## Fall 2020 Course Descriptions as of 04/05/2020 08:12 PM

Information in Browse Course Catalog is subject to change. Information is term specific. Please refer to the appropriate term when searching for course content. Key to Course Descriptions may be found at: **http://rcs.registrar.arizona.edu/course_descriptions_key**.

**Immunobiology (IMB)**

**IMB 401: Medical Microbiology and Immunology** (4 units)
**Description:** The molecular and biological characteristics of microorganisms of importance in human health and disease; the reaction of the host (immune system) to infectious agents and the mechanisms of host defense (immunity); molecular and cellular immunology and pathogenesis of infectious disease. This course will include areas such as immunology, virology, bacteriology, mycology, parasitology and infectious diseases.
**Grading basis:** Regular Grades
**Career:** Undergraduate
**Course Components:** Lecture Required
**Co-convened with:** IMB 501
**Course typically offered:**
Main Campus: Spring

**Field trip:** Prerequisite: Students should have taken undergraduate courses such as microbiology, immunology, biochemistry, molecular biology or biology to enroll in this course.

**IMB 402: Medical Microbiology Basics** (1 unit)
**Description:** This course will present basic concepts in the areas of microbiology, including bacteriology, virology, mycology and parasitology. It will also present the pathogenesis of medically important, viral, bacterial, fungal and parasitic diseases. In addition, it will provide vocabulary that is useful in approaching the medical literature. The course will be especially useful to pre-health profession students (Medicine, Dentistry, Nursing, Pharmacy, Public Health) as well as students planning a carrier in biomedical research.
**Grading basis:** Regular Grades
**Career:** Undergraduate
**Course Components:** Lecture Required
**Co-convened with:** IMB 502
**Course typically offered:**
Main Campus: Fall, Winter, Spring
Online Campus: Fall, Spring, Summer

**Recommendations and additional information:** General biology, molecular or cellular biology recommended.
**Field trip:** none

**IMB 404: Medical Virology Basics** (1 unit)
**Description:** This course will present basic concepts in the areas of human virology. It will also present the pathogenesis of medically important viral infectious diseases. In addition, it will provide vocabulary that is useful in approaching the medical literature. The course will be especially useful to pre-health profession students (Medicine, Dentistry, Nursing, Pharmacy, Public Health) as well as students planning a carrier in biomedical research.
**Grading basis:** Regular Grades
**Career:** Undergraduate
**Course Components:** Lecture Required
**Co-convened with:**
**Course typically offered:**
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

**Field trip:** None

**IMB 501: Medical Microbiology and Immunology** (4 units)
**Description:** The molecular and biological characteristics of microorganisms of importance in human health and disease; the reaction of the host (immune system) to infectious agents and the mechanisms of host defense (immunity); molecular and cellular immunology and pathogenesis of infectious disease. This course will be taught by several experts in the areas of immunology, virology, bacteriology, mycology, parasitology and infectious diseases.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Co-convened with:** IMB 401
**Course typically offered:**
Main Campus: Spring

**Recommendations and additional information:** Background in molecular biology, microbiology, or immunology.

**IMB 502: Medical Microbiology Basics** (1 unit)
**Description:** This course will present basic concepts in the areas of microbiology, including bacteriology, virology, mycology and parasitology. It will also present the pathogenesis of medically important, viral, bacterial, fungal and parasitic diseases. In addition, it will provide vocabulary that is useful in approaching the medical literature. The course will be especially useful to pre-health profession students (Medicine, Dentistry, Nursing, Pharmacy, Public Health) as well as students planning a carrier in biomedical research.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Co-convened with:**
**Course typically offered:** Online Campus: Fall, Spring, Summer

**Recommendations and additional information:** General biology, molecular or cellular biology recommended
**Field trip:** none

**IMB 503L: Parasitology Laboratory** (1 unit)
**Description:** Parasite morphology and diagnostic laboratory techniques.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Laboratory Required
**Equivalent to:** ECOL 503L, EIS 503L, ENTO 503L, IMB 503L, INSC 503L, MBIM 503L, MICR 503L, VSC 503L
**Also offered as:** ACBS 503L, ECOL 503L, EIS 503L, MIC 503L
**Course typically offered:**
Main Campus: Fall

**Home department:** Veterinary Science & Microbiology

**IMB 503R: Biology of Animal Parasites** (3 units)
**Description:** Biology of host-parasite relationships with emphasis on parasites of veterinary and human importance. Parasite morphology and physiology, life cycles, epidemiology, pathogenesis and zoonotic potential. Graduate-level requirements include an in-depth research paper on the molecular biology/immune response of a single parasite.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** ECOL 503R, EIS 503R, ENTO 503R, IMB 503R, INSC 503R, MBIM 503R, MICR 503R, VSC 503R
**Also offered as:** ACBS 503R, ECOL 503R, EIS 503R, MIC 503R
**Course typically offered:**
Main Campus: Fall

**Home department:** Veterinary Science & Microbiology

**IMB 504: Medical Virology Basics** (1 unit)
**Description:** This course will present basic concepts in the areas of human virology. It will also present the pathogenesis of medically important viral infectious diseases. In addition, it will provide vocabulary that is useful in approaching the medical literature. The course will be especially useful to pre-health profession students (Medicine, Dentistry, Nursing, Pharmacy, Public Health) as well as students planning a carrier in biomedical research.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Co-convened with:** IMB 404
**Course typically offered:**
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

**Recommendations and additional information:** General biology or equivalent.
**Field trip:** None

**IMB 519: General Immunological Concepts** (4 units)
**Description:** Basic concepts of the immune system. Presentation of the roles of antigen, immunoglobulins, complement, lymphokines and role of immune cells play in humoral and cell-mediated immunity.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** IMB 519, MBIM 519, MICR 519, VSC 519
**Also offered as:** ACBS 519, MIC 519
**Co-convened with:**
**Course typically offered:**
Main Campus: Fall

**Home department:** Veterinary Science & Microbiology

**IMB 520: Pathogenic Bacteriology** (3 units)
**Description:** This course explores major themes in mechanisms of bacterial pathogenesis using examples from a variety of important human and veterinary pathogens. Students will learn to find and interpret primary literature related to pathogenic bacteria. Graduate students will make a series of short presentations analyzing papers from the course in more depth.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** IMB 520, MBIM 520, VSC 520
**Also offered as:** MIC 520
**Course typically offered:**
Main Campus: Fall

**Home department:** Veterinary Science & Microbiology

**IMB 521: Scientific Grantsmanship** (2 units)
**Description:** An interactive graduate-level course focused on written scientific communication and research integrity/ethics. The writing portion of the course is developed with a particular emphasis on NIH-style grant writing to develop the necessary skills to develop and write fellowship and grant applications. Students will work together with faculty and in peer groups to develop scientific hypotheses, aims, and research plans. The students will develop an NIH-style research proposal through the course of the semester. The student will develop skills necessary to for successful scientific writing.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Course typically offered:**
Main Campus: Fall

**Recommendations and additional information:** 2nd year PhD students (and beyond) only.

**IMB 523: Mechanisms of Disease** (4 units)
**Description:** Comparative general pathology of animal and selected human diseases with emphasis on pathogenesis, pathophysiology, and morphologic and biochemical changes at the macroscopic, microscopic and molecular levels. Recitation will stress general mechanisms of disease common to all mammalian species, with focus on tissue injury and adaptation; inflammation and repair; and disorders of circulation, immunity, and cell growth, including neoplasia. Available for honors credit. Graduate-level requirements will include outside discussion and preparation of a research proposal on a relevant topic emphasizing the molecular pathogenesis of selected infectious diseases and currently applicable biotechniques, and critical analysis of related publications from the current literature.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Also offered as:** ACBS 523, PCOL 523
**Co-convened with:**
**Course typically offered:**
Main Campus: Spring

**Home department:** School of Animal & Comparative Biomedical Sciences
**Enrollment requirement:** Prerequisites: ACBS 500A and ACBS 500B or concurrent enrollment, or PSIO 201 and PSIO 202 or concurrent enrollment, or ACBS 215 or concurrent enrollment, or consent of instructor.

**IMB 525: Environmental Microbiology** (3 units)
**Description:** Current concepts in water quality, aerobiology and microbial biogeochemistry. Graduate-level requirements include extra journal readings and more comprehensive exams.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** IMB 525, MBIM 525, MICR 525, SW 525
**Also offered as:** ENVS 525
**Course typically offered:**
Main Campus: Fall

**Home department:** Soil, Water, & Environmental Sciences

**IMB 526: Environmental Microbiology Laboratory** (2 units)
**Description:** Basic techniques for isolation and characterization of environmental soil and water microflora including methods for enumeration and measurement of physiological activity. Graduate-level requirements include additional assignments.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Laboratory Required
**Equivalent to:** IMB 526, MBIM 526, MICR 526, SW 526
**Also offered as:** ENVS 526
**Course typically offered:**
Main Campus: Fall

**Home department:** Soil, Water, & Environmental Sciences

**IMB 532: Comparative Immunology** (3 units)
**Description:** How have vertebrate immune systems evolved from simple origins? We will cover comparative immunology of prokaryotes, protozoans, plants, fungi, invertebrates, and "lower" vertebrates. By studying the origins and evolution of immunity across the history of life, and following the progression of immune system complexity across different lineages, we begin to see patterns that help explain how our immune system developed from those of our ancestors. Such comparative study will highlight the strengths and weaknesses of our immune system, and point to ways in which other organisms have overcome the same pathogenic stresses we currently face. This class will pull together data from many fields, including immunology, molecular and cell biology, ecology, and evolution. Graduate students will prepare and give one oral presentation of a specific topic to the class, which will be graded.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Also offered as:** ACBS 532, ECOL 532, EIS 532, MCB 532, MIC 532
**Course typically offered:**
Main Campus: Fall

**Home department:** Committee on Entomology and Insect Science
**Enrollment requirement:** MCB 181R and MCB 181L, ECOL 182R and ECOL 182L, or instructor consent.

**IMB 533: Medical and Molecular Virology** (4 units)
**Description:** Structure, classification, replication, and mechanisms of pathogenesis of human and animal viruses. Graduate-level requirements include an additional discussion hour per week.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** IMB 533, MBIM 533, VSC 533
**Also offered as:** MIC 533
**Course typically offered:**
Main Campus: Spring

**Home department:** Veterinary Science & Microbiology

**IMB 538: Ecology of Infectious Disease** (3 units)
**Description:** Term paper required for graduate credit.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** IMB 538, MBIM 538, MICR 538, VSC 538
**Also offered as:** ACBS 538, MIC 538
**Course typically offered:**
Main Campus: Spring

**Home department:** Veterinary Science & Microbiology

**IMB 540: Biodegradation of Pollutants in Soil and Groundwater** (3 units)
**Description:** Description of modern pollution problems and potential biological remediation techniques focusing on the chemistry, biochemistry and molecular biology of biodegradation of hazardous and toxic compounds. Graduate-level requirements include analysis and oral presentation of a remediation case study and more comprehensive exams.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** IMB 540, MBIM 540, SW 540
**Also offered as:** ENVS 540
**Course typically offered:**
Main Campus: Spring

**Home department:** Soil, Water, & Environmental Sciences

**IMB 543: Research Animal Methods** (3 units)
**Description:** Regulations, care, diseases and techniques involving common laboratory animals used in research and teaching programs. Graduate-level requirements include an in-depth research paper on one of the lecture topics presented in the course plus research proposal preparation.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** ANS 543, BIOC 543, IMB 543, MBIM 543, MICR 543
**Also offered as:** ACBS 543, BIOC 543
**Co-convened with:** BIOC 443
**Course typically offered:**
Main Campus: Fall

**Home department:** School of Animal & Comparative Biomedical Sciences

**IMB 548: Basic and Advanced Immunology** (3 units)
**Description:** The primary goal of Basic Immunological Concepts is to provide students with a graduate level exposure to the cornerstone concepts in immunobiolgy. Discussion-based lectures, including student participation in each unit, will be followed by student-led discussion and analysis of cutting-edge, seminal papers in the field, with emphasis on the most recent literature. The lectures will be designed to foster critical student discussion, and students will learn to read and evaluate the primary literature in a critical and clear manner. They will also learn to discriminate gaps and conjectures from solid experimental scientific proof. In short, they should gain a foundational working knowledge of immunobiology that will provide a framework from which to theoretically and experimentally approach immunological subjects as a working scientist.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Course typically offered:**
Main Campus: Fall

**IMB 554: Host-Microbial Interactions** (3 units)
**Description:** Graduate-level requirements include a five-page proposal.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Equivalent to:** IMB 554, MBIM 554, VSC 554
**Also offered as:** ACBS 554, MIC 554
**Course typically offered:**
Main Campus: Spring

**Home department:** Veterinary Science & Microbiology

**IMB 564: Advanced Topics: Function, Regulation and Dysregulation of the Immune System** (3 units)
**Description:** This course will expose students to the highest level of instruction and independent literature analysis and discussion, while covering topics that will allow students to understand function of immune system as it defends the organism against viral, bacterial, fungal and parasitic microorganisms and cancer, and its dysfunction in the course of immunodeficiency, autoimmunity and transplantation. Didactic instruction in each unit will be followed by the student-led discussion and analysis of cutting-edge, seminal papers in the field, with an accent on most recent literature.
**Grading basis:** Regular Grades
**Career:** Graduate

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|---|---|---|
| **Course Components:** | Discussion | May Be Offered |
| | Lecture | Required |

**Repeatable:** Course can be repeated a maximum of 2 times.
**Course typically offered:**
Main Campus: Spring

**Recommendations and additional information:** IMB 561 or with special approval of the course director. Graduate school-enrolled students with B.A. or B.Sc.

**IMB 565: Principles and Molecular Mechanisms of Microbe-Host Interactions** (3 units)
**Description:** Course covers the interactions that occur between microbes (bacteria, parasites and viruses) and their host that result in disease, commensalism or parasitism. Examples will be drawn from systems that have been defined at the molecular/genetic levels, and viewed from the standpoints of microbe and host. Ideas will be presented in lecture format and class discussions of assigned literature.
**Grading basis:** Regular Grades
**Career:** Graduate

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|---|---|---|
| **Course Components:** | Discussion | May Be Offered |
| | Lecture | Required |

**Course typically offered:**
Main Campus: Fall

**Recommendations and additional information:** For PhD students: undergraduate degree in biology-related subject or after satisfactory discussion with Instructor.

**IMB 566: Cellular Immunology** (4 units)
**Description:** Cells and cellular events involved in humoral and cell-mediated immune responses; morphologic, physiologic and biochemical characterizations of the lymphoreticular system.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Course typically offered:**
Main Campus: Fall

**Recommendations and additional information:** IMB 502A & IMB 502B are required prerequisites. If you have not taken the prerequisite course(s), you must see Dr. Harris (626-5127) for permission to take the course.

**IMB 580: Molecular Virology** (3 units)
**Description:** The current status of basic research in virology at the molecular level.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Course typically offered:**
Main Campus: Spring

**IMB 593: Internship** (1 - 6 units)
**Description:** Specialized work on an individual basis, consisting of training and practice in actual service in a technical, business, or governmental establishment.
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Spring

**IMB 595A: IMB- Journal Club** (1 unit)
**Description:** This course will give Immunobiology and other interested graduate students, post-docs, and faculty an opportunity to effectively communicate and critically evaluate important research finding/papers from the current scientific literature and journal articles.
**Grading basis:** Student Option ABCDE/PF
**Career:** Graduate
**Course Components:** Colloquium Required
**Repeatable:** Course can be repeated a maximum of 15 times.
**Course typically offered:**
Main Campus: Fall, Spring

**-SA** represents a Student Abroad & Student Exchange offering
**-CC** represents a Correspondence Course offering
**May Be Offered** Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

**IMB 595H: Problems in the Biology of Complex Diseases** (2 units)
**Description:** Complex diseases (CDs: e.g., asthma, allergy, COPD, obesity, inflammatory bowel disease, hypertension, coronary artery disease, diabetes, rheumatoid arthritis, multiple sclerosis, schizophrenia) are the next major challenge in human biology because they are at the same time unique, common and difficult to decipher. The complexity of CDs lies in their pathogenesis, in which a constellation of environmental and genetic factors interact in intricate ways to alter biological thresholds and response patterns, modifying disease susceptibility. Since both genes and environmental exposures contribute to CDs, the biological pathways involved in CD pathogenesis depend on the genetic background of a given population and the specific environment to which that population is exposed. Hence, asthma, obesity and hypertension in Arizona may not be the same as asthma, obesity and hypertension in Iceland.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Colloquium Required
**Equivalent to:** GENE 595H, IMB 595H, MCB 595H
**Also offered as:** CMM 595H, GENE 595H, MCB 595H, PCOL 595H
**Course typically offered:**
Main Campus: Spring

**Home department:** Cellular & Molecular Medicine

**IMB 599: Independent Study** (1 - 6 units)
**Description:** Qualified students working on an individual basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Spring

**IMB 605: Medical Immunology and Infectious Disease** (4 units)
**Description:** This course will combine lectures from the UA medical curriculum with regular meetings with basic-science faculty to introduce students to the concepts of Medical Immunology and Infectious Disease. Students will gain knowledge of not only basic-science aspects of these highly interrelated topics, but also medical aspects of these topics that will be valuable in guiding translational research in this general area. This course provides a flexible learning format with less formal in-class instruction than traditional courses. Students will view course content in podcast format on their own (or with other students), and meet once per week as a class with faculty for group discussion and review of the content. See the end of this proposal for a complete list of lecture topics.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Lecture Required
**Also offered as:** CMM 605
**Course typically offered:**
Main Campus: Fall

**Home department:** Cellular & Molecular Medicine

**IMB 693: Internship** (1 - 6 units)
**Description:** Specialized work on an individual basis, consisting of training and practice in actual service in a technical, business, or governmental establishment.
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Course typically offered:**
Main Campus: Fall, Spring

**IMB 695C: Readings in Cancer Immunology** (1 - 2 units)
**Description:** This course will focus on the analysis and discussion of current basic and clinical immunological studies of cancer in the literature and on the search for ways to control the disease. Immunological surveillance plays an important role in cancer. Dysregulation of the immune system contributes to the poorer outcome in the disease.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Colloquium Required
**Equivalent to:** CBIO 695C, MBIM 695C, PCOL 695C
**Also offered as:** CBIO 695C, PCOL 695C
**Course typically offered:**
Main Campus: Spring

**Recommendations and additional information:** MIC 419.

**IMB 695L: Advanced Topics: Modulation of the Biology of Aging by Inflammation, Infection and Immunity** (1 unit)
**Description:** An interactive graduate-level course focused on how inflammation and immune function/dysfunction contributes to key biological and medical aspects of aging. This course will evaluate the basic biology of aging with a focus on how the aging immune system impacts geriatric principles of care, common geriatric syndromes and aging-associated disease, the biologic basis of health disparities (where known), and other unique issues related to aging research. The course is open to both graduate students and medical students/residents. Graduate students funded through the Training Grant will be required to attend in their 3rd and 4th year in place of Journal Club. The course is comprised of three aspects: literature review, topic discussion, and attendance in the Advances in Aging Lecture Series (Grand Rounds). Students will be assigned relevant literature to review in advance of in-class discussion on topics in aging research. Each discussion will be led by an expert in the field. The Advances in Aging Lecture Series are 1-hour Grand Rounds that meet once per month and will add clinical perspective to the field of aging research. More information on Advances in Aging Lecture Series topics and archived lectures is available at http://aging.arizona.edu/program/advances-aging-lecture-series. Topics that will be covered in the course include: Introduction to Aging Research, Aging Theories, and Model Organisms; Replicative Senescence as a Driver of Age-Associated Inflammation; DNA Damage, Repair, and Oncogenesis; Mitochondrial Aging and Metabolism; Musculoskeletal Changes in Aging and Frailty; Infection and Immunosenescence; Aging with HIV in the age of ART; Microbiota in Aging; Neural Changes, Neurodegeneration, and Alzheimer's Disease; Cardiovascular Aging and Stroke; Stem Cell Aging and Longevity Extension/Rejuvenation Research.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Colloquium Required
**Repeatable:** Course can be repeated a maximum of 2 times.
**Also offered as:** BIOC 695L, CHEM 695L, CMM 695L, CPH 695L, NURS 695L, PHCL 695L, PSIO 695L

**IMB 696A: Research Seminar** (1 unit)
**Description:** The development and exchange of scholarly information, usually in a small group setting. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers. Only advanced Immunobiology graduate students within one year of graduation should enroll in this course with the course director's approval. Regular grades will be awarded for this course: A B C D E.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Seminar Required
**Course typically offered:**
Main Campus: Fall, Spring

**Recommendations and additional information:** Only advanced Immunobiology graduate students within one year of graduation should enroll in this course with the consent of the course director.

**IMB 696B: Student Research Seminar** (1 unit)
**Description:** The development and exchange of scholarly information, usually in a small group setting. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Seminar Required
**Repeatable:** Course can be repeated a maximum of 20 times.
**Course typically offered:**
Main Campus: Fall, Spring

**Field trip:** n/a

**IMB 696E: Current Research in Vision and Neurodegeneration** (1 unit)
**Description:** The goal of this elective is to allow students working with an Ophthalmology faculty to gain experience presenting research to an academic audience.
**Grading basis:** Regular Grades
**Career:** Graduate
**Course Components:** Seminar Required
**Repeatable:** Course can be repeated for a maximum of 6 units.
**Equivalent to:** PHCL 696E, PSIO 696E
**Also offered as:** OPH 696E, PHCL 696E, PSIO 696E
**Course typically offered:**
Main Campus: Fall, Spring

**Home department:** Ophthalmology & Vision Science

**IMB 699: Independent Study** (1 - 5 units)
**Description:** Qualified students working on an individual basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Spring

**IMB 800: Research** (1 - 16 units)
**Grading basis:** Clerkship S,HP,P,F
**Career:** Medical School
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Spring

**Recommendations and additional information:** Consent of instructor and coordinator.

**IMB 801A: Medical Microbiology** (3 units)
**Description:** The biological characteristics of microorganisms of importance in human health and disease; the reaction of the host to infectious agents and the mechanisms of host defense; diagnosis and management of infectious disease. Lectures, discussions, demonstrations and laboratory experiments. This is a two-semester course with both semesters required to be taken consecutively (801A-801B) in order to receive a final grade.
**Grading basis:** Clerkship S,HP,P,F
**Career:** Medical School
**Course Components:** Lecture Required
**Recommendations and additional information:** BIOC 462A, BIOC 462B or equivalent.

**IMB 891A: Microbiology and Immunology** (1 - 16 units)
**Description:** Specialized work on an individual basis, consisting of instruction and practice in actual service in a department, program, or discipline. Teaching formats may include seminars, in-depth studies, laboratory work and patient study.
**Grading basis:** Clerkship S,HP,P,F
**Career:** Medical School
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated for a maximum of 16 units.
**Recommendations and additional information:** 3rd and 4th-year medical students only.

**IMB 899: Independent Study** (1 - 16 units)
**Description:** The goal of this elective is to allow the student to work with a particular faculty member in pursuit of a particular field of study in microbiology and immunology.
**Grading basis:** Clerkship S,HP,P,F
**Career:** Medical School
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Spring

**Recommendations and additional information:** 3rd and 4th-year medical students only.

**IMB 900: Research** (1 - 9 units)
**Description:** Individual research, not related to thesis or dissertation preparation, by graduate students.
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Summer

**IMB 909: Master's Report** (1 - 6 units)
**Description:** Individual study or special project or formal report thereof submitted in lieu of thesis for certain master's degrees.
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Summer

**IMB 910: Thesis** (1 - 6 units)
**Description:** Research for the master's thesis (whether library research, laboratory or field observation or research, artistic creation, or thesis writing). Maximum total credit permitted varies with the major department.
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Summer

**IMB 920: Dissertation** (1 - 9 units)
**Description:** Research for the doctoral dissertation (whether library research, laboratory or field observation or research, artistic creation, or dissertation writing).
**Grading basis:** Alternative Grading: S, P, F
**Career:** Graduate
**Course Components:** Independent Study Required
**Repeatable:** Course can be repeated a maximum of 99 times.
**Course typically offered:**
Main Campus: Fall, Summer