts from across the curriculum. Course is equivalent to UWP 007Y/V/M/MY.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Not open to students who have already fulfilled the Entry Level Writing Requirement (ELWR); do not change grade mode to P/NP if course is for the ELWR.

*Credit Limitation(s):* Students who do not earn a grade that fulfills ELWR but that confers unit credit (a grade of C-, D+, D, or D-) may repeat the course to complete the ELWR and to replace their previous grade, but will not receive additional unit credit. Students who fail the course (receive a grade of F) can repeat the course to complete the ELWR, to replace their previous grade, and to receive the unit credit for the course. Not open for credit to students who have completed the ELWR.

*Grade Mode:* Letter.

## **UWP 007M – Entry Level Writing: Practices in College Reading & Writing for Multilingual Writers (4 units)**

*Course Description:* Development of multilingual writers' composition and English language skills across genres and disciplines. Integrates college-level reading, critical thinking, and written communication, using texts from across the curriculum. Equivalent to UWP 007Y/V/M/Y.

*Prerequisite(s):* Enrollment via campus placement (using the English Language Placement Exam or Analytical Writing Placement Exam) or after successful completion of UWP 022.

*Learning Activities:* Discussion/Laboratory 4 hour(s).

*Enrollment Restriction(s):* For students who have not yet satisfied the Entry Level Writing Requirement (ELWR); do not change grade mode to P/NP if course is for the Entry Level Writing Requirement (ELWR); to satisfy ELWR, students must receive a letter grade of C or higher.

*Credit Limitation(s):* No credit for students who have completed UWP 007, UWP 023, or WLD 057.

*Grade Mode:* Letter.

## **UWP 007MY – Practices in College Reading & Writing for Multilingual Writers (4 units)**

*Course Description:* Development of multilingual writers' composition and English language skills across genres and disciplines. Integrates college-level reading, critical thinking, and written communication, using texts from across the curriculum. Equivalent to UWP 007Y/V/M/Y.

*Prerequisite(s):* Enrollment via campus placement (using the English Language Placement Exam or Analytical Writing Placement Exam) or after successful completion of UWP 022.

*Learning Activities:* Lecture/Lab 2 hour(s), Web Electronic Discussion 2 hour(s).

*Enrollment Restriction(s):* For students who have not yet satisfied the Entry Level Writing Requirement (ELWR). Do not change grade mode to P/NP if course is for the Entry Level Writing Requirement (ELWR). To satisfy ELWR, students must receive a letter grade of C or higher.

*Credit Limitation(s):* No credit for students who have completed UWP 007, UWP 023, or WLD 057.

*Grade Mode:* Letter.

## **UWP 007V – Practices in College Reading & Writing (4 units)**

*Course Description:* Development of skills required for success in college-level writing across genres and disciplines. Integrates reading, critical thinking, and written communication, using texts from across the curriculum. Course is equivalent to UWP 007Y/M/M/Y.

*Learning Activities:* Web Virtual Lecture 2 hour(s), Web Electronic Discussion 2 hour(s).

*Enrollment Restriction(s):* Not open to students who have already fulfilled the Entry Level Writing Requirement (ELWR); do not change grade mode to P/NP if course is for the ELWR.

*Credit Limitation(s):* Students who do not earn a grade that fulfills ELWR but that confers unit credit (a grade of C-, D+, D, or D-) can repeat the course to complete the ELWR and to replace their previous grade, but will not receive additional unit credit. Students who fail the course (receive a grade of F) can repeat the course to complete the ELWR, to replace their previous grade, and to receive the unit credit for the course. Not open for credit to students who have completed the ELWR.

*Grade Mode:* Letter.

## **UWP 007Y – Practices in College Reading & Writing (4 units)**

*Course Description:* Development of skills required for success in college-level writing across genres and disciplines. Integrates reading, critical thinking, and written communication, using texts from across the curriculum. Course is equivalent to UWP 007V/M/M/Y.

*Learning Activities:* Lecture/Discussion 2 hour(s), Web Electronic Discussion 2 hour(s).

*Enrollment Restriction(s):* Not open to students who have already fulfilled the Entry Level Writing Requirement (ELWR); do not change grade mode to P/NP if course is for the ELWR.

*Credit Limitation(s):* Students who do not earn a grade that fulfills ELWR but that confers unit credit (a grade of C-, D+, D, or D-) can repeat the course to complete the ELWR and to replace their previous grade, but will not receive additional unit credit. Students who fail the course (receive a grade of F) can repeat the course to complete the ELWR, to replace their previous grade, and to receive the unit credit for the course. Not open for credit to students who have completed the ELWR.

*Grade Mode:* Letter.

## **UWP 010 – Introduction to Professional Writing Studies (4 units)**

*Course Description:* Introduction to writing as an object of study and to theories and research in the field. Survey of how writing is created, disseminated, and used in private, public, and academic contexts.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y; or the equivalent.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 011 – Popular Science & Technology Writing (4 units)**

*Course Description:* Positioning of science and technology in society as reflected and constructed in popular texts. Topics include genre theory, demarcation, rhetorical figures, forms of qualitative and quantitative reasoning, and the epistemic role of popularization in science.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 012 – Writing & Visual Rhetoric (4 units)**

*Course Description:* Introduction to writing needs, conventions, and genres in design contexts. Emphasis on applying critical reading, analysis, and writing skills to designed products, such as graphics, visual communications, and clothes, and designed spaces, such as exhibitions and interior architecture.

*Learning Activities:* Lecture/Discussion 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **UWP 013 – Video Game Rhetorics (4 units)**

*Course Description:* Examination of video games as rhetorical texts whose meaning is produced through complex interplay of procedures, narratives, rules, and context. Writing about video games using critical perspectives and analytic methods.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **UWP 015 – Principles & Practices of Rhetoric (4 units)**

*Course Description:* Rhetorical principles for written communication—such as audience, purpose, and genre—as well as practical application of rhetoric in both analyzing persuasive discourse and composing across a variety of genres.

*Prerequisite(s):* (UWP 001 C- or better; or UWP 001Y C- or better; or UWP 001V C- or better); ENL 003 C- or better; COM 001 C- or better; COM 002 C- or better; COM 003 C- or better; COM 004 C- or better; NAS 005 C- or better.

*Learning Activities:* Discussion 1 hour(s); Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 020 – Oral English for International Students (4 units)**

*Course Description:* Intensive work in oral English for international students, to increase fluency, accuracy, and use of appropriate discourse strategies in academic settings; e.g., seminar, discussion, laboratory. Training in segmental features of English sounds, intonation, stress, non-verbal cues, and register.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

## **UWP 021 – Introduction to Academic Reading & Writing for Multilingual Students (4 units)**

*Course Description:* Reading and writing paragraphs and short multi-paragraph texts for academic purposes. Suitable for students whose primary home language was not English.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One placed in the course via Writing Placement 2020 offered by the UWP.

*Grade Mode:* Letter.

## **UWP 022 – Intermediate Academic Reading & Writing for Multilingual Students (4 units)**

*Course Description:* Reading and writing short multi-paragraph texts for academic purposes. Suitable for students whose primary home language was not English.

*Prerequisite(s):* UWP 021.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Pass One placed in the course via Writing Placement 2020 offered by the UWP.

*Grade Mode:* Letter.

## **UWP 024 – English Structures & Strategies in Academic Writing (4 units)**

*Course Description:* Practice in academic writing designed to prepare undergraduate students from language backgrounds other than English for successful academic work. Development of academic writing, critical thinking, and reading skills. Development of clear, accurate language for presenting an effective argument.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Open to students from language backgrounds other than English.

*Credit Limitation(s):* Not open for credit to students who have taken LIN 024.

*Grade Mode:* Letter.

## **UWP 025 – Academic Writing for ESL Students (4 units)**

*Course Description:* Writing skills necessary for upper division courses, including skills crucial to writing lab and project reports, summaries, critiques, abstracts, and responses to exam questions. Includes practice with the syntax, grammar, and vocabulary characteristics of academic writing.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken LIN 027.

*Grade Mode:* Letter.

## **UWP 026 – Reading in Scientific & Technical Subjects for ESL Students (4 units)**

*Course Description:* Instruction and practice in reading scientific and technical texts. Techniques for comprehending and analyzing grammatical and organizational patterns. Notetaking skills, summarizing, vocabulary enrichment.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken LIN 028.

*Grade Mode:* Pass/No Pass only.

## **UWP 028 – Persuasive Writing for Multilingual Students (4 units)**

*Course Description:* Instruction in analyzing style of persuasive texts, using appropriate vocabulary, and applying English grammatical structures in argumentation. Suitable for multilingual students desiring additional instruction in persuasive English writing.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 029 – Research Writing for Multilingual Students (4 units)**

*Course Description:* Reading and writing effectively in various research genres across the disciplines. Suitable for multilingual students desiring additional instruction in the linguistic and rhetorical features of research writing in English for academic purposes.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 002 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 048 – Style in the Essay (4 units)**

*Course Description:* Principles of style, language, and structure in the essay. Analysis and development of voice and genre, including sentence revision for force and clarity, and development of effective paragraphs and essays.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; or equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to completion of UWP 001, or equivalent, with C- (P) or better.

*Credit Limitation(s):* Not open for credit to students who have taken UWP 018.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 049 – Writing Research Papers (4 units)**

*Course Description:* Principles of research writing. Analysis and development of research topics and effective arguments, including critical reading, analysis, integration, and documentation of source material.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; or equivalent.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Restricted to completion of UWP 1, or equivalent, with C- (P) or better.

*Credit Limitation(s):* Not open for credit to students who have taken UWP 019.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 092 – Internship in Writing (1-12 units)**

*Course Description:* Internships in fields where students can practice their skills.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y or ENL 003.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

## **UWP 098 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y or ENL 003; or equivalent course; consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y or ENL 003; or equivalent course; consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 100 – Genre Theory & Professional Writing (4 units)**

*Course Description:* Introduction to discipline of professional writing. Examination of writing as a social practice, using genre theory as a conceptual framework. Analysis of how genres function rhetorically in specific contexts and how social systems both shape and are shaped by genres.

*Prerequisite(s):* (UWP 001 or UWP 001V or UWP 001Y); UWP 010; or the equivalent of UWP 001.

*Learning Activities:* Lecture 3 hour(s), Extensive Writing/Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 101 – Advanced Composition (4 units)**

*Course Description:* Instruction for students in all disciplines in advanced principles of academic and professional writing. Focus on writing tasks both within and beyond the academy. May be taught abroad.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or ENL 003 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 101V – Advanced Composition (4 units)**

*Course Description:* Instruction for students in all disciplines in advanced principles of academic and professional writing. Focus on writing tasks both within and beyond the academy.

*Prerequisite(s):* UWP 001 C- or better or UWP 001Y C- or better or UWP 001V C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or ENL 003 C- or better or NAS 005 C- or better; upper division standing.

*Learning Activities:* Extensive Writing, Web Electronic Discussion 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 101Y – Advanced Composition (4 units)**

*Course Description:* Instruction for students in all disciplines in advanced principles of academic and professional writing. Focus on writing tasks both within and beyond the academy.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or ENL 003 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 1.50 hour(s), Web Electronic Discussion 1.50 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 102A – Writing in the Disciplines: Special Topics (4 units)**

*Course Description:* Advanced instruction in writing in that discipline and practice in effective styles of communication.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors or to students concurrently enrolled in an upper division course in a specific academic discipline or interdisciplinary field.

*Repeat Credit:* May be repeated 1 time(s) when taken in conjunction with a different subject-matter course.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 102B – Writing in the Disciplines: Biology (4 units)**

*Course Description:* Advanced instruction in writing in biology.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors in a biological science or to students concurrently enrolled in an upper division biological science course.

*Credit Limitation(s):* Not open for credit to students who have completed ENL 102B.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 102C – Writing in the Disciplines: History (4 units)**

*Course Description:* Advanced instruction in writing in history.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors in history or to students concurrently enrolled in an upper division course accepted for the history major.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 102D – Writing in the Disciplines: International Relations (4 units)**

*Course Description:* Advanced instruction in writing in international relations.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the major.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

**UWP 102E – Writing in the Disciplines: Engineering (4 units)**

*Course Description:* Advanced instruction in writing in engineering.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to upper division students in the College of Engineering and to students enrolled in an upper division engineering or computer science course for the major.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102F – Writing in the Disciplines: Food Science & Technology (4 units)**

*Course Description:* Advanced instruction in writing in food science & technology.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors in food science and technology and to students concurrently enrolled in an upper division course in food science and technology.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102G – Writing in the Disciplines: Environmental Writing (4 units)**

*Course Description:* Advanced instruction in writing and practice in effective styles of communication in the fields of environmental study, policy, or advocacy.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to students with upper division coursework with an environmental focus.

*Credit Limitation(s):* Not open for credit to students who have completed UWP 102A in the same academic field.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102H – Writing in the Disciplines: Human Development & Psychology (4 units)**

*Course Description:* Advanced instruction in writing and practice in effective styles of communication in Human Development & Psychology.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors and minors or to students concurrently enrolled in an upper division course in Human Development or Psychology.

*Credit Limitation(s):* Not open for credit to students who have completed UWP 102A in the same academic field.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102I – Writing in the Disciplines: Ethnic Studies (4 units)**

*Course Description:* Advanced instruction in cross-disciplinary writing about race and ethnicity and practice in effective styles of communication.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors and minors in ethnic studies, or students with upper division coursework focusing on race and ethnicity.

*Credit Limitation(s):* Not open for credit to students who have completed UWP 102A in the same academic field.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102J – Writing in the Disciplines: Fine Arts (4 units)**

*Course Description:* Advanced instruction in writing about the arts and practice in effective styles of communication.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors and minors or to students concurrently enrolled in an upper division course in Art History, Art Studio, Design, Music, or Theater & Dance.

*Credit Limitation(s):* Not open for credit to students who have completed UWP 102A in the same academic field.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102K – Writing in the Disciplines: Sociology (4 units)**

*Course Description:* Advanced instruction in writing and practice in effective styles of communication in Sociology and related academic and professional fields.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors and minors in Sociology or to students concurrently enrolled in an upper division Sociology course.

*Credit Limitation(s):* Not open for credit to students who have completed UWP 102A in the same academic field.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102L – Writing in the Disciplines: Film Studies (4 units)**

*Course Description:* Advanced instruction in writing about film and practice in effective styles of communication.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors and minors or to students concurrently enrolled in an upper division course in Film Studies, Technocultural Studies, English, American Studies, or any other upper division course that includes the analysis and understanding of film as a medium.

*Credit Limitation(s):* Not open for credit to students who have completed UWP 102A in the same academic field.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 102M – Writing in the Disciplines: Community & Regional Development (4 units)**

*Course Description:* Advanced instruction in writing in the Community & Regional Development discipline and practice in effective styles of communication.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to upper division Community and Regional Development majors and minors or upper division students concurrently enrolled in an upper division Community and Regional Development course.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Writing Experience (WE).

## **UWP 102N – Writing in the Disciplines: Anthropology (4 units)**

*Course Description:* Advanced instruction in writing and practice in effective styles of communication in Anthropology and related academic and professional fields.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; 4 or 5 on AP English Lit and Comp exam; or 6 or better on IB HL English Exam.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Restricted to upper division standing; Anthropology Major or Minor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 1020 – Writing in Human Rights Studies (4 units)**

*Course Description:* Rhetorical concepts and processes applied to writing in Human Rights Studies through exploration of policy briefs, academic articles, journalism, and testimony. How authors use writing to inform readers, press the audience to empathize with others, reflect on the past, learn about injustices, and propose solutions.

*Prerequisite(s):* UWP 001 C- or better; or UWP 001V C- or better; or UWP 001Y C- or better; or ENL 003 C- or better; or NAS 005 C- or better; or COM 001 C- or better; or COM 002 C- or better; or COM 003 C- or better; or COM 004 C- or better; upper-division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **UWP 104A – Writing in the Professions: Business Writing (4 units)**

*Course Description:* Effective communication in and for organizations, including corporations, government agencies, and non-profit. Suitable for students entering careers such as management, public relations, and grant writing.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have taken UWP 104AY.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104AY – Writing in the Professions: Business Writing (4 units)**

*Course Description:* Effective communication in and for organizations, including corporations, government agencies, and nonprofit. Suitable for students entering careers such as management, public relations, and grant writing.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 1.50 hour(s), Web Electronic Discussion 1.50 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have taken UWP 104A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104B – Writing in the Professions: Law (4 units)**

*Course Description:* Advanced principles of critical thinking, argumentation, and style, with special emphasis on their application in the legal profession. Suitable for students planning careers in law, business, administration, or management.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104C – Writing in the Professions: Journalism (4 units)**

*Course Description:* Non-fiction for magazines and newspapers, with attention to style and language. Emphasis on research, interviewing, market analysis, and query letters.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104D – Writing in the Professions: Elementary & Secondary Education (4 units)**

*Course Description:* Advanced expository writing in the contemporary American classroom. Strongly recommended for teaching credential candidates.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104E – Writing in the Professions: Science (4 units)**

*Course Description:* Writing abstracts, research proposals, scientific papers, other forms of scientific communication. Presenting data graphically. Primarily for students engaged in or planning careers in basic or applied research.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing or enrollment in a graduate science curriculum.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104F – Writing in the Professions: Health (4 units)**

*Course Description:* Advanced expository writing common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Not open to students who have taken UWP 104FY.

*Credit Limitation(s):* Not open for credit to students who have taken UWP 104FY.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104FY – Writing in the Professions: Health (4 units)**

*Course Description:* Advanced expository writing common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry.

*Prerequisite(s):* UWP 001 C- or better; UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 1.50 hour(s), Web Electronic Discussion 1.50 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Not open to students who have taken UWP 104F.

*Credit Limitation(s):* Not open for credit to students who have taken UWP 104F.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104I – Writing in the Professions: Internships (4 units)**

*Course Description:* Advanced instruction in writing in the workplace, including public and private sectors, government agencies, profit and non-profit organizations. Collaborative work and practice in effective styles of communication. May be taught abroad.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to students concurrently enrolled in an internship and to Contemporary Leadership minors.

*Credit Limitation(s):* Not open for credit to students who have completed UWP 102A.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104J – Writing in the Professions: Writing for Social Justice (4 units)**

*Course Description:* Advanced instruction in writing for Social Justice, using an interdisciplinary approach combining feminist, critical race, ethnic, cultural, and transnational studies; practice in techniques of research and styles of communication for diverse audiences. Suitable for activists in community organizing, non-profits, politics.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 104T – Writing in the Professions: Technical Writing (4 units)**

*Course Description:* Communicating effectively about technology and other technical subjects to varied audiences for varied purposes. Suitable for students entering professions that require communicating technical information to subject matter experts, managers, technicians, and non-specialists.

*Prerequisite(s):* UWP 001 C- or better or UWP 001V C- or better or UWP 001Y C- or better or ENL 003 C- or better or COM 001 C- or better or COM 002 C- or better or COM 003 C- or better or COM 004 C- or better or NAS 005 C- or better; and upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Credit Limitation(s):* Not open for credit to students who have taken UWP 104A prior to fall 2012.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 106 – English Grammar (4 units)**

*Course Description:* Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers; their development; and their usefulness in describing the conventions of English.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y or ENL 003 or LIN 001 or LIN 001Y; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Cross Listing:* ENL 106, LIN 106.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH).

## **UWP 110 – Specialized Genres in Professional Writing (4 units)**

*Course Description:* Instruction in the elements and practices of professional writing in specialized genres. May be taught abroad.

*Prerequisite(s):* Satisfaction of the upper division writing requirement.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to upper division students who have satisfied the upper division writing requirement; counts toward the writing minor.

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 111A – Specialized Topics in Journalism (4 units)**

*Course Description:* Instruction in the elements and practices of advanced journalism.

*Prerequisite(s):* Satisfaction of the upper division writing requirement.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to upper division students with a strong interest in journalism; counts toward the writing minor.

*Repeat Credit:* May be repeated 1 time(s) when specialized journalism topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 111B – Specialized Topics in Journalism: Investigative Journalism (4 units)**

*Course Description:* Instruction in the elements and practices of in-depth investigative journalism.

*Prerequisite(s):* Satisfaction of the upper division writing requirement.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to upper division students with a strong interest in journalism; counts toward the writing minor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 111C – Specialized Topics in Journalism: Science Journalism (4 units)**

*Course Description:* Instruction in the elements and practices of science journalism.

*Prerequisite(s):* Satisfaction of the upper division writing requirement.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to upper division students with a strong interest in journalism; counts toward the writing minor.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 112A – Introduction to Professional Editing (4 units)**

*Course Description:* Introduction to general editing practices and principles, with an emphasis on professional editing in organizational contexts, including academia and the workplace. Extensive practice in copy, comprehensive, and collaborative editing.

*Prerequisite(s):* satisfaction of the upper division writing requirement.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to upper division students who have satisfied the upper division writing requirement; counts toward the writing minor, Group C: Theory, History, & Design.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); Writing Experience (WE).

## **UWP 115 – Writing Center Research, Theory, & Practice for Peer Writing Tutors (4 units)**

*Course Description:* Writing course explores writing center research with an emphasis on research-based theories and practices useful to student writing center peer tutors.

*Prerequisite(s):* ELWR (Entry Level Writing Requirement) fulfillment required.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing/ Discussion 2 hour(s), Extensive Problem Solving 1 hour(s).

*Enrollment Restriction(s):* Open to students who have fulfilled the ELWR (Entry Level Writing Requirement); class size limited to 25 students.

*Grade Mode:* Letter.

*General Education:* Writing Experience (WE).

## **UWP 120 – Rhetorical Approaches to Scientific & Technological Issues (4 units)**

*Course Description:* Application of rhetorical theories to scientific issues. Topics include: Rhetorical dimensions of scientific knowledge-making; scientific voice; rhetorical figures in science; incommensurability and demarcation; epistemology, definition, and classification; science wars; models of scientific literacy and accommodation, and implications for risk communication.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Restricted to upper division standing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **UWP 121 – History of Scientific Writing (4 units)**

*Course Description:* History of scientific writing from the 17th century to the present; origins and evolution of scientific genres; role of scientific writing in producing scientific knowledge; discursive differences between disciplines; emergence of English as a global language of science.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **UWP 150 – Digital Rhetorics (4 units)**

*Course Description:* Rhetorical concepts and processes applied to digital environments with an emphasis on user experience, universal design, and writing for networked publics. Application of rhetorical theory as both an analytic method and as a heuristic for the production of digital texts and performances.

*Prerequisite(s):* UWP 010 C- or better; UWP 015 C- or better.

*Learning Activities:* Discussion 1 hour(s), Lecture/Discussion 3 hour(s).

*Grade Mode:* Letter.

## **UWP 151 – Rhetorics & Culture (4 units)**

*Course Description:* Relationship between written communication and cultural practices, epistemologies, and genres. Producing texts for different professional and community writing scenarios that leverage cultural rhetoric strategies.

*Prerequisite(s):* UWP 010 C- or better; UWP 015 C- or better.

*Learning Activities:* Lecture/Discussion 3 hour(s); Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 190 – Capstone Portfolio Seminar (4 units)**

*Course Description:* Capstone course for majors. Synthesis and application of rhetorical concepts learned in the major. Development of professional digital and print portfolio for graduate school and career applications.

*Prerequisite(s):* UWP 100.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to majors who have completed 135 units.

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

## **UWP 192 – Internship in Writing (1-12 units)**

*Course Description:* Internships in fields where students can practice their skills. May be taught abroad.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y or ENL 003; or equivalent course; consent of instructor.

*Learning Activities:* Internship 3-36 hour(s).

*Repeat Credit:* May be repeated 12 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **UWP 197T – Tutoring in Writing (1-5 units)**

*Course Description:* Tutoring one-on-one or leading small voluntary discussion groups affiliated with a writing course.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 1-5 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **UWP 197TC – Community Tutoring in Writing (1-4 units)**

*Course Description:* Field experience, with individuals or in K-12 classroom instruction, focusing on reading- and writing-to-learn strategies in any subject area.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial 1-4 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH).

## **UWP 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* UWP 001 or UWP 001V or UWP 001Y or ENL 003; or equivalent course; consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated 10 unit(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Arts & Humanities (AH); Writing Experience (WE).

## **UWP 220 – Rhetorical Approaches to Genre Study (4 units)**

*Course Description:* Using genre theory and methods of analysis to understand and prepare to do research on different types of writing in varying academic and professional contexts. Emphasis on problems in organizational, professional, and/or interdisciplinary communication.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **UWP 225 – English for International/ESL Graduate Students (4 units)**

*Course Description:* Multi-skills ESL course designed to help international/ESL students improve their English language skills for successful academic study. Emphasis on writing, speaking, listening, reading, and academic culture.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken LIN 025.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **UWP 226 – Writing for International Graduate Students (4 units)**

*Course Description:* Focuses on writing needed for academic work, including summaries, critiques, research & grant proposals, memos, resumes, and research papers. Includes a review of grammar needed for writing and some focus on reading skills and American vocabulary and idioms.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Credit Limitation(s):* Not open for credit to students who have taken LIN 026.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **UWP 250 – Writing Assessment (4 units)**

*Course Description:* Examines key testing and measurement concepts; the history of writing assessment; and relationships among writing tests and methods of teaching writing; the impacts of Information and Communication Technology (ICT), and how educational policies both drive and respond to writing assessments.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **UWP 253 – Writing Program Administration (4 units)**

*Course Description:* Theories, models, and procedures of writing programs, primarily in higher education. Developmental, first-year, and advanced writing programs, writing centers, writing-across-the-curriculum programs, writing minors and majors, and graduate programs in rhetoric and composition.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **UWP 255 – Theory & Research in Response to Student Writing (4 units)**

*Course Description:* Intensive focus on the critical topic of response or feedback to student writers. Coverage of philosophy, theory, and empirical research on teacher written feedback, teacher-student writing conferences, peer response, and error correction.

*Learning Activities:* Discussion 3 hour(s), Extensive Writing, Extensive Writing/Discussion, Project.

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

## **UWP 270 – Literacy & Technology (4 units)**

*Course Description:* Examines how the physical qualities of texts offer different affordances during production and reception; grounds these discussions in the development of literacy practices and writing technologies from ancient to contemporary; creates frameworks for research into literacy, teaching, and textual technologies.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Extensive Writing.

*Grade Mode:* Letter.

## **UWP 271 – Second Language Writing (4 units)**

*Course Description:* Traces the history of second language writing theory and research on second language writers in a variety of academic and professional contexts. Emphasis on writer characteristics, texts, and contexts.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing, Project.

*Enrollment Restriction(s):* Restricted to graduate standing.

*Grade Mode:* Letter.

## **UWP 280 – Journal Editing Workshop: Writing on the Edge (2 units)**

*Course Description:* Reading and critiquing manuscript submissions. Discussing relevant work in the field of writing studies. Applying principles of professional editing. Developmental editing, copy-editing, and typesetting of accepted manuscripts. Soliciting articles and communicating with contributors. Students encouraged to enroll both quarters.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **UWP 298 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **UWP 299 – Individual Study (1-12 units)**

*Course Description:* Individual study.

*Prerequisite(s):* Consent of instructor. Graduate standing.

*Learning Activities:* Workshop 1-12 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **UWP 390 – Theory & Practice of Teaching University-Level Composition (4 units)**

*Course Description:* Examination of current theories and practices in teaching of writing. Practical application to undergraduate writing courses. Emphasis on designing assignments and class sequences, and responding to student writing. Examination of impact of cultural, technological and theoretical changes on composition pedagogy.

*Learning Activities:* Seminar 3 hour(s), Extensive Writing.

*Enrollment Restriction(s):* Open to graduate students teaching UWP 001 in the fall quarter following this course.

*Grade Mode:* Letter.

**UWP 391 – Oral English for ESL Students (4 units)**

*Course Description:* Intensive work in oral English for non-native English-speaking students, particularly international student teaching assistants, to increase fluency, accuracy, and use of appropriate discourse strategies in academic settings; e.g., seminar, discussion, laboratory.

*Prerequisite(s):* Open only to non-native speakers of English with priority enrollment to international student teaching assistants; completion of any required ESL courses or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated with consent of instructor.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**UWP 392 – Teaching Expository Writing (2 units)**

*Course Description:* Discussion of problems related to teaching expository writing at the university level, with special emphasis on teaching reading and writing skills and responding to student papers.

*Prerequisite(s):* UWP 390; graduate standing; appointment as Teaching Assistant in the Composition Program; or the equivalent of UWP 390.

*Learning Activities:* Discussion 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**UWP 394 – Theory & Practice of Teaching Writing Across the Curriculum (4 units)**

*Course Description:* Professional development in the teaching of writing for TAs across disciplines, including theories of writing, assignment design, responding and grading, and supporting multilingual writers.

Supports TAs in their current contexts and prepares them to teach writing as future faculty.

*Prerequisite(s):* Graduate Standing.

*Learning Activities:* Lecture/Discussion 3 hour(s), Conference 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory Only.

**UWP 395 – Teaching Multilingual Writers (4 units)**

*Course Description:* Preparing teachers of university-level second language writers, whether in composition courses or courses in other disciplines with a substantial writing component. Suitable for graduate students and advanced undergraduates.

*Prerequisite(s):* Graduate standing or advanced undergraduate standing; recommended: UWP 390, LIN 1, ENL 106/LIN 106/UWP 106.

*Learning Activities:* Seminar 3 hour(s).

*Grade Mode:* Letter.

**UWP 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable 1-4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Urology (URO)**

School of Medicine

**URO 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

**URO 400 – Office Urology (1 unit)**

*Course Description:* Introduction to ambulatory care of urologic patients including basic therapeutic and diagnostic procedures from case material referred to private clinic. Management of urinary tract infection will be emphasized.

*Prerequisite(s):* Fourth-year medical students with consent of instructor.

*Learning Activities:* Clinical Activity 4 hour(s).

*Grade Mode:* Honors/Pass/Fail.

**URO 460 – Urology Clinical Clerkship (5-18 units)**

*Course Description:* Clinical experience in diagnosis and treatment of urologic disease. Student will work closely with house staff, participate in conferences and surgery, and perform initial patient evaluation on new patients.

*Prerequisite(s):* Consent of instructor; third-year medical student; physical diagnosis or the equivalent.

*Learning Activities:* Clinical Activity 8-40 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**URO 461 – Externship in Urology (3-18 units)**

*Course Description:* Under supervision, student acting as intern will assume full inpatient responsibility including admission history, physical examination, management of hospitalization, and participate in surgical procedures, outpatient clinic and learning diagnostic and therapeutic procedures.

*Prerequisite(s):* Consent of instructor; fourth-year medical students.

*Learning Activities:* Clinical Activity 60 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**URO 499 – Research in Urology (1-12 units)**

*Course Description:* Research in oncology, male infertility, urodynamics, neurogenic bladder. Unique opportunity to apply recent technologies (nuclear medicine resonance, flow cytometry, recombinant DNA) in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthetics.

*Prerequisite(s):* Medical or veterinary medical students with consent of instructor.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Honors/Pass/Fail.

**Veterinary Clinical Rotation (DVM)**

School of Veterinary Medicine

Courses in DVM are not displayed. For information, contact the School of Veterinary Medicine at 530-752-1360; <http://www.vetmed.ucdavis.edu>.

**Viticulture & Enology (VEN)**

College of Agricultural & Environmental Sciences

**VEN 002 – Introduction to Viticulture (2 units)**

*Course Description:* Fundamental principles of biology and culture of the grapevine including taxonomy, morphology, physiology, distribution, domestication, utilization, propagation, production systems, harvesting, and storage and processing of grapes. Successful completion should prepare students for upper division courses in viticulture.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 003 – Introduction to Winemaking (3 units)**

*Course Description:* Overview of the history of wine, viticulture, fermentation, winery operations, the physiology of wine consumption, wines produced in California and other major wine-producing regions and the sensory evaluation of wine. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE) or Social Sciences (SS).

**VEN 090X – Lower Division Seminar (2 units)**

*Course Description:* Introduction to current issues surrounding wine and health as they relate to diet, nutrition, and toxicology.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Seminar 1 hour(s), Term Paper, Extensive Writing.

*Grade Mode:* Letter.

**VEN 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**VEN 101A – Viticultural Practices (3 units)**

*Course Description:* Identification, cultivation, and use of the major wine, table, raisin, and rootstock cultivars. Includes practices specific to the fall such as fruit contracts, maturity sampling, harvesting, cover crops, and soil-pests. One field trip required.

*Prerequisite(s):* VEN 002.

*Learning Activities:* Lecture 1.50 hour(s), Discussion/Laboratory 3.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 101B – Viticultural Practices (3 units)**

*Course Description:* Theory, principles, and practices of pruning and grapevine propagation. Plant materials and the certification process, weed control and weed identification, wood diseases, and frost protection. One field trip required.

*Prerequisite(s):* VEN 002.

*Learning Activities:* Lecture 1.50 hour(s), Discussion/Laboratory 3.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 101C – Viticultural Practices (3 units)**

*Course Description:* Field oriented experience in the principles and practices of grapevine production, including vineyard establishment, vine training, trellising, canopy management practices, irrigation and water management, and methods of crop adjustment for improvement of fruit quality. One field trip required.

*Prerequisite(s):* VEN 002.

*Learning Activities:* Lecture 1.50 hour(s), Discussion/Laboratory 3.50 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 110 – Grapevine Growth & Physiology (3 units)**

*Course Description:* Botanical aspects including morphology and domestication will precede lectures covering flower development and energy budget concepts. Impact of physiological variables such as photosynthesis translocation, mineral nutrition, and water relations on fruit ripening and composition will be covered.

*Prerequisite(s):* VEN 002.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 111 – World Viticulture (3 units)**

*Course Description:* Study of the diversity of viticulture, both geographical and historical. History of grape growing and its spread throughout the world will be covered, along with discussions of current viticultural practices in different parts of the world, including California.

*Prerequisite(s):* Upper division standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

**VEN 111L – Critical Evaluation of Wines of the World (1 unit)**

*Course Description:* Critical analysis of wines produced in different parts of the world with emphasis on the relationship between sensory properties of the wines and factors associated with their place of origin.

*Prerequisite(s):* VEN 111 required concurrently.

*Learning Activities:* Discussion/Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**VEN 112 – Soils in Viticulture (3 units)**

*Course Description:* Landscape distribution, physical and chemical processes in viticultural soils. Site evaluation procedures, best soil management practices, vineyard fertilization, and soil health monitoring.

*Prerequisite(s):* (CHE 002B or CHE 002BH); BIS 002A; (PHY 001A, PHY 001B (can be concurrent)) or PHY 007A (can be concurrent); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Enrollment Restriction(s):* Open to Viticulture & Enology majors and grad group only or with consent of instructor.

*Grade Mode:* Letter.

**VEN 114 – Fermented Foods (4 units)**

*Course Description:* Physiology, biochemistry, and genetics of microorganisms important in food fermentations. How microorganisms are used in fermentations and how raw materials are converted into finished fermented foods and beverages.

*Prerequisite(s):* BIS 103; MIC 102; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Pass One restricted to upper division or graduate level Food Science and Viticulture & Enology majors.

*Cross Listing:* FST 114.

*Grade Mode:* Letter.

**VEN 115 – Raisin & Table Grape Production (2 units)**

*Course Description:* Overview of the raisin and table grape industries in California and other production areas of the world. Cultural practices associated with raisin and table grape production will also be discussed.

*Prerequisite(s):* VEN 002.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 118 – Grapevine Pests, Diseases & Disorders (3 units)**

*Course Description:* Various pests and diseases of vineyards throughout California. Pest/disease identification and control methods (to include sampling techniques) also will be discussed. Integrated management approach to pest control methods will be emphasized.

*Prerequisite(s):* VEN 002.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 123 – Analysis of Musts & Wines (2 units)**

*Course Description:* Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking.

*Prerequisite(s):* CHE 002C; (PLS 021 or PLS 021V); (CHE 008B or CHE 118B or CHE 128B).

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 123L – Analysis of Musts & Wines Laboratory (2 units)**

*Course Description:* Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. Laboratory exercises demonstrating various chemical, physical and biochemical methods. Data will be analyzed and results interpreted in weekly lab reports; includes student-designed independent project and written report.

*Prerequisite(s):* VEN 123 (can be concurrent); CHE 002C; PLS 021 or PLS 021V; (CHE 008B or CHE 118B or CHE 128B).

*Learning Activities:* Laboratory 3 hour(s), Independent Study 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division and graduate students in Viticulture & Enology; others by approval of instructor.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**VEN 124 – Wine Production (2 units)**

*Course Description:* Principles and practices of making standard types of wines, with special reference to grape varieties used and methods of vinification.

*Prerequisite(s):* VEN 003; VEN 123 (can be concurrent); (BIS 102 or BIS 105).

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**VEN 124L – Wine Production Laboratory (3 units)**

*Course Description:* Current technologies used in production of California table wines; analysis and monitoring of impact of fermentation variables on microbial performance and product quality; student-designed independent research project.

*Prerequisite(s):* VEN 124 (can be concurrent).

*Learning Activities:* Laboratory 3 hour(s), Independent Study 3 hour(s), Term Paper 3 hour(s).

*Enrollment Restriction(s):* Restricted to undergraduates in fermentation science, viticulture & enology, biotechnology, microbiology, food science and applied plant biology majors; to graduate students in food science, agricultural and environmental chemistry and horticulture.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Writing Experience (WE).

**VEN 125 – Wine Types & Sensory Evaluation (2 units)**

*Course Description:* Principles of sensory evaluation and application to wines. Factors influencing wine flavor, data from sensory analysis of model solutions.

*Prerequisite(s):* PLS 120 or STA 106.

*Learning Activities:* Lecture 2 hour(s).

*Enrollment Restriction(s):* Open to upper division and graduate students in Viticulture & Enology; others by approval of instructor.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**VEN 125L – Sensory Evaluation of Wine Laboratory (2 units)**

*Course Description:* Sensory evaluation of wines and model systems using discrimination tests, ranking, descriptive analysis and time-intensity analysis. Data will be analyzed by appropriate statistical tests and the results interpreted in extensive weekly lab reports.

*Prerequisite(s):* VEN 125 (can be concurrent).

*Learning Activities:* Laboratory 3 hour(s), Term Paper 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division major students in fermentation science or viticulture & enology; graduate students in the food science program.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

**VEN 126 – Wine Stability (3 units)**

*Course Description:* Principles of equilibria and rates of physical and chemical reactions in wines; treatment of unstable components in wines by adsorption, ion exchange, refrigeration, filtration, and membrane processes; and protein, polysaccharide, tartrate, oxidative and color stabilities.

*Prerequisite(s):* VEN 124.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Restricted to Viticulture & Enology; Fermentation Science, Applied Plant Biology majors; graduate students in Food Science, Microbiology, Horticulture and Horticulture & Agronomy groups.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 126L – Wine Stability Laboratory (2 units)**

*Course Description:* Practical application of principles of equilibria and rates of physical and chemical reactions to wine stability.

*Prerequisite(s):* VEN 126 (can be concurrent); VEN 123L; and consent of instructor.

*Learning Activities:* Laboratory 3 hour(s), Independent Study 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division Fermentation Science, Viticulture & Enology majors, graduate students in the Food Science, Agricultural and Environmental Chemistry, Microbiology, or by consent of instructor.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**VEN 127L – Post-Fermentation Wine Processing Lab (3 units)**

*Course Description:* Sensory and chemical impact of processing on wines; bench-scale analytical results to make and implement processing decisions; principles and theories of equipment operation and scale-up.

*Prerequisite(s):* VEN 123; VEN 123L; VEN 126; VEN 126L; VEN 135 (can be concurrent); or consent of instructor.

*Learning Activities:* Laboratory 3 hour(s).

*Enrollment Restriction(s):* Restricted to upper division or graduate standing.

*Grade Mode:* Letter.

**VEN 128 – Wine Microbiology (2 units)**

*Course Description:* Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine.

*Prerequisite(s):* (VEN 123, VEN 124, MIC 102, MIC 103L); VEN 125, VEN 126 recommended.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 128L – Wine Microbiology Laboratory (2 units)**

*Course Description:* Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine.

*Prerequisite(s):* VEN 123; VEN 124; VEN 128 (can be concurrent); MIC 103L.

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Restricted to upper division major students in fermentation science or viticulture & enology; graduate students in the food science program.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

**VEN 135 – Wine Technology & Winery Systems (4 units)**

*Course Description:* Process technologies and process systems that are used in modern commercial wineries. Lectures, demonstrations, problem solving sessions, and possible field trips. Includes grape preparation and fermentation equipment; post-fermentation processing equipment; winery utilities, cleaning systems, and waste treatment.

*Prerequisite(s):* PLS 021 or PLS 021V; MAT 016A; MAT 016B; ((PHY 001A, PHY 001B) or PHY 007A).

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**VEN 140 – Distilled Beverage Technology (3 units)**

*Course Description:* Distillation principles and practices; production technology of brandy, whiskey, rum, vodka, gin, and other distilled beverages; characteristics of raw materials, fermentation, distillation, and aging.

*Prerequisite(s):* CHE 008B; FST 110A.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL).

**VEN 170 – Grape & Wine Industry Regulation (1 unit)**

*Course Description:* Regulatory and legal issues related to grape growing and winemaking. State and federal regulations for production and sale of alcoholic beverages. Land use, food and chemical safety regulations, crop insurance, wine distribution and importation, and direct-to-consumer sales.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 1 hour(s).

*Enrollment Restriction(s):* Open to Viticulture & Enology undergraduate students and Graduate students only.

*Grade Mode:* P/NP only.

**VEN 181 – Readings in Enology (1 unit)**

*Course Description:* Critical evaluation of selected monographs in enology. Discussion leadership rotates among the students.

*Prerequisite(s):* VEN 003.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**VEN 190X – Winemaking Seminar (1 unit)**

*Course Description:* Outside speakers on a specific winemaking topic chosen for the quarter. Discussion with the speaker hosted by the faculty member(s) in charge.

*Prerequisite(s):* VEN 003.

*Learning Activities:* Seminar 1 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to Viticulture & Enology majors and graduate students.

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**VEN 192 – Internship (1-12 units)**

*Course Description:* Work experience related to Fermentation Science (Enology) or Plant Science (Viticulture) majors. Internships must be approved and supervised by a member of the department or major faculty, but are arranged by the student.

*Prerequisite(s):* Consent of instructor; completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**VEN 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**VEN 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**VEN 200 – Introduction to Scientific Methods (2 units)**

*Course Description:* Processes involved in conducting scientific research. Topics covered will include conducting literature review, formulating hypotheses, and analyzing and reporting results. Students will complete an annotated bibliography and complete a written and oral research proposal.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture/Discussion 1 hour(s), Term Paper 1 hour(s).

*Grade Mode:* Letter.

**VEN 210 – Grape Development & Composition (3 units)**

*Course Description:* Anatomy, physiology and biochemistry of grape berry development, with emphasis on the development of grape composition relevant to winemaking.

*Prerequisite(s):* (BIS 102, BIS 103) or BIS 105.

*Learning Activities:* Discussion 1 hour(s), Lecture 2 hour(s).

*Grade Mode:* Letter.

**VEN 213 – Flavor Chemistry of Foods & Beverages (3 units)**

*Course Description:* Become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods.

Required to read and critically evaluate flavor chemistry literature.

*Prerequisite(s):* CHE 008B; ((VEN 123, VEN 123L) or FST 103); or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s).

*Cross Listing:* FST 213.

*Grade Mode:* Letter.

**VEN 215 – Sensometrics (3 units)**

*Course Description:* Experimental design and statistical analysis, including multivariate analysis, for both sensory and instrumental data in enology and food-related studies.

*Prerequisite(s):* FST 117; ((VEN 125, VEN 125L) or (FST 107A or FST 107B)); or equivalent to FTS 117.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**VEN 216 – Sustainable Vineyard Development (5 units)**

*Course Description:* Application of plant, meteorological, soil, water, GIS, and economic sciences to sustainable vineyard development. Preparation of a comprehensive study to determine the viticultural and economic feasibility of a given site for raisin, table, or wine grape production.

*Prerequisite(s):* (VEN 101A, VEN 101B, VEN 101C); (VEN 115 or VEN 118); or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Fieldwork 3 hour(s), Term Paper.

*Grade Mode:* Letter.

**VEN 217 – Field & GIS Evaluation of Soils (3 units)**

*Course Description:* Principles and practices used to evaluate agricultural soils in the field, including soil pits, soil cores, electrical conductivity meters, ground penetrating radar, geomorphology and surface terrain analysis. Use of geographic information sciences, soil databases, digital elevation models and geostatistics.

*Prerequisite(s):* PLS 120; (PLS 205 or PLS 206); (SSC 100 or SSC 105 or SSC 107); VEN 101C; consent of instructor; ABT 180 is recommended.

*Learning Activities:* Lecture/Lab 4 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

**VEN 219 – Natural Products of Wine (3 units)**

*Course Description:* Structure, occurrence, and changes due to wine production to the natural products found in wine. Chemicals with a sensory impact will be emphasized, including flavonoids and other phenolics, terpenes and norisoprenoids, pyrazines, oak volatiles and other wine constituents.

*Prerequisite(s):* VEN 123; VEN 124; or natural products background, and consent of instructor.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **VEN 223 – Instrumental Analysis of Must & Wine (4 units)**

*Course Description:* Theory and practice of instrumental analysis of wines and musts. emphasis on the principles of analytical techniques (e.g., CE, GC, HPLC, Mass Spectrometry) and factors determining correct choice of instrumental method.

*Prerequisite(s):* VEN 123 or FST 103; ((BIS 102 and BIS 103) or BIS 105), (CHE 107B or CHE 115) recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to upper division students in Viticulture & Enology, Food Science and Technology; students in Food Science, Ag & Environmental Chemistry and Viticulture & Enology graduate groups.

*Grade Mode:* Letter.

## **VEN 224 – Advances in the Science of Winemaking (3 units)**

*Course Description:* Selected topics in the science and technology of winemaking. Topics will be drawn from current research of participating enology and viticulture faculty. Critical analysis of the technical content of published material will be emphasized.

*Prerequisite(s):* VEN 125; VEN 126; or consent of instructor; graduate standing.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **VEN 225 – Advanced Sensory Analysis of Wines (3 units)**

*Course Description:* Sensory descriptive analysis experiments will be designed and conducted using standard sensory science methods. Data will be analyzed by analyses of variance, principal component analyses and generalized Procrustes analysis to evaluate the judges performance and interpret the significance of the results.

*Prerequisite(s):* ((VEN 124, VEN 125) or FST 107); AMR 120; or the equivalent.

*Learning Activities:* Lecture/Discussion 2 hour(s), Laboratory 4 hour(s).

*Grade Mode:* Letter.

## **VEN 235 – Winery Design (4 units)**

*Course Description:* Design of wineries. Includes process calculations, equipment selection, process layout and building choice and siting. Project scheduling, capital costs, and ten-year cash flow analysis for the winery. One field trip required.

*Prerequisite(s):* VEN 124; VEN 135; or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s), Independent Study.

*Grade Mode:* Letter.

## **VEN 270 – Critical Evaluation of Scientific Literature (2 units)**

*Course Description:* Contemporary research topics in biological sciences. Discussion of recent research articles in a special topic area chosen by instructor. Intended to develop skills in critical evaluation of scientific publications.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 2 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VEN 290 – Seminar (1 unit)**

*Course Description:* Seminar.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VEN 290C – Advanced Research Conference (1 unit)**

*Course Description:* Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VEN 291 – Advanced Viticulture (2 units)**

*Course Description:* Critical evaluation of scientific and popular literature on selected topics of current interest that relate viticulture to fruit or wine sensory attributes or quality.

*Prerequisite(s):* VEN 110; VEN 116; VEN 124; VEN 125; VEN 210 recommended.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Repeat Credit:* May be repeated 1 time(s).

*Grade Mode:* Letter.

## **VEN 292 – Advanced Internship (1-15 units)**

*Course Description:* Work experience related to Fermentation Science (Enology) or Plant Science (Viticulture) majors. Internships must be approved and supervised by a graduate group faculty member or students major professor, but are arranged by the student.

*Prerequisite(s):* VEN 123; VEN 123L; VEN 124; VEN 124L; VEN 125; VEN 125L; VEN 126; VEN 126L; VEN 128; VEN 128L; and consent of instructor.

*Learning Activities:* Internship 3-45 hour(s), Variable.

*Enrollment Restriction(s):* Restricted to Viticulture & Enology Graduate Group graduate students.

*Repeat Credit:* May be repeated 15 unit(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VEN 297T – Tutoring in Viticulture & Enology (1-5 units)**

*Course Description:* Designed for graduate students who desire teaching experience, but are not teaching assistants. Student contact primarily in laboratory or discussion sections, and under direction of a faculty member.

*Prerequisite(s):* Consent of instructor; graduate standing.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VEN 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VEN 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

## **VEN 396 – Teaching Assistant Training Practicum (1-4 units)**

*Course Description:* Teaching assistant training practicum.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Variable.

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

# **Wildlife, Fish, & Conservation Biology (WFC)**

## **WFC 010 – Wildlife Ecology & Conservation (4 units)**

*Course Description:* Introduction to the ecology and conservation of vertebrates. Complexity and severity of world problems in conserving biological diversity.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **WFC 050 – Natural History of California's Wild Vertebrates (3 units)**

*Course Description:* Examination of the natural history of California's wild vertebrates (fish, amphibians, reptiles, birds, and mammals), including their biogeography, systematics, ecology and conservation status.

*Learning Activities:* Lecture 2 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Writing Experience (WE).

## **WFC 051 – Introduction to Conservation Biology (3 units)**

*Course Description:* Introduction to conservation biology including both biological and social issues related to the loss of species and habitats. Intended for students with no background in biological sciences.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

## **WFC 092 – Internship (1-6 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor; lower division standing.

*Learning Activities:* Internship 3-18 hour(s).

*Grade Mode:* Pass/No Pass only.

## **WFC 098 – Directed Group Study (1-5 units)**

*Course Description:* Group study on focused topics in Wildlife, Fish, & Conservation Biology. Topic varies according to instructor.

*Learning Activities:* Variable.

*Grade Mode:* P/NP only.

## **WFC 099 – Special Study for Undergraduates (1-5 units)**

*Course Description:* Special study for undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

## **WFC 100 – Field Methods in Wildlife, Fish, & Conservation Biology (4 units)**

*Course Description:* Introduction to field methods for monitoring and studying wild vertebrates and their habitats, with an emphasis on ecology and conservation. Required weekend field trips.

*Prerequisite(s):* EVE 101 (can be concurrent) or ESP 100 (can be concurrent); (BIS 002A, BIS 002B, BIS 002C); or equivalent course of EVE 101 or ESP 100 (can be taken concurrently), and consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **WFC 101 – Field Research in Wildlife Ecology (2 units)**

*Course Description:* Field research in ecology of wild vertebrates in terrestrial environments; formulation of testable hypotheses, study design, introduction to research methodology, oral and written presentation of results. Limited enrollment.

*Prerequisite(s):* Consent of instructor. One upper division course in each of ecology, statistics, and either ornithology, mammalogy, or herpetology.

*Learning Activities:* Lecture/Discussion 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

## **WFC 101L – Field Research in Wildlife Ecology: Laboratory (4 units)**

*Course Description:* Field research in ecology of wild vertebrates in terrestrial environments; testing ecological hypotheses through field research, application of research methodology, supervised independent research projects. Held between Labor Day and fall quarter.

*Prerequisite(s):* WFC 101 (can be concurrent); and consent of instructor.

*Learning Activities:* Lecture/Discussion 2 hour(s), Fieldwork 15 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **WFC 102 – Field Studies in Fish Biology (1 unit)**

*Course Description:* Emphasis on theory of quantitative fish capture methods and design of individual research projects on ecology, behavior, physiology or population biology of fishes.

*Prerequisite(s):* Consent of instructor. Upper division course in each of ecology, aquatic biology, fish biology, and statistics.

*Learning Activities:* Lecture/Discussion 1 hour(s).

*Grade Mode:* Letter.

## **WFC 102L – Field Studies in Fish Biology: Laboratory (6 units)**

*Course Description:* Field investigations of fish biology are emphasized including quantitative capture methods and individual research projects on ecology, behavior, physiology or population biology of fishes at the field site in relation to their habitats.

*Prerequisite(s):* WFC 102 (can be concurrent); and consent of instructor.

*Learning Activities:* Fieldwork 15 hour(s), Laboratory 12 hour(s), Discussion/Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **WFC 103 – Applied Statistics for Wildlife Research (4 units)**

*Course Description:* Introduction to basic statistical concepts and methods as tools for fish and wildlife research. Application of general guiding principles of developing research questions and projects, basic probability theory, statistical estimation (correlation, regression, ANOVA, Chi-square test) and hypothesis testing. Introduction of some specialized analytical techniques, such as population dynamics modeling and time series analysis.

*Prerequisite(s):* (MAT 016B or MAT 017B or MAT 021B); (WFC 010 or WFC 050); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 1 hour(s).

*Credit Limitation(s):* Only 2 units credit allowed to students who have completed STA 013, STA 100, or PLS 120.

*Grade Mode:* Letter.

## **WFC 110 – Biology & Conservation of Wild Mammals (3 units)**

*Course Description:* Origins, evolution, diversification, and geographical and ecological distributions of mammals. Morphological, physiological, reproductive, and behavioral adaptations of mammals to their environment.

*Prerequisite(s):* (BIS 002A, BIS 002B, BIS 002C); (EVE 101 (can be concurrent) or ESP 100 (can be concurrent)); or equivalent course to ESP 100 or EVE 101.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **WFC 110L – Laboratory in Biology & Conservation of Wild Mammals (3 units)**

*Course Description:* Laboratory exercises in the morphology, systematics, species identification, anatomy, and adaptations of wild mammals to different habitats.

*Prerequisite(s):* WFC 110 (can be concurrent); and consent of instructor.

*Learning Activities:* Laboratory 6 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **WFC 111 – Biology & Conservation of Wild Birds (3 units)**

*Course Description:* Phylogeny, distribution, migration, reproduction, population dynamics, behavior and physiological ecology of wild birds. Emphasis on adaptations to environments, species interactions, management, and conservation.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C; upper division ecology course recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

## **WFC 111L – Laboratory in Biology & Conservation of Wild Birds (3 units)**

*Course Description:* Laboratory exercises in bird species identification, anatomy, molts, age and sex, specialized adaptations, behavior, research, with emphasis on conservation of wild birds. Several weekend field trips, after class bird walks, and independent bird study are required.

*Prerequisite(s):* WFC 111 (can be concurrent); and consent of instructor.

*Learning Activities:* Laboratory 6 hour(s), Fieldwork 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **WFC 120 – Biology & Conservation of Fishes (3 units)**

*Course Description:* Evolution, ecology, and conservation of marine and freshwater fishes.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C; upper division ecology course recommended.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

## **WFC 120L – Laboratory in Biology & Conservation of Fishes (2 units)**

*Course Description:* Morphology, taxonomy, conservation, and identification of marine and freshwater fishes with emphasis on California species.

*Prerequisite(s):* WFC 120 (can be concurrent); and consent of instructor.

*Learning Activities:* Laboratory 3 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Grade Mode:* Letter.

## **WFC 121 – Physiology of Fishes (4 units)**

*Course Description:* Comparative physiology, growth, reproduction, behavior, and energy relations of fishes.

*Prerequisite(s):* Upper division courses in nutrition and physiology or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

## **WFC 122 – Population Dynamics & Estimation (4 units)**

*Course Description:* Description of bird, mammal and fish population dynamics, modeling philosophy, techniques for estimation of animal abundance (e.g., mark-recapture, change-in-ratio, etc.), mathematical models of populations (e.g., Leslie matrix, logistic, dynamic pool, stockrecruitment); case histories.

*Prerequisite(s):* (MAT 016A, MAT 016B); (STA 013 or STA 013Y); (BIS 002A, BIS 002B, BIS 002C); or the equivalent of STA 013; an upper division course in ecology.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

## **WFC 124 – Sampling Animal Populations (4 units)**

*Course Description:* Introduction to major statistical modeling approaches for estimating animal population parameters, including: sample counts, distance sampling, repeated point counts (N-mixture modeling), capture-mark-recapture for closed and open populations, static and dynamic occupancy modeling, and richness estimation. Methods are embedded in the context of obtaining reliable estimates of abundance, survival, occurrence and other ecological parameters for management and conservation.

*Prerequisite(s):* (STA 100 or WFC 103 or PLS 120); (EVE 101 or ESP 100); or equivalent; upper division standing.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**WFC 125 – Tropical Ecology & Conservation (4 units)**

*Course Description:* Ecology and natural history of the tropics. Challenges and opportunities associated with tropical conservation. Design and communicate course-based research project.

*Prerequisite(s):* EVE 101 or ESP 100.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Credit Limitation(s):* Only 2 units credit allowed to students who have completed EVE 138.

*Grade Mode:* Letter.

**WFC 126 – Conservation in Working Landscapes (4 units)**

*Course Description:* Ecology, natural history, and conservation of working landscapes. Critical evaluation of tradeoffs (and potential synergies) that arise when simultaneously pursuing conservation, food production, and human livelihood objectives in crop fields, pastures, settlements, forestry systems, and patches of semi-natural habitat.

*Prerequisite(s):* BIS 002B; or consent of instructor; EVE 101 or ESP 100 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Grade Mode:* Letter.

**WFC 130 – Physiological Ecology of Wildlife (4 units)**

*Course Description:* Principles of physiological ecology, emphasizing vertebrates. Ecological, evolutionary, and behavioral perspectives on physiological mechanisms used by animals to adapt to their environment, including consideration of climate-change and other threats to biodiversity. Tropical, temperate, and polar ecosystems are highlighted.

*Prerequisite(s):* EVE 101 or ESP 100; (BIS 002A, BIS 002B, BIS 002C); or equivalent course to ESP 100.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**WFC 134 – Herpetology (3 units)**

*Course Description:* Evolution and ecology of the world's diverse reptiles and amphibians. Emphasis on adaptations to environments, species interactions, management, and conservation.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C; upper division ecology course recommended.

*Learning Activities:* Lecture 2 hour(s), Term Paper.

*Grade Mode:* Letter.

**WFC 134L – Herpetology Laboratory (3 units)**

*Course Description:* Diagnostic characteristics and functional attributes of amphibians and reptiles, emphasizing ecological, bio-geographic and phylogenetic patterns. Field experience with common species of reptiles and amphibians in the Davis area.

*Prerequisite(s):* WFC 134 (can be concurrent); and consent of instructor.

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

**WFC 136 – Ecology of Waterfowl & Game Birds (4 units)**

*Course Description:* Detailed examination of distribution, behavior, population dynamics, and management of waterfowl and upland game birds.

*Prerequisite(s):* WFC 111; or consent of instructor. WFC 111L strongly recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Fieldwork 1 hour(s).

*Grade Mode:* Letter.

**WFC 141 – Behavioral Ecology (4 units)**

*Course Description:* Basic theories underlying the functional and evolutionary significance of behavior, and the role of ecological constraints. Supporting empirical evidence taken mainly from studies of wild vertebrates.

*Prerequisite(s):* EVE 101 or ESP 100 (can be concurrent); (BIS 002A, BIS 002B, BIS 002C); or equivalent course.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**WFC 144 – Marine Conservation Science (4 units)**

*Course Description:* Key differences between marine and terrestrial ecosystems, major stressors of marine ecosystems (e.g., fisheries, pollution, bioinvasions, climate change and habitat destruction) and their consequences. Laws and agencies responsible for addressing problems, and the policies used.

*Prerequisite(s):* Course in introductory ecology.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Limited to 30 students.

*Grade Mode:* Letter.

**WFC 150 – Urban Wildlife Ecology (3 units)**

*Course Description:* Introduction to the behavior, ecology, and evolution of wild animals in urban environments. Effects of urbanization on disease, fitness, and dynamics of animal populations. Conservation and conflict management efforts in urban settings.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**WFC 151 – Wildlife Ecology (4 units)**

*Course Description:* Ecology of wild vertebrates, including habitat selection, spatial organization, demography, population dynamics, competition, predation, herbivory, energetics, and community dynamics, set in the context of human-caused degradation of environments in North America.

*Prerequisite(s):* BIS 002B; or equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**WFC 152 – Ecology of Human-Wildlife Conflicts (3 units)**

*Course Description:* Ecological approaches to managing wild vertebrates that come into conflict with agriculture, public health, or the conservation of biodiversity.

*Prerequisite(s):* BIS 002B; or equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**WFC 153 – Wildlife Ecotoxicology (4 units)**

*Course Description:* Various forms of environmental pollution in relation to fish and wildlife, the effects and mechanisms of pollutants, effects on individuals and systems, laboratory and field ecotoxicology, examples/case histories, philosophical/management considerations.

*Prerequisite(s):* Introductory courses in organic chemistry, ecology, and physiology, or consent of instructor; ETX 101 recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Writing Experience (WE).

**WFC 154 – Conservation Biology (4 units)**

*Course Description:* Introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats.

*Prerequisite(s):* BIS 002B; or the equivalent.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**WFC 155 – Wildlife Space Use & Habitat Conservation (4 units)**

*Course Description:* Relationships between habitat characteristics and wildlife behavior/ecology, principles of habitat conservation and management.

*Prerequisite(s):* EVE 101 or ESP 100; or the equivalent of EVE 101 or ESP 100.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**WFC 155L – Habitat Conservation & Restoration Laboratory (2 units)**

*Course Description:* Analysis of the characteristics of wildlife and fish habitats, application of restoration methods, and evaluation of conservation and restoration projects in the field. Participate during the term in a restoration project.

*Prerequisite(s):* (EVE 101 or ESP 100); WFC 155 (can be concurrent); or the equivalent of ESP 100 or EVE 101.

*Learning Activities:* Fieldwork 3 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**WFC 156 – Plant Geography (4 units)**

*Course Description:* Survey of the geographical distribution of vegetation types and habitats, with consideration of the environmental and historical factors that determine these patterns. Conservation and management approaches. Analytical field and lab techniques introduced.

*Prerequisite(s):* ESP 100 or EVE 101; PLB 102 or PLB 108 strongly recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL); Writing Experience (WE).

**WFC 157 – Coastal Ecosystems (4 units)**

*Course Description:* Overview of coastal ecosystems, physical and biological elements and processes, and coastal zone dynamics, including sandy, rocky and muddy shorelines, estuaries, dunes and coastal watersheds. Discussion of the role of historical factors and conservation, restoration, and management approaches.

*Prerequisite(s):* EVE 101; course work in organismal biology, physical geography, and geology recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s), Fieldwork 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

**WFC 158 – Infectious Disease in Ecology & Conservation (3 units)**

*Course Description:* Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and their applications. Role of scientists in developing disease control policies.

*Prerequisite(s):* EVE 101 or ESP 100 or VET 409; or the equivalent.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**WFC 160 – Animal Coloration (3 units)**

*Course Description:* Evolutionary and ecological significance of coloration in mammals, birds, reptiles, amphibians, fish, cephalopods, crustaceans, spiders, insects, humans as well as color in fashion, plants and the military. Topics include history, protective coloration, warning coloration, mimicry, sexual dichromatism and color change.

*Prerequisite(s):* BIS 002A; BIS 002B; BIS 002C.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

**WFC 168 – Climate Change Ecology (4 units)**

*Course Description:* Ecological responses to current and expected future climate change, across levels of biological organization from individuals to ecosystems.

*Prerequisite(s):* BIS 002B; (EVE 101 or ESP 100); or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**WFC 190 – Departmental Research Seminar (1 unit)**

*Course Description:* Reports and discussions of recent advances related to wildlife and fisheries biology.

*Prerequisite(s):* Upper division standing in the Biological Sciences.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 3 time(s).

*Grade Mode:* Pass/No Pass only.

**WFC 191 – Museum Science (2 units)**

*Course Description:* Principles and methods required to preserve and present biological specimens for research, teaching collections, and museums.

*Prerequisite(s):* Consent of instructor. Upper division standing.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

**WFC 192 – Internship (1-12 units)**

*Course Description:* Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty.

*Prerequisite(s):* Consent of instructor. Completion of 84 units.

*Learning Activities:* Internship 3-36 hour(s).

*Grade Mode:* Pass/No Pass only.

**WFC 195 – Field & Laboratory Research (3 units)**

*Course Description:* Critique and practice of research methods applied to field and/or laboratory environments of wild vertebrates. Work independently or in small groups to design experimental protocol, analyze data, and report their findings.

*Prerequisite(s):* (WFC 110L or WFC 111L or WFC 120L); (WFC 121 or WFC 130); EVE 101; or the equivalent of EVE 101, and consent of instructor.

*Learning Activities:* Laboratory 6 hour(s), Discussion 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

**WFC 197T – Tutoring in Wildlife & Fisheries (1-5 units)**

*Course Description:* Experience in teaching under guidance of faculty member.

*Prerequisite(s):* Consent of instructor. Major in Wildlife, Fish, and Conservation Biology.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**WFC 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**WFC 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**WFC 223 – Conservation Biology & Animal Behavior (3 units)**

*Course Description:* Influences of concepts of animal behavior (functional, evolutionary, developmental, mechanistic, and methodological issues) on conservation biology theory and practice.

*Prerequisite(s):* ECL 208 or ANB 221; and consent of instructor.

*Learning Activities:* Lecture 1.50 hour(s), Discussion 1.50 hour(s).

*Grade Mode:* Letter.

**WFC 230 – Advanced Physiological Ecology of Wildlife (4 units)**

*Course Description:* Advanced principles of physiological ecology. Ecological, evolutionary and behavioral perspectives on physiological mechanisms used by animals to adapt to their environment in the context of climate change and other threats to biodiversity. Primary literature will form the basis of discussion.

*Learning Activities:* Lecture 3 hour(s), Discussion 1 hour(s).

*Grade Mode:* Letter.

**WFC 262 – Advanced Population Dynamics (3 units)**

*Course Description:* Logical basis for population models, evaluation of simple ecological models, current population models with age, size, and stage structure, theoretical basis for management and exemplary case histories. Emphasis on development and use of realistic population models in ecological research.

*Prerequisite(s):* Graduate standing; advanced course in ecology (e.g., EVE 101), population dynamics (e.g., WFC 122), and one year of calculus; familiarity with matrix algebra and partial differential equations recommended.

*Learning Activities:* Lecture 3 hour(s).

*Cross Listing:* ECL 262.

*Grade Mode:* Letter.

**WFC 290 – Seminar (1-3 units)**

*Course Description:* Seminar devoted to a highly specific research topic in any area of wildlife or fisheries biology. Special topic selected for a quarter will vary depending on interests of instructor and students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Seminar 1-3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**WFC 290C – Research Group Conference (1 unit)**

*Course Description:* Weekly conference on research problems, progress and techniques in wildlife and fishery sciences.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**WFC 291 – Seminar in Aquatic Ecology (2 units)**

*Course Description:* Presentation and analysis of assigned topics in aquatic ecology emphasizing fish, fisheries and aquatic conservation.

*Prerequisite(s):* Graduate standing in Biology.

*Learning Activities:* Seminar 2 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**WFC 292 – Physiology of Fishes Seminar (1 unit)**

*Course Description:* Seminar devoted to current topics concerning the physiological functioning of fishes.

*Prerequisite(s):* Consent of instructor. Graduate standing and at least two courses in physiology.

*Learning Activities:* Seminar 1 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**WFC 294 – Seminar in Behavioral Ecology of Predators & Prey (3 units)**

*Course Description:* Presentation and analysis of research papers on social and foraging behavior of predatory animals, antipredator strategies of prey species, co-evolution of predators and prey, and ecology of predator-prey interactions.

*Prerequisite(s):* Graduate standing.

*Learning Activities:* Seminar 2 hour(s).

*Repeat Credit:* May be repeated 2 time(s).

*Cross Listing:* ANB 294.

*Grade Mode:* Letter.

**WFC 295 – Seminar in Wildlife Ecotoxicology (3 units)**

*Course Description:* Presentation and analysis of assigned and searched research papers on transport, exposure, and effects of environmental contaminants on wildlife-associated ecosystem components, especially at individual/population levels. Specific subjects vary each offering.

*Prerequisite(s):* Graduate standing in Biology.

*Learning Activities:* Seminar 2 hour(s), Term Paper.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**WFC 297T – Supervised Teaching in Wildlife & Fisheries Biology (1-3 units)**

*Course Description:* Tutoring and teaching students in undergraduate courses in Wildlife, Fish, & Conservation Biology. Weekly conferences with instructor; evaluations of teaching; preparing for and conducting demonstrations, laboratories, and discussions; preparing and grading examinations.

*Prerequisite(s):* Consent of instructor. Meet qualifications for teaching assistant; graduate standing.

*Learning Activities:* Tutorial 3-9 hour(s).

*Repeat Credit:* May be repeated 6 unit(s) when a different course is tutored.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**WFC 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Learning Activities:* Variable.

*Grade Mode:* Letter.

**WFC 299 – Research (1-12 units)**

*Course Description:* Research.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**Women's Studies (WMS)**

College of Letters & Science

**WMS 020 – Cultural Representations of Gender (4 units)**

*Course Description:* Interdisciplinary investigation of how specific cultures represent gender difference. Examine a variety of cultural forms and phenomena including film, television, literature, music, popular movements, and institutions.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**WMS 025 – Gender & Global Cinema (4 units)**

*Course Description:* Role gender plays in film history/culture in various geographical contexts and in aspects of contemporary globalization. Films from nations such as China, Colombia, Cuba, Ethiopia, India, Iran, Korea, New Zealand, and the U.S.

*Learning Activities:* Lecture 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

**WMS 060 – Feminist Critiques of Western Thought (4 units)**

*Course Description:* Critical introduction to major traditions of social thinking in the West from a feminist perspective.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**WMS 104 – Feminist Research (4 units)**

*Course Description:* Introduction to feminist applications and transformations of traditional disciplinary research practices; initial training in methodologies for feminist interdisciplinary work.

*Prerequisite(s):* Required for Women's Studies major.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**WMS 130 – Globalization & Politics of Family Change (4 units)**

*Course Description:* Political/cultural changes, conflicts, and economic disparities that have led to greater mobility and dispersal of families. Transnationalism on gender relations, sexualities, and the meaning of family.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**WMS 136 – Critical Food Studies (4 units)**

*Course Description:* Production and consumption of food at the intersections of gender, race, ethnicity, nation, and body. Individual and familial experiences as part of larger economic and political structures in the U.S. and globally.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Oral Skills (OL); Writing Experience (WE).

**WMS 137 – Contemporary Debates in Western Feminist Theory (4 units)**

*Course Description:* Interpretations of poststructuralist, postmodern, and postcolonial thought from a critical feminist perspective; includes methods of applying theory to concrete social/cultural problems of gender, race, sexuality, class.

*Prerequisite(s):* WMS 060; or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **WMS 138 – Critical Fashion Studies (4 units)**

*Course Description:* Feminist cultural studies of style-fashion-dress through transnational circuits, personal subjectivities. Fashion as means of gender oppression and liberation. Histories and discourses of masculinities and femininities. Clothing works on global assembly line. Use of dress in construction/regulation of identities.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **WMS 140 – Gender & Law (4 units)**

*Course Description:* Exploration of women's legal rights in historical and contemporary context, discussing a variety of legal issues and applicable feminist theories. Topics include constitutional equal protection, discrimination in employment and education, sexual orientation discrimination, and the regulation of abortion.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

## **WMS 145 – Women's Movements in Transnational Perspective (4 units)**

*Course Description:* Transnational perspectives on 20th- and 21st-century women's movements in Western, colonial and post-colonial contexts, examining movement's forms and political orientations and relationships between women's movements and other forces for change.

*Prerequisite(s):* WMS 050 recommended.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Enrollment Restriction(s):* Limited to 90 students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

## **WMS 146 – Gender, War & Peace (4 units)**

*Course Description:* Applies a critical gender perspective to militarism as manifest in contexts of military rule, war, conflict, peacebuilding and security post-conflict. Addresses the changing configurations of gender and sexuality in military institutions and militarized economies and cultures from an interdisciplinary perspective.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); World Cultures (WC); Writing Experience (WE).

## **WMS 158 – Masculinities (4 units)**

*Course Description:* Cultural, economic, and political forces which shape historical and contemporary masculinities. Impact of race, class, ability, nation and sexuality on experiences and cultural representations of masculinity.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

## **WMS 160 – Women, "Race" & Sexuality in Postcolonial Cinema (4 units)**

*Course Description:* Feminist analysis of race, sexuality and class in the representation of women in commercial and/or independent films.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Enrollment Restriction(s):* Limited to 90 students.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **WMS 162 – Feminist Film Theory & Criticism (4 units)**

*Course Description:* Historical overview of and contemporary issues in feminist film theory, including representation, spectatorship, and cultural production. Film stars, women filmmakers, and the intersections of gender, race, sexuality, and class in films and their audiences.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **WMS 164 – Topics in Gender & Cinematic Representation (4 units)**

*Course Description:* Examination of a specific topic within the broad rubric of gender and cinema. Possible topics include Latinas in Hollywood; gender, nation, cinema; and gender and film genre. Topics vary.

*Learning Activities:* Lecture/Discussion 3 hour(s), Film Viewing 3 hour(s).

*Repeat Credit:* May be repeated 2 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); Visual Literacy (VL); World Cultures (WC); Writing Experience (WE).

## **WMS 165 – Feminist Media Production (6 units)**

*Course Description:* Media production as a mode of cultural criticism, furthering feminist/ social justice activist goals. Fundamentals of camera, editing and distribution via a social engagement model. Study and hands-on response to key historic and contemporary feminist and social justice media discourses.

*Prerequisite(s):* (CTS 020 or CDM 020); or two WMS courses.

*Learning Activities:* Lecture/Discussion 3 hour(s), Laboratory 3 hour(s), Fieldwork 6 hour(s).

*Cross Listing:* CDM 105.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Visual Literacy (VL).

## **WMS 170 – Queer Studies (4 units)**

*Course Description:* Study of queer sexualities, identities, theories, practices. Alternative sexualities as historical, social, and cultural constructions in intersections with race, gender, class, nationality. Interdisciplinary exploration of sexual liberation and the regulation of sexuality through history, theory and expressive cultural forms.

*Prerequisite(s):* WMS 070 recommended or consent of instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**WMS 175 – Gender & Experience of Race (4 units)**

*Course Description:* Exploration of the co-construction of “race” and gender in comparative national historical contexts and contemporary lived experience. Study of intersections of race and gender in identities and how institutions, labor migration, social movements and consumption shape racialized gendered identities.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**WMS 180 – Women of Color Writing in the United States (4 units)**

*Course Description:* Literature, especially novels, written by contemporary women of color in the United States, understood in their socio-economic, cultural and historical contexts.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**WMS 182 – Globalization, Gender & Culture (4 units)**

*Course Description:* Critical gender analysis of globalization as a process of interconnected cultural, social and economic transformations inflected by gender, nation, class and race/ethnicity. Critical self-reflection and social observation skills.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Oral Skills (OL); World Cultures (WC); Writing Experience (WE).

**WMS 184 – Gender in the Arab World (4 units)**

*Course Description:* Examination of the history, culture, and social/political/economic dynamics of gender relations and gendering in the Arab world.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); World Cultures (WC); Writing Experience (WE).

**WMS 187 – Gender & Public Policy (4 units)**

*Course Description:* Role of gender in the creation of social policies, especially with respect to issues brought into the policy arena by contemporary feminism.

*Learning Activities:* Lecture/Discussion 3 hour(s), Term Paper.

*Grade Mode:* Letter.

*General Education:* Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD); Writing Experience (WE).

**WMS 189 – Special Topics in Critical Gender Studies (4 units)**

*Course Description:* In-depth examination of a women's studies topic related to the research interests of the instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Repeat Credit:* May be repeated 1 time(s) when topic differs.

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**WMS 190 – Senior Seminar (4 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Capstone course for senior Womens Studies majors, which focuses on current issues on feminism as they impact theory, public policy, and practice.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); American Cultures, Governance, & History (ACGH); Domestic Diversity (DD).

**WMS 192 – Internship in Women's Studies (1-12 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Supervised internship and study in positions/institutional settings dealing with gender-related problems or issues, as for example, a women's center, affirmative action office, advertising agency, or social welfare agency. Final written report on internship experience.

*Prerequisite(s):* Completion of a minimum of 84 units and consent of instructor; enrollment dependent on availability of intern positions with priority to Women's Studies majors.

*Learning Activities:* Internship 3-36 hour(s), Term Paper.

*Grade Mode:* Pass/No Pass only.

**WMS 194HA – Senior Honors Project in Women's Studies (4-6 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* In consultation with an advisor, students complete a substantial research paper or significant creative project on a Womens Studies topic.

*Prerequisite(s):* Senior standing, Women's Studies major, and advisor's approval.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**WMS 194HB – Senior Honors Project in Women's Studies (4-6 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* In consultation with an advisor, students complete a substantial research paper or significant creative project on a Women's Studies topic.

*Prerequisite(s):* Senior standing, Women's Studies major, and advisor's approval.

*Learning Activities:* Independent Study 12 hour(s).

*Grade Mode:* Letter.

*General Education:* Arts & Humanities (AH) or Social Sciences (SS); Writing Experience (WE).

**WMS 197T – Tutoring in Women's Studies (1-4 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Leading small, voluntary discussion groups affiliated with a Womens Studies course.

*Prerequisite(s):* Upper division standing and consent of director.

*Learning Activities:* Tutorial 3-12 hour(s).

*Repeat Credit:* May be repeated 8 unit(s).

*Grade Mode:* Pass/No Pass only.

**WMS 200A – Current Issues in Feminist Theory (4 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Current issues in feminist theory; techniques employed to build feminist theory in various fields.

*Learning Activities:* Seminar 4 hour(s).

*Grade Mode:* Letter.

**WMS 201 – Special Topics in Feminist Theory & Research (4 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Explores in depth a topic in feminist theory and research related to the research interests of the instructor.

*Learning Activities:* Lecture/Discussion 4 hour(s).

*Enrollment Restriction(s):* Limited enrollment.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Letter.

**WMS 250 – Cultural Study of Masculinities (4 units)**

*Course Description:* Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structures.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Seminar 3 hour(s), Term Paper.

*Cross Listing:* AMS 250.

*Grade Mode:* Letter.

**WMS 299 – Special Study for Graduate Students (1-12 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Special study for graduate students.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

**WMS 299D – Dissertation Research & Writing (4 units)**

Starting Fall Quarter 2023, this course is no longer offered.

*Course Description:* Dissertation research & writing.

*Prerequisite(s):* WMS 200A; WMS 200B; fulfillment of course requirements for the DE in Feminist Theory and Research; advancement to candidacy.

*Learning Activities:* Extensive Writing/Discussion 3 hour(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

# ADVANCED ACADEMIC STUDIES

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## Graduate Education & Professional Schools

- Graduate Studies (<http://gradstudies.ucdavis.edu/>); 530-752-0650
- School of Education (<http://education.ucdavis.edu/>); 530-752-8258
- School of Law (<http://www.law.ucdavis.edu/>); 530-752-6477
- Graduate School of Management (<http://gsm.ucdavis.edu/>); 530-752-7658
- School of Medicine (<http://www.ucdmc.ucdavis.edu/medschool/>); 916-734-4800
- Betty Irene Moore School of Nursing (<http://nursing.ucdavis.edu/>); 916-734-2145
- School of Veterinary Medicine (<https://www.vetmed.ucdavis.edu/>); 530-752-1383

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2022-2023 ([https://local-resources.ucdavis.edu/local\\_resources/docs/catalog/GenCat20222023.pdf](https://local-resources.ucdavis.edu/local_resources/docs/catalog/GenCat20222023.pdf)); published Apr 25, 2022 | 2022-2023 ([https://local-resources.ucdavis.edu/local\\_resources/docs/catalog/GenCat20222023-Final.pdf](https://local-resources.ucdavis.edu/local_resources/docs/catalog/GenCat20222023-Final.pdf)); with all courses to Apr 24, 2023

2021-2022 ([https://local-resources.ucdavis.edu/local\\_resources/docs/catalog/GenCat20212022.pdf](https://local-resources.ucdavis.edu/local_resources/docs/catalog/GenCat20212022.pdf)); published Apr 26, 2021 | 2021-2022 ([https://local-resources.ucdavis.edu/local\\_resources/docs/catalog/GenCat20212022-Final.pdf](https://local-resources.ucdavis.edu/local_resources/docs/catalog/GenCat20212022-Final.pdf)); with all courses to Apr 24, 2022

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2019-2020 ([https://local-resources.ucdavis.edu/local\\_resources/docs/catalog/GenCat20192020.pdf](https://local-resources.ucdavis.edu/local_resources/docs/catalog/GenCat20192020.pdf)); published Apr 29, 2019 | 2019-2020 ([https://local-resources.ucdavis.edu/local\\_resources/docs/catalog/GenCat20192020-Final.pdf](https://local-resources.ucdavis.edu/local_resources/docs/catalog/GenCat20192020-Final.pdf)); with all courses to Apr 26, 2020

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