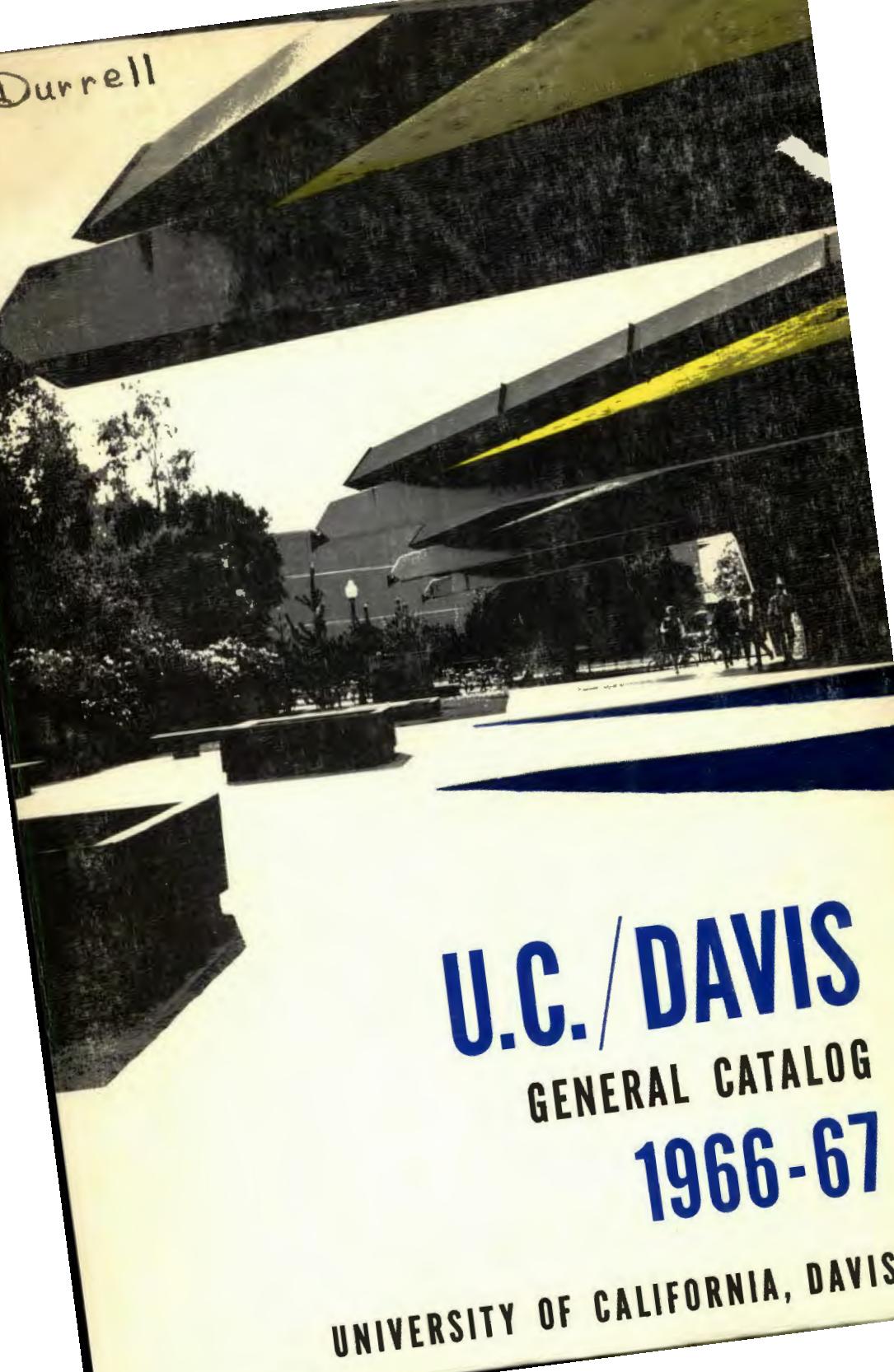


Durrell



U.C./DAVIS
GENERAL CATALOG
1966-67

UNIVERSITY OF CALIFORNIA, DAVIS



U.C./DAVIS

PUBLISHED AT DAVIS, CALIFORNIA

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Dr. Duvrell

GENERAL CATALOG

Davis

**Fall, Winter, and Spring Quarters
1966-1967**



May 9, 1966

UNIVERSITY OF CALIFORNIA · DAVIS

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UNIVERSITY CALENDAR

1966-1967

Davis Campus

Fall Quarter 1966

March 1, Tuesday

*May 16, Monday
May 20, Friday
May 16, Monday
July 29, Friday
July 1, Friday

July 15, Friday

August 29, Monday

September 5, Monday

September 26, Monday
September 26, Monday
October 1, Saturday
September 28, Wednesday

September 29, Thursday
September 30, Friday
October 3, Monday
October 7, Friday

October 14, Friday

October 21, Friday

November 1, Tuesday

November 5, Saturday
November 15, Tuesday

Applications for admission to undergraduate standing, including applications for intercampus transfer, for the fall quarter 1966 must be filed with complete credentials with the Office of Admissions on or before this date.

} Early sectioning.

} Registration by mail (continuing students only).

Candidates who expect to complete work for the degrees of Doctor of Philosophy and Doctor of Engineering to be conferred in December 1966 must file applications for candidacy with the Dean of the Graduate Division on or before this date. Credentials and applications for admission to graduate standing for fall quarter 1966 must be filed with the Dean of the Graduate Division on or before this date.

Applications for readmission to graduate status for fall quarter 1966 must be filed with the Registrar on or before this date. Applications for readmission to undergraduate status for fall quarter 1966 must be filed with the Registrar on or before this date.

Fall quarter begins.

} Orientation and testing.

Theses for the degrees of Doctor of Philosophy and Doctor of Engineering to be conferred in December 1966 must be filed in final form with the committees in charge on or before this date.

} Registration in person.

Instruction begins.

Candidates who expect to complete work for masters' degrees to be conferred in December 1966 must file applications for candidacy on or before this date.

Petitions to enroll or add courses to study lists must be filed on or before this date (also last day to register).

Petitions to drop courses without scholarship penalty must be filed with the Registrar on or before this date.

Candidates who expect to complete work for the degrees of Doctor of Philosophy and Doctor of Engineering to be conferred in March 1967 must file applications for candidacy with the Dean of the Graduate Division on or before this date.

Candidates who expect to complete work for A.B. and B.S. degrees to be conferred in December 1966 must file announcement of candidacy with the Registrar on or before this date.

Applications for admission to undergraduate standing, including applications for intercampus transfer, for the winter quarter 1967 must be filed with complete credentials with the Office of Admissions on or before this date.

Homecoming Day.

Credentials and applications for admission to graduate standing for winter quarter 1967 must be filed with the Dean of the Graduate Division on or before this date.

* Weekends and holidays excepted.

6 / Calendar

November 16, Wednesday	Theses for masters' degrees to be conferred in December 1966 must be filed in final form with the committees in charge on or before this date.
November 24, Thursday	{ Thanksgiving holiday—academic and administrative holiday.
November 25, Friday	Theses for the degrees of Doctor of Philosophy and Doctor of Engineering to be conferred in December 1966 must be filed with the Dean of the Graduate Division on or before this date.
November 28, Monday	Applications for readmission to graduate status for winter quarter 1967 must be filed with the Registrar on or before this date. Instruction ends.
December 5, Monday	Applications for readmission to undergraduate status for winter quarter 1967 must be filed with the Registrar on or before this date.
December 10, Saturday	{ Final examinations.
December 12, Monday	Theses for masters' degrees to be conferred in December 1966 must be filed with the Dean of the Graduate Division on or before this date.
December 17, Saturday	Fall quarter ends.
December 18, Sunday	{ Christmas holiday—academic and administrative holiday.
December 19, Monday	{ New Year's holiday—academic and administrative holiday.
December 23, Friday	
December 26, Monday	
December 30, Friday	
January 2, Monday	
Winter Quarter 1967	
January 3, Tuesday	Winter quarter begins.
January 4, Wednesday	Theses for the degrees of Doctor of Philosophy and Doctor of Engineering to be conferred in March 1967 must be filed in final form with the committees in charge on or before this date.
January 5, Thursday	Registration in person.
January 13, Friday	{ Orientation and testing.
January 20, Friday	Instruction begins.
January 27, Friday	Candidates who expect to complete work for masters' degrees to be conferred in March 1967 must file applications for candidacy on or before this date.
February 1, Wednesday	Candidates who expect to complete work for A.B. and B.S. degrees to be conferred in March 1967 must file announcement of candidacy with the Registrar on or before this date.
February 13, Monday	Petitions to enroll or add courses to study lists must be filed on or before this date (also last day to register).
February 15, Wednesday	Petitions to drop courses without scholarship penalty must be filed with the Registrar on or before this date.
	Candidates who expect to complete work for the degrees of Doctor of Philosophy and Doctor of Engineering to be conferred in June 1967 must file applications for candidacy with the Dean of the Graduate Division on or before this date.
	Applications for admission to undergraduate standings including applications for intercampus transfer, for the spring quarter 1967 must be filed with complete credentials with the Office of Admissions on or before this date.
	Applications for fellowships and graduate scholarships for 1967-68 must be filed on or before this date.
	Applications for 1967-68 undergraduate scholarships for current students must be filed on or before this date.
	Lincoln's birthday holiday—academic and administrative holiday.
	Applications for 1967-68 undergraduate scholarships for new students must be filed on or before this date.
	Credentials and applications for admission to graduate standing for spring quarter 1967 must be filed with the Dean of the Graduate Division on or before this date.

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...the campus will preserve the tone of its nonurban traditions; the spirit of service, and of involvement and integration of all its units with every other unit. Its students and its faculties will strive to maintain its traditional atmosphere of closeness and friendliness.

—UCD Long-Range Development Plan

Davis Campus

The University of California, Davis, is a publicly supported institution of higher learning, dedicated to the tasks of increasing and disseminating human knowledge through the primary functions of teaching and research. As an institution, the University is committed to the achievement of academic excellence. To fulfill this commitment it is essential that all members of the University community qualify for their roles by superior preparation, intellectual curiosity, freedom from prejudice, and a desire to contribute significantly to the cultural advancement of humanity.

Along with the pursuit of academic excellence, a spirit of service and an atmosphere of closeness and friendliness are traditional attitudes at Davis. They grew naturally from the first days of regular instruction in 1909, when the student body consisted of twenty-eight young men who wanted to become efficient farmers.

Originally known as the University Farm, the campus was acquired to serve the rural population of California, offering three years of instruction in the principles and practice of managing soils, crops, and animals. The need for such training had been anticipated by the late Judge Peter J. Shields, who helped write the legislative Act of 1905 establishing the Farm, and who is known as the "Father of the Davis Campus."

The need for greater educational opportunities increased rapidly, and in 1922, in conjunction with the Berkeley College of Agriculture, the degree of Bachelor of Science in Agriculture became available to the Davis student. A few years later the Davis campus had its own College of Agriculture. In 1946, the School of Veterinary Medicine was established to satisfy the need for professional veterinary medical education in California. Meanwhile, from a few basic, practical courses emphasizing agriculture, a full-fledged University campus was beginning to emerge.

The period of most rapid change and expansion began in 1951 when the College of Letters and Science was founded, and more and more degree programs became available. Although Davis had long offered courses in the humanities and social sciences, these disciplines now joined with the natural sciences to offer fully developed University curricula. By 1961, graduate programs were so extensive and so numerous that a Graduate Division was established as a separate academic unit. The College of Engineering was formed in the following year, and it, too, owed much to the foundation already provided by the curriculum in agricultural engineering which had been offered on the campus for many years. The more recently founded School of Law holds its first classes in the fall of 1966, and a School of Medicine, now being organized, is expected to begin instruction by at least 1968.

Adding to the strength of the campus and to its role in serving the people of California are the National Center for Primate Biology, the Institute of Governmental Affairs, the Agricultural History Center, the International Agricultural Center, the Crocker Nuclear Laboratory, and the Laboratory for Research in Fine Arts and Museology.

Although the face of the campus is constantly changing to accommodate the increasing student population, long-range building plans envision the preservation of features that give Davis its particular character. The Quadrangle, traditional focus of campus activity, will continue to be the center of academic life, with the Library to the south and the Memorial Union complex extending the length of its north side. The cork oaks surrounding the Quad are an enduring part of the landscape, as is the plane tree court behind the Library, where Commencement exercises were once held. Today the court is enclosed by the expanding Library building, providing a spacious open-air retreat, easily accessible from the general reading rooms of the Library.

An important addition to campus buildings is Freeborn Hall, an assembly hall that is part of the Memorial Union complex; it seats 1,800 for concerts, lectures, and special events.

The Wyatt Pavilion Theatre, a feature unique to the Davis campus, is another example of the transformations that are taking place. The framework of the theatre is a 55-year-old livestock judging pavilion. After the pavilion was moved from the site of the new chemistry building to the "bankside" of Putah Creek, architects fashioned an intimate theatre modeled on earlier and larger Elizabethan structures. It was opened during the year of the Shakespeare Quadricentennial, in December 1964, and the first play produced was, appropriately, Shakespeare's *Richard II*. Since that time plays ranging from Aristophanes' *Lysistrata* to John Whiting's *A Penny for a Song* have been staged here.

Concerts, lectures, and film classics have long been provided for the University community. With the development of the College of Letters and Science, however, the cultural program has expanded. A number of distinguished artists—musicians, novelists, and poets—have been guests of the University, remaining in residence for a semester or more as performers, lecturers, and consultants. The Department of Art maintains exhibits of student work and traveling art shows in the Memorial Union and the Library, as well as open-air displays of sculpture and frescos.

THE HONOR SPIRIT

A long-time tradition on the Davis campus, the Honor Spirit is most evident at examination time, when there are no proctors in the classrooms and students are relied on to do their own work.

But the Honor Spirit is not limited to student behavior during examinations. According to its code, the responsibility for good conduct rests with the individual student, and this attitude pervades all student activities. It is largely responsible for the atmosphere of mutual respect and confidence that exists between students and faculty, as well as among the students themselves.

UNIVERSITY LIBRARY

The Library on the Davis campus contains 460,000 volumes and annually receives 9,000 current periodicals and serials. Its holdings in the natural sciences and agriculture are outstanding, and collections in the humanities, social sciences, fine arts, engineering, law, and medicine are being rapidly developed. In addition to the main library, four branch libraries, a law library, and several specialized departmental collections are also maintained.

To accommodate the rapidly growing collection and satisfy the need for additional reading space, a wing was added to the General Library in 1964, which is operated on the "open stack" principle, permitting direct access to volumes shelved there. A second wing, expected to be ready for occupancy in 1967, will double the space available for books and readers. Plans for development anticipate 900,000 volumes by 1970.

Within the General Library are a Bibliographic Center and a number of other special collections, including over 200,000 items on various forms of microcopy, some 7,500 maps, more than 100,000 pamphlets, a number of speech and music phonograph records, about 200,000 items in the F. Hal Higgins Library of Agricultural Technology, and a rare book library of 5,500 volumes. The Reference Department provides orientation and assistance in using these collections.

The Library is a depository for United States government publications, for all publications of the State of California, and for the Atomic Energy Commission, which recently made available over 87,000 publications of great value to scientific research. The Documents Department provides service for readers requiring use of government publications.

Special facilities include a browsing collection for recreational reading, audio-visual equipment, listening rooms, a group study room, a typing room, an outdoor reading area, and a copying service that provides facsimiles of printed materials at a nominal cost.

The Library provides its users with a series of information leaflets explaining in more detail the various aspects of its services.

EDUCATION ABROAD

The Education Abroad Program provides outstanding students the opportunity to participate in the life of a university overseas. Its study centers, administered by faculty members drawn from all campuses of the University, are located in Colombia, France, Germany, Greece, Hong Kong, Italy, Japan, Spain, Sweden, and the United Kingdom.

Students from all campuses are eligible to participate in the program, which is administered by the Santa Barbara campus for the entire University. Requirements for qualification are: junior standing in the University, a B average (overall and in the language), seriousness of purpose, and an indication of ability to adapt to a new culture. A Faculty Selection Committee on each campus recommends students who meet these standards.

Participants spend nine to eleven months abroad, beginning the year with a special language orientation program of six or seven weeks. The time allowed

provides for a full academic year in the university of their choice and some vacation travel. Students enrolled in the program receive full academic credit for courses satisfactorily completed. The estimated total cost, including a modest allowance for spending money and vacation travel, ranges from \$1,800 to \$2,400.

A partial list of the courses offered at the study centers begins on page 176 of this catalog. Further information can be obtained from the academic adviser for Undergraduate Study Abroad or the International Student Adviser. Names of the advisers for the current year are given in the *Schedule and Directory*.

SUMMER SESSIONS

Announcements concerning summer sessions in 1966-67 will be issued by the Registrar and the Office of Summer Sessions.

UNIVERSITY EXTENSION

By a variety of methods the University of California Extension makes the resources of the University available to individuals and organizations throughout the state. Its aims are the intellectual and cultural development of adults; the dissemination of new knowledge resulting from teaching and research within the University; continuing professional, scientific, and technical training; development of special educational programs for public and private organizations; and education in public affairs.

Detailed information is available at the Extension office on any campus of the University or at the following additional locations: 1100 South Grand Avenue, Los Angeles 90015, Tel: (213) 747-4321; 1221 Fourth Avenue, San Diego 92101, Tel: (714) 232-7321; 55 Laguna Street, San Francisco 94102, Tel: (415) 861-6833; 3620B West 182nd Street, Torrance 90504, Tel: (213) 323-4773.

FOREIGN LANGUAGE TRAINING

Research and field work overseas may be facilitated by oral proficiency training in any of twenty-eight languages taught at the Defense Language Institute at the Presidio of Monterey. This unique program is available on a limited basis to University graduate students and faculty. For additional information, the campus Language Training Adviser may be consulted. Application forms may be obtained from the Secretary, University of California Language Training Advisory Committee, University of California, Santa Cruz, California 95060.

THE STATEWIDE UNIVERSITY

The University of California had its beginnings in 1868, with the Governor's signing of the Organic Act passed by the State Legislature. The following year the University opened its doors on the Oakland campus of the College of California. Five years later the University moved to Berkeley, when the first buildings were completed.

Today the University has nine campuses to serve the State of California.

Davis continues to be the center for agricultural teaching and research. The other campuses are Berkeley, Irvine, Los Angeles, Riverside, San Diego, San Francisco, Santa Barbara, and Santa Cruz. Each campus has its own distinct atmosphere and special features, but all share the same high standards and adhere to the same admission regulations.

Each campus is headed by a chancellor, and the principal University-wide officer is the president. The government of the University is entrusted to a corporation called The Regents of the University of California. There are twenty-four Regents: sixteen are appointed by the Governor; the others, including the President of the University, serve *ex officio*. An Academic Senate governs the academic activities of the University; it is composed of the president, chancellors, vice-chancellors, vice-presidents, deans, directors, registrars, librarians, and all professors and instructors giving instruction in any curriculum under the control of the Senate.

The Davis Division of the Academic Senate, the academic administrative body for the Davis campus, determines the conditions for certificates and degrees (subject to the approval of the Regents) and authorizes and supervises all courses of instruction in the academic and professional colleges and schools.



Admission and Registration

The admission requirements of the University of California are uniform on all its campuses and are based on two assumptions: first, that the best assurance of success in the University is shown by high quality of scholarship in previous work; and second, that the study of certain specified subjects will give the student good preparation for University work.

Admission to the University qualifies the student to attend the campus of his choice within the limits of curricula offerings and student capacity.

ADMISSION TO FRESHMAN STANDING

An applicant for admission to freshman standing must meet the requirements listed below. Special requirements for nonresident applicants will be found on page 19.

Graduation from High School

SUBJECT REQUIREMENTS

Courses offered in satisfaction of the following requirements must appear on a list certified by the high school principal as meeting the subject requirements and approved by the Director of Admissions of the University of California.

a. History, 1 unit

This consists of 1 unit of United States history, or $\frac{1}{2}$ unit of United States history and $\frac{1}{2}$ unit of civics or American government.

b. English, 3 units

These consist of six semesters of English composition, literature, and oral expression.

c. Mathematics, 2 units

These consist of 2 units of subjects such as elementary algebra, geometry, trigonometry, calculus, elementary functions, matrix algebra, probability, statistics, or courses combining these topics. Arithmetic and such nonacademic subjects as shop mathematics and business mathematics are excluded.

d. Laboratory Science, 1 unit

This consists of an eleventh- or twelfth-grade year course in one laboratory science. Both semesters must be in the same subject field.

e. Foreign Language, 2 units

These must be in one language. Any foreign language with a written literature is acceptable.

f. Advanced course, 1 (or 2) unit

This is to be chosen from the following:

Mathematics, a total of 1 unit of second-year algebra, solid geometry, trigonometry, or other certified advanced courses.

Foreign Language, either 1 additional unit in the same foreign language offered under *e* above or 2 units of another foreign language.

Science, 1 unit of either chemistry or physics in addition to the science offered under *d*.

Electives

Additional elective units to complete the minimum of 15 standard high school entrance units are also required.

SCHOLARSHIP REQUIREMENTS

At least a B average is required in courses taken after the ninth year used to meet the subject requirements. Grades received in elective courses or in courses taken in the ninth year or earlier are not used in computing this average. Subject requirements are satisfied by courses in which a grade of C or higher has been earned. Grades are considered on a semester basis except from schools that give only year grades. Grades, including those earned in accelerated and advanced courses, are accepted as they appear on the transcript.

In determining the B average, a grade of A in one course will be used to balance a C in another, but an A may not be used to compensate for D, I, or F grades. Courses taken in the ninth year or earlier in which a grade of D or lower is received may be repeated to establish subject credit.

Courses taken after the ninth year in which a grade of C or lower is received may be repeated to establish subject credit or to improve scholarship. Grades earned in the first repetition may be used to satisfy scholarship. Grades of C or higher in additional repetitions will satisfy the subject requirement, but will not be counted higher than a C in scholarship computation.

Not more than 2 high school units of the *a* to *f* pattern may be repeated.

Admission by Examination

A high school graduate who has not satisfied the entrance requirements as a result of his high school record and who has not attempted college work subsequent to high school (except during summer session immediately following high school graduation) may qualify for admission if he achieves the prescribed minimum scores in the following tests taken after the first half of the eleventh grade:

The Scholastic Aptitude Test and

Three College Entrance Examination Board Achievement Tests:

1. English
2. One in either Social Science or Foreign Language
3. One in either Natural Science or Mathematics

Arrangements to take the tests should be made with the Educational Testing Service, P. O. Box 1025, Berkeley, California 94701, or P. O. Box 592, Princeton, New Jersey 08540. The fees are to be paid to the Educational Testing Service. Scores will be regarded as official only if they are received by the Office of

Admissions directly from the Educational Testing Service. Applicants should arrange to take the tests as early as possible so that the scores can be reported in time to be considered for admission.

The tests may be taken at different times. To improve a score, a test may be repeated *once*, and the score earned on the repetition will be accepted; however, the scores earned on the Scholastic Aptitude Test, which has two parts, must come from the same sitting. The total score on the Scholastic Aptitude Test must be at least 1,000; the scores on the three Achievement Tests must total 1,650, and the score on any one Achievement Test must not be less than 500.

Requirements for Out-of-State Applicants

GRADUATION FROM HIGH SCHOOL

The acceptability of records from high schools outside California will be determined by the Office of Admissions.

SUBJECT REQUIREMENTS

The same subject pattern as for a California resident is required (see page 17).

SCHOLARSHIP REQUIREMENTS

The scholarship requirements for a nonresident applicant are the same as those for a resident except that the scholarship average must be 3.4 or higher in the required high school subjects taken in tenth, eleventh, and twelfth years.

ADMISSION BY EXAMINATION

A nonresident applicant who is ineligible for admission to freshman standing and who has not attempted college work subsequent to high school (except during the summer session immediately following high school graduation) may qualify for admission by examination.

The requirements for a nonresident applicant are the same as those for a resident except that the total score on the Scholastic Aptitude Test must be at least 1,100 and the scores on the three Achievement Tests must total at least 1,725.

High School Preparatory Subjects

In addition to the high school subjects required for admission to the University, certain preparatory subjects are recommended for many University curricula to give the student an adequate background for his chosen field of study. Lack of a recommended high school course may delay graduation from the University. Details of these recommendations will be found in the bulletin *Prerequisites and Recommended Subjects*, which is ordinarily in the hands of high school and junior college counselors and which may be obtained from the campus Office of Admissions.

A student needing additional preparation is advised to attend one of the many

excellent California junior colleges. There he can take courses applicable toward the requirements of the college or school of the University in which he wishes to enroll.

ADMISSION TO ADVANCED UNDERGRADUATE STANDING

Applicants who have registered since high school graduation at any collegiate institution, including junior colleges, summer school, or extension courses, must apply for admission in advanced standing. An applicant may *not* disregard his previous college record and apply as a freshman.

Regulations applying to admission in advanced standing are as follows:

1. Those eligible for admission from high school, but who attended another collegiate institution, must present from that institution a statement of good standing and a grade-point average of 2.0 (2.8 for nonresidents).

2. Those *ineligible* for admission from high school because of subject deficiencies may establish eligibility by completing, at an accredited college, the required courses with at least C grades, and by maintaining an average of 2.0 (2.8 for nonresidents).

3. Those *ineligible* for admission from high school because of grade-point deficiency may establish eligibility by taking, at an accredited college, a minimum of 56 acceptable semester units (or 84 quarter credits), with an average of 2.4 or better (2.8 for nonresidents).

4. Subject deficiencies of not more than 2 units may be waived for those who present the 56 or more semester units (or 84 quarter credits) and the 2.4 grade-point average mentioned above (2.8 for nonresidents). Deficiencies in excess of 2 units must be satisfied.

The University grants credit for courses consistent with its curriculum that have been completed in accredited colleges and universities. The University accepts, at full unit value, approved transfer courses completed with satisfactory grades in the public junior colleges of the state. Frequently, students who intend to complete their advanced studies at the University will find it to their advantage to complete the first two years of their college work in a California public junior college. After a student has earned 105 quarter units (70 semester units) acceptable toward a degree, no further units will be granted for courses completed at a junior college, although subject credit may still be earned. (The College of Letters and Science accepts a maximum of 99 quarter units, or 66 semester units.)

The acceptability of extension courses taken at an institution other than the University is decided by the Office of Admissions. The faculty of the particular school or college in which the student plans to enroll, however, decides upon the applicability of such course work in satisfaction of degree requirements.

ADMISSION OF APPLICANTS FROM OTHER COUNTRIES

Applicants from other countries will be admitted in accordance with the general regulations governing admissions. An application, official certificates, and detailed transcripts of record should be submitted to the Office of Admis-

sions early in the appropriate filing period (see page 22). Doing so will allow time for exchange of necessary correspondence and, if the applicant is admitted, will help him in obtaining the necessary passport visa.

An applicant from another country whose native language is not English may be admitted only after demonstrating that his command of English will permit him to profit by instruction in the University. An applicant's knowledge of English is tested by an examination given by the University. Admission of an applicant who fails to pass this examination will be deferred until he has acquired the necessary proficiency in the use of English.

Foreign students whose schooling has not been in English are urged to take the Test of English as a Foreign Language (TOEFL). Arrangements to take the test may be made in writing directly to TOEFL, Educational Testing Service, P. O. Box 592, Princeton, New Jersey 08540, U.S.A. Results of the test should be forwarded to the Office of Admissions, University of California, Davis 95616.

A student who is outside the United States and applies for admission to the lower division of the College of Engineering must pass with satisfactory scores the College Entrance Examination Board Scholastic Aptitude Test (verbal and mathematics section) and achievement examinations in English composition, physics, and advanced mathematics. If he does not present satisfactory scores in these tests, he will not be able immediately to undertake courses in the College of Engineering even though he is admitted to the University. Arrangements to take tests in another country should be made directly with the Educational Testing Service, P. O. Box 592, Princeton, New Jersey 08540. The fee for these examinations should be sent to the Educational Testing Service, not to the University. The applicant should request that his scores in the tests be forwarded to the Office of Admissions, University of California, Davis 95616.

REQUIREMENTS FOR ADMISSION TO GRADUATE STANDING

See page 112 or the *Announcement of the Graduate Division*.

SPECIAL ADMISSION CATEGORIES

In the case of a student who is technically ineligible for admission to the University, the Admissions Officer has authority and responsibility to consider other evidence of ability to pursue University work.

Conditions for admission to *special* or *limited status* are assigned by the Admissions Officer and are subject to the approval of the dean of the college or school in which the applicant plans to study. Admission is for a specified time only, and a prescribed scholarship average must be maintained. No degree can be granted to students in special or limited status. Applicants must submit transcripts of record from all schools attended beyond the eighth grade. They may also be required to take the examination in Subject A.

Special Status

Students admitted to special status are those twenty-one years of age or older who have not completed the University admission requirements but whose

special attainments may qualify them for certain courses in the University toward a definite and limited objective.

No applicant will be admitted directly from high school, and only cases of unusual merit will be considered. A personal interview is usually required before final action can be taken.

A special status student will be admitted to courses for which, in the judgment of the instructor, he has satisfactory preparation. Students in this category will seldom be able to undertake the work of engineering and professional colleges or schools.

An applicant will not be admitted to special status for the purpose of making up requirements for admission to the University as a regular student.

Limited Status

Students in limited status are those with a bachelor's degree who are not candidates for an advanced degree, or those without a bachelor's degree who have completed a substantial amount of college work with a satisfactory scholarship average and whose special attainments may qualify them for certain courses in the University toward a definite and limited objective.

An applicant will not be admitted to limited status for the purpose of raising a low scholarship average.

Applicants for a Second Bachelor's Degree

The second bachelor's degree is limited to students who have completely changed their objective. Those admitted to this status must indicate very strong probability of academic success.

Admission is subject to the approval of the Admissions Officer and of the dean of the school or college in which the applicant plans to enroll.

APPLICATION PROCEDURES

Applicants are expected to study the admission requirements (starting on page 17) to determine as closely as possible their eligibility before following the steps outlined below. Application should be directed to only one campus of the University.

Freshman Standing

1. Application Form

An application for admission is obtained by writing the Office of Admissions, University of California, Davis, California 95616. Applicants are urged to write early in the appropriate period as follows:

1967 Winter Quarter: May 1, 1966 through November 1, 1966

1967 Spring Quarter: August 1, 1966 through February 1, 1967

1967 Fall Quarter: October 1, 1966 through March 1, 1967

2. Application Fee

The completed application form accompanied by a \$10 nonrefundable application fee should be returned to the Office of Admissions as promptly as possible. (The application fee should be in the form of a check or money order made out to The Regents of the University of California.) An application received without the \$10 fee will be returned to the applicant.

3. Transcript of Record

The applicant is responsible for arranging to have transcripts sent and insuring their early arrival at the Office of Admissions, University of California, Davis.

Students still in high school should request the school to send directly to the Office of Admissions an official transcript of all work completed through the junior year and a list of courses in progress during the final two semesters. A complete and final transcript, including a statement of high school graduation must be submitted for each applicant by the high school from which he graduated. Any additional schools attended after an application for admission has been filed are considered to be a part of the applicant's record and are to be reported to the Office of Admissions. Transcripts and other documents submitted become the property of the University and are not returnable.

4. Notification of Eligibility

Applicants will be notified of eligibility in order of date of application providing appropriate transcripts are on file. A delay will occur if required documents or fees are not available. Applicants will be notified of their eligibility status as soon as their records have been evaluated.

5. "Statement of Intention to Register" Form

Admitted applicants will receive a "Statement of Intention to Register" form with their notification of eligibility. The form should be completed and returned immediately along with a \$25 nonrefundable fee. This fee will be credited to the incidental fee if the student registers for the quarter in which he is accepted.

6. Smallpox Vaccination Certificate

During the registration period every new student and every student returning to the University after an absence of one or more quarters must present at the time of examination by the University medical examiners, a certificate establishing the fact that he has been successfully vaccinated against smallpox within the last three years. A form for this purpose is routinely sent to all new students.

7. Change of Campus

If, after an applicant has filed for admission, his plans change and he prefers to register on a different campus, he must write to the Director of Admissions, University Hall, University of California, Berkeley, California 94720, indicating his reason for the change. His records will be transferred to the campus he wishes to attend provided facilities are available there. Such requests must be received before the end of the filing period.

8. Reapplication

An applicant who is not eligible for admission, or one who has been admitted but does not register in the quarter for which he applied and who later desires to attend the University, must submit a new application for admission with the \$10 fee. The new application will be acted upon in light of the current availability of facilities and current admission requirements.

9. Intercampus Transfer

An undergraduate student who is registered on any campus of the University, or who was previously registered in a regular session of the University and has not since been registered in another institution may apply for transfer to another campus of the University by filing the proper forms *on the campus where he last registered*. The intercampus transfer application forms and application for transcript of record forms may be obtained from the Office of the Registrar and must be filed with that office by November 1, 1966, for the 1967 winter term, by February 1, 1967, for the 1967 spring term, and by March 1, 1967, for the 1967 fall term.

Advanced Undergraduate Standing

Applicants for admission to advanced undergraduate standing should follow all steps outlined above for freshman standing and in addition arrange with each college or university attended since graduation from high school to send directly to the Office of Admissions, University of California, Davis 95616, an official transcript of work completed or in progress.

Graduate Standing

An application form and information are obtained by writing directly to the Office of the Graduate Division, Room 6, Freeborn Hall, University of California, Davis 95616.

Professional Schools

School of Law

The requirements for admission to the School of Law are described on page 101. More detailed information and the appropriate application form may be obtained by writing the School of Law, University of California, Davis 95616.

School of Veterinary Medicine

The requirements for admission to the School of Veterinary Medicine are described on page 105. More detailed information may be obtained by writing the School of Veterinary Medicine, University of California, Davis 95616. The application form may be obtained from the Office of Admissions, University of California, Davis 95616.

Special or Limited Standing

The qualifications for admission to special or limited standing are discussed on pages 21 and 22. For admission to either category, a request should be addressed to the Office of Admissions, University of California, Davis 95616.

GENERAL REGISTRATION PROCEDURE

All students must complete the necessary registration requirements. These requirements include:

1. Obtaining registration materials from the Registrar at the designated time and place. (Detailed information may be found in the *Schedule and Directory* available from the Student Bookstore on campus shortly before the opening of each quarter.)

Late registration privileges will be granted through Friday of the second week of instruction. A \$10 fee will be assessed to defray the extra clerical costs of late registration.

2. Preparing with the faculty adviser a study program of courses in accordance with the following regulations, and obtaining the adviser's signature on the Study List Card.

a. Entering students must enroll in the Subject A course if they have not satisfied this requirement (see page 31).

b. Students who wish to continue a foreign language studied only in high school, will take a placement test to determine the appropriate level of language ability for proper placement in class.

c. Students wishing to do so may take an examination in chemistry which will, if passed satisfactorily, permit them to take an accelerated course.

d. Maximum and minimum limits are placed on the number of units for which a student may enroll each term. These vary with each college or school. However, the University considers 12 quarter units a minimum full-time load. All students participating in student and intercollegiate activities must carry this minimum number of units.

3. Paying the prescribed fees (see page 35).

a. For all nonimmigrant foreign students, the Associated Students Supplementary Health Insurance program is required (see page 39).

4. Passing a physical examination given by the University Medical Examiners (see page 39).

5. Submitting a Statement of Residence. This is required of all new and returning students, including new graduates who may have been registered previously as Davis campus undergraduates, and those whose residency status has changed recently (see page 26).

6. Presenting completed registration forms and packets to the Registrar by the prescribed times (see the *Schedule and Directory*).

ADDING OR DROPPING COURSES

Adding or dropping courses after the registration materials have been submitted to the Registrar requires the approval of the adviser and the appropriate dean on a petition which is subsequently presented to the Registrar.

CHANGES OF MAJOR, COLLEGE, OR SCHOOL

With the approval of the appropriate dean or deans, a student in good standing can transfer from one area of study to another. Petition forms for this purpose may be obtained from the Registrar.

CHANGE OF NAME

Petition forms for this purpose may be obtained from the Registrar.

WITHDRAWALS

Withdrawals may be granted by the University for emergency reasons or *for good cause*. Information may be obtained at the Dean of Students Office. For Graduate Students only the approval of the Dean of the Graduate Division is required on the petition. Immediately upon ceasing class attendance, students receiving veteran benefits and those who have been deferred by Selective Service because of registration in the University must report in person or write to the Dean of Students. Unauthorized withdrawals may jeopardize the student's registration privileges and result in failing grades.

READMISSION AFTER AN ABSENCE

All former students who wish to re-enter the University of California, Davis, must file an application for readmission with the Registrar. Official transcripts of all work attempted in the interim must be submitted. Final dates for filing for readmission are listed on pages 5-7.

RULES GOVERNING RESIDENCE

The residence classification of each student is determined in accordance with Section 244 of the California Government Code, Sections 23054, 23055, and 23057 of the California Education Code and the Standing Orders of the Regents. It is therein provided that a resident student is any person who has been a legal resident of the State of California for more than one year immediately preceding the opening day of the semester during which he proposes to enroll.

The attention of the prospective student who is not a citizen is directed to the fact that he is a nonresident unless, in addition to the general California residence requirements for tuition purposes, he has been admitted to the United States for permanent residence in accordance with all applicable laws of the United States. The attention of the prospective student who has not attained the age of 22 and whose parents are not California residents, and the attention of the veteran who was not a resident of California at the time of his entrance into the Armed Forces, is directed to the fact that presence in California for

more than one year does not, of itself, entitle the student to classification as a resident.

Every student who is classified as a resident but who becomes a nonresident of California is obliged to notify the Registrar at once. Application for a change in classification with respect to a previous quarter will not be received under any circumstances.

A person incorrectly classified as a resident student is subject to reclassification as a nonresident. If the incorrect classification resulted from concealed facts or untruthful statements made by him, the student then shall be required to pay all tuition fees which would have been charged to him as a nonresident student. He shall be subject also to such discipline as the President of the University may approve.

The final determination of the eligibility of a student to register as a resident will be made by the Attorney in Residence Matters, 590 University Hall, University of California, Berkeley, California 94704.

Students classified as nonresidents are required to pay a tuition fee of \$267 each quarter. This fee is in addition to the incidental fee. (Exemption from payment of the nonresident tuition fee may be granted to an unmarried minor whose parent is in the active military service of the United States and is stationed in California on the opening day of the quarter during which the minor proposes to attend the University. It is the responsibility of the student to file official verification of this fact from the parent's commanding officer. This verification should be addressed to the Registrar and filed when the student declares residency.)



Scholastic Requirements

EVALUATIONS

Every instructor is required to assign a letter grade for each student registered in his course. The QUALITY of a student's work will be reported in one of the following grades:

Passing work: A, excellent; B, good; C, fair; D, barely passing.

Failing work: F, work so poor that it must be repeated to receive recognition.

Undetermined: I, work is satisfactory but incomplete for good cause.

Pass (P) or Fail (F): Honors students may petition their academic dean for the privilege of enrolling each quarter in one elective course for which they will be graded "pass" or "fail." Units gained in this way are not counted in calculating the grade-point average.

| Satisfactory (S) or Unsatisfactory (U): Graduate students, under certain circumstances, may be assigned grades of S or U, but in calculating the grade-point average, units gained in this way will not be counted.

Quality points (grade points) will be assigned each grade as follows:

$$A = 4; B = 3; C = 2; D = 1; I \text{ and } F = 0.$$

All grades except I are final when filed by an instructor in his end-of-term course report. No final grade except I may be revised by re-examination. A student may repeat only those courses in which he has received a grade of D or F.

Except as authorized by the appropriate dean, no student may repeat more than once a course in which he has received a grade of D or F. When a course is repeated, the units completed shall be credited toward a degree only once, but the student's grade-point average will be computed on the total number of units attempted. At each repetition the student will receive the grade assigned by the instructor and the corresponding grade points.

The QUANTITY of work attempted by the student is measured in quarter units (see page 117) which are assigned by the faculty for each individual course. To convert these units to semester units they should be multiplied by $\frac{2}{3}$; from semester to quarter units by $\frac{3}{2}$.

The student's course work is recorded in terms of units, grades, and quality grade points. The ratio of grade points over units attempted determines the grade-point average. The student is expected to maintain a C (2.0 grade-point average) or better on all work undertaken in the University. If he falls below a C average, he will be scholastically deficient.

SCHOLASTIC DEFICIENCIES

The following provisions apply to all undergraduate students in the College of Agriculture, Engineering, and Letters and Science.

Probation. A student shall be placed on probation if at the end of the term his grade-point average is less than C (2.0) computed on the total of all courses undertaken in the University, including courses graded I (incomplete).

To be removed from probationary status, a student must achieve an overall

grade-point average of at least C (2.0) on all work attempted in the University of California, including courses graded I (incomplete).

Dismissal. A student shall be subject to dismissal from the University if:

a. His grade-point average falls below 1.5 for any term, or

b. After one term on probation he has not achieved an overall grade-point average of at least C (2.0) on all work attempted in the University of California, including courses graded I (incomplete).

The School of Veterinary Medicine has the following provisions:

Probation. A student shall be placed on probation if at the close of his first term in the School of Veterinary Medicine his record for that term falls below a C average, computed on the total of all courses taken in the veterinary medical curriculum.

Dismissal. A student shall be subject to dismissal from the School of Veterinary Medicine:

a. If at the end of any term subsequent to his first he has failed to maintain a grade-point average of 2.0 (a C average), computed on the total of all courses taken in the veterinary medical curriculum, subsequent to his admission to the School, for which he has received a final report; or

b. If during any term he fails to pass with a grade of C or higher courses totaling at least 4 units; or

c. If at any time he has, in the judgment of the faculty of the School, failed to meet the professional and ethical standards of the profession of veterinary medicine.

A student who fails to meet the minimum scholastic requirements specified above is subject to such supervision as the faculty of his college or school may determine. The faculty may:

a. Dismiss such a student from the University, or

b. Suspend his dismissal, continuing him on probation, or

c. Authorize the return on probation of a dismissed student.

To transfer from one campus of the University to another, or from one college or school to another on the same campus, a student who has been dismissed or is on probation must obtain the approval of the dean whose jurisdiction he is seeking. After making the transfer, the student is subject to the supervision as provided in the above.

Graduate students with scholarship deficiencies are subject to action at the discretion of the Dean of the Graduate Division.

TRANSCRIPTS OF RECORD

Upon written request to the Office of the Registrar, a student will be provided with an official transcript of his work completed at the Davis campus of the University of California. Work completed at any other University campus or any other institution must be requested directly from the school concerned. University Extension transcripts must be requested from the University Extension Office, University of California, Berkeley, California.

A fee of \$1 per copy of each graduate and each undergraduate record should accompany each request. Graduate and undergraduate transcripts are individual records and must be requested separately.

Application for a transcript of record should be made at least one week in advance of the time needed.

MID-TERM WARNING NOTICES

Students wishing to know their class standing at the mid-quarter may inquire from their instructor. Those who have deficient grades (D or F) should confer with their adviser. The Dean of Students Office may also be of assistance.

FINAL EXAMINATIONS

The *Schedule and Directory* lists the final examination groups. This information is available at the beginning of the term so that students can avoid final examination conflicts.

Final examinations are mandatory in all undergraduate courses, except as follows:

a. They are not normally required in laboratory courses or their equivalent; however, a department, at its option, may require a final examination in any laboratory course if prior announcement has been made in the *Schedule and Directory*.

b. Final examinations may be omitted in any undergraduate course with the approval of the appropriate committee on courses and upon recommendation of the department concerned.

Wherever practicable, final examinations are written and must be completed within a previously announced time limit. Examinations in non-laboratory courses may not exceed two hours.

Under certain prescribed conditions a student may receive Credit by Examination without formal enrollment in a course. The rules governing such examinations may be obtained from the Registrar.

Final grade notices will be sent to the student if, before the end of the term, he has deposited with the Registrar a self-addressed, stamped envelope.

GRADUATION REQUIREMENTS

Three groups of requirements must be satisfied before the student can become eligible for candidacy for the bachelor's degree. They are: 1) college or school requirements, 2) individual departmental requirements, which are all specific and vary as to particulars; and 3) the University requirements, which are general and apply to all schools and colleges. For information on college, school, or departmental requirements see the appropriate section of this catalog.

The University requirements are as follows:

Subject A: English Composition

Every entering student must satisfy the Subject A requirement. This requirement is designed to assure a level of competence in written English essential to his satisfactory progress as a University student. The requirement can be met:

1. By achieving a minimum score of 600 in the College Entrance Examination Board Achievement Test, English Composition, after completing the eleventh grade in high school.
2. By passing a Subject A examination given under the jurisdiction of the University of California at various centers in the state annually in April or May or at the campus upon arrival.
3. By entering the University with credentials showing the completion elsewhere, with a grade not lower than C, of one or more acceptable college courses in English composition (totaling at least 3 semester units, or the equivalent, of transferable college credit).
4. By enrolling in and satisfactorily completing the Subject A course (see page 307).
5. By enrolling in the Subject A course and qualifying for a special examination through superior scholastic achievement during the early weeks of the course.

Foreign students whose native language is not English can meet the Subject A requirement by passing a special examination in English Composition, and if necessary, completing Rhetoric 26 with a minimum grade of C.

American History and Institutions

Every student must demonstrate a knowledge of American History and Institutions. Every graduating student should 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.

He may meet this requirement in any of the following ways:

1. By passing a special examination in American History and Institutions. Students electing to take this examination should do so before the senior year. No unit credit is given for completing this requirement by examination.
2. By completing any two of the following courses: History 17A, 17B, 170A, 170B, 170C, 171A, 171B, 171C, 173, 174A, 174B, 175A, 175B, 176A, 176B, 178A, 178B, 179A, 179B, 180, 183A, 183B; Political Science 1A, 1B, 100, 102, 103, 104, 105, 106, 113, 128A, 163, 164, 166. Students taking these courses are subject to the regular rules that apply for prerequisites and majors. Upper division history courses may be taken to satisfy the requirement only with the permission of the instructor.

3. By presenting evidence that the requirement has been satisfied at another collegiate institution whose credits are acceptable for transfer to the Davis campus of the University of California. Transfer students should consult with their faculty adviser or the Supervisor of the American History and Institutions Requirement to make sure they have satisfied this requirement soon after their arrival on the Davis campus.

Foreign students studying at the University on F class (student) or J class (exchange visitor) visas should call at the American History and Institutions office to secure exemption from the requirement. They should bring their passports, visas, and registration cards with them.

Further information may be obtained from the Supervisor of the American History and Institutions Requirement.

Residence Requirement

The minimum residence requirement for a bachelor's degree at the University of California is one academic year. Each summer session in which a student completes a course of at least 3 quarter units may be counted as half a quarter's residence. Thirty-six of the final 45 quarter units completed by each candidate must be earned in residence in the college or school of the University of California in which the degree is to be taken. No more than 18 of the 36 quarter units may be completed in summer session courses on the campus of residence.

Exceptions to this rule are candidates for the Bachelor of Laws degree, and those who have been in the military service. With the approval of the dean of his 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 award of the degree may be recommended for the degree after only one quarter of University residence in which he completes at least 16 units or passes a comprehensive examination in his major or field of concentration.

Scholarship Requirement

To receive a bachelor's degree, except the Bachelor of Laws, a student must obtain twice as many grade points as units for all courses attempted by him in the University. An exception to this rule is authorized for honors students undertaking certain courses (see "Credit by Examination" page 34).

Unit Requirement

Every candidate will normally present a minimum of 180 quarter units as partial satisfaction of the requirements for the bachelor's degree.

Filing for Degree Candidacy

Each candidate for graduation must file an Announcement of Candidacy with the Registrar at the beginning of the quarter in which he plans to graduate. The dates for filing are published on pages 5-7 of this catalog and in the *Schedule and Directory*.

HONORS AND PRIZES

Honors at Entrance

All entering freshmen are considered for Honors at Entrance on the basis of outstanding scholarship achieved in high school. Certificates are presented to the honors recipients shortly after registration in the University.

Deans' Honors List

The names of all students who have completed a minimum of 12 units of work on the Davis campus and who have achieved a 3.0 grade-point average or better

in all work undertaken in the University and in the college will be listed by the various deans and submitted to the Registrar for publication in the *Student Directory* the following quarter. Students achieving this distinction have the following privileges:

"Pass" or "Fail" grades. Subject to the approval of the instructor, honors students may take one course each quarter, not submitted in satisfaction of the requirements of the major program, in which they will be graded "pass" or "fail." In calculating the grade-point standing, units gained in this way are not counted; they do, however, count toward graduation.

Credit by Examination. Honors students may request credit by examination in courses without formally enrolling in them, or in subjects appropriate to the student's curriculum but not offered as courses in the University. Arrangements should be made with the dean, and his approval and that of the instructor appointed to give the examination are necessary before the examination can be given. Application forms for such examinations may be obtained from the Registrar.

Graduation Honors

Graduating students may qualify for honors, high honors, or highest honors. The names of recipients are published in the commencement program and the appropriate notation is made on their diploma and on their permanent record in the Registrar's Office.

Prizes

Prizes for student achievement on the Davis campus consist of inscribed plaques and cash awards. The University Medal is the highest honor awarded to a graduating senior in recognition of superior scholastic achievement. In addition, a College Medal is given to the outstanding graduating senior of each of the colleges and professional schools.

Student Expenses, Housing, and Financial Aids

STUDENT EXPENSES

Expenses of students attending the University of California, Davis, vary widely according to course of study, personal tastes, and individual means. The following average amounts may be helpful, however, in estimating a student's annual college costs.

Registration (incidental fee \$73, Memorial union fee \$3.50, student body membership \$5.00):	Quarterly	Annual (3 quarters)
California residents	\$ 81.50	\$ 244.50
Out-of-state residents (includes tuition fee)	348.50	1045.50
Room and board	320.00	920.00
Books and supplies	50.00	150.00
Student Health Insurance (optional)*	20.00
Parking cars on campus (optional)	16.00
Subject A (if needed; see page 307)	45.00	..
Miscellaneous (travel, laundry, recreation, etc.)	540.00
Annual total cost for California residents		\$1890.50
Annual total cost for out-of-state residents		\$2691.50

The average costs listed above are not final and are subject to revision. Students should have enough funds with them at the beginning of the fall quarter to cover registration fees, books, and the first month's room and board.

Refunds. For students who withdraw with official approval before the end of any quarter, part of the fees enumerated above may be refunded. A schedule of refunds and other information will be found in the circular *Student Fees and Deposits*, obtainable from the Registrar.

SCHOLARSHIPS AND FINANCIAL AIDS

The Financial Aids Officer, in the Dean of Students Office, administers a variety of scholarships and loans; he also makes available certain employment opportunities for needy students under the Work-Study Program.

The granting of financial assistance is based on the applicant's academic record, financial need, and promise of achievement. As funds are limited, it is seldom possible to make awards in amounts large enough to defray the total costs of education. Students are expected to provide some funds from their personal and family resources. Those who will need financial assistance to complete their education, however, are encouraged to apply for scholarships.

Application forms and inquiries should be directed to the Office of the Dean of Students—Financial Aids.

A single application form is used for all applications for scholarships, loans, and jobs under the Work-Study Program. From the information given in the application, faculty committees determine the eligibility of applicants as well as

* For foreign students attending the University on nonimmigrant visas health insurance is mandatory.

the type and amount of scholarship, loan, job, or combination thereof to be awarded. A student is first considered for a scholarship and then is automatically considered for a loan or a job, or both, until his financial need has been met.

A Parents' Confidential Statement must accompany the application. Forms for making this statement may be obtained from the high school or the University. The completed form must be sent to the College Scholarship Service, P. O. Box 1025, Berkeley, California 94701, not later than two weeks before the application deadline, requesting that the financial need analysis be sent to the University of California, Davis. *Exception:* A Parents' Confidential Statement need not be filed if a student is applying for a Regents Scholarship and does not wish to be considered for any additional scholarships or loans.

Application deadlines. To be considered for scholarships, for the following academic year, the application must be on file at the Dean of Students Office by the following dates:

February 1—for students currently in attendance at UCD

February 15—for entering students

Students who are unable to meet the above deadlines may still be considered for a loan or job—but not a scholarship—if the application is submitted by the following dates:

April 15—loans and employment (Work-Study Program only) for students currently in attendance at UCD

June 30—for entering students

Loan and job applications submitted after the deadline will be considered only as funds become available.

Notification of awards will be made about:

April 15—for scholarships

August 15—for loans

Work-Study job awards are made only after students are enrolled and have organized class schedules.

Students are expected to pay their fall registration fees from personal resources, as scholarship and loan checks are not issued until after the registration period.

Graduate Students

Information about scholarships, fellowships, and other assistance for graduate students may be obtained from the Dean of the Graduate Division (see also page 115).

Army ROTC Scholarship Program

Applications may be obtained from the Department of Military Science, University of California, Davis, *during the month of April*. Selection is based on academic and military records and potential officer qualities. Notification is made before July 15 of each year.

College Work-Study Program

The University is able to offer students on the Davis campus a number of part-time jobs (10 to 15 hours per week during the academic year and 40 hours per week during the summer period, if not enrolled for Summer School). Applicants for this program must be from low- or middle-income families and enrolled, or accepted for enrollment, for full-time courses of study at the University.

The jobs provided under this program are separate from other student employment opportunities on the campus.

Emergency Financial Assistance

Emergency loans for graduates and undergraduates are usually limited to \$100, to be repaid within 30 days. Money is granted at the time of application.

LIVING ACCOMMODATIONS

Residence Halls

As a residential campus, the University attempts to provide housing for students who wish to live on campus. At the present time the University operates three co-ed halls of 400 students each; six 200-student halls, three for men and three for women; and three 45-student residences, one for graduate men and two for undergraduate women. An advisory staff in residence in each hall maintains close personal contact with all students in that hall and is readily available for assistance.

Each hall maintains its own council, elected by the residents, to act on matters concerning their welfare, and residents pay annual dues averaging \$12. The Residence Hall Association is a coordinating governing body for all the residence halls.

The cost for room and board for the academic year is \$920; this includes 20 meals a week. All students planning to live in residence halls sign a contract for one academic year. Payment is usually made in installments according to a payment schedule. Rooms in the residence halls contain the necessary furniture, linen, blankets, and study lamps; charges include the weekly laundering of linen. Further information and applications for housing are sent when students apply for admission to the University. Specific questions should be directed to the Housing Office. Since accommodations are limited, early application is advised. A deposit of \$100 is required when a contract is signed and returned.

Housing for Married Students

There are 475 apartments for married students on the Davis campus. Some of these apartments have one bedroom, but most are two-bedroom units. Both furnished and unfurnished accommodations are available. Costs in married student housing are (as of July 1, 1965): one bedroom, unfurnished, \$83; two bedrooms, unfurnished, \$95; two bedrooms, furnished, \$110; all rates include utilities. Applications should be addressed to the Housing Office, University of California, Davis 95616.

Off-Campus Accommodations

The Housing Office maintains a listing service for those interested in off-campus housing. Students, faculty, and staff associated with the University of California should consult that office for assistance in locating off-campus accommodations.

Over 700 women students are housed in privately owned off-campus residence halls. These halls meet all the standards of approval set by the University and adhere to the same rules and regulations that apply to a University residence hall. In addition, there are recommended housing units for women, which meet certain University requirements such as supervision and the establishment of student government.

Students living off campus in private rooms or apartments may have meals at the Memorial Union Dining Commons or at the residence hall dining room on one of several meal-ticket plans.

Fraternities

Ten national fraternities are represented on the Davis campus, providing living quarters and meals for their undergraduate members and pledges. The fraternities, under their system of self-government, provide social, recreational, and academic programs for their members as well as some experience with business activities. A faculty member acts as adviser for each fraternity. The cost of living in a fraternity is comparable to that of the residence halls.

Membership in fraternities is by invitation only. Men who are interested in fraternities should write to or call on the Assistant Dean of Students for Fraternities and plan to attend the Interfraternity Council Smoker held on the Saturday and Sunday following the first week of classes of the fall quarter.

Student Services and Activities

STUDENT HEALTH PROGRAM Medical Evaluation

To safeguard the health of the student and the University community, every new student, as a part of registration, must pass an examination by the University Medical Examiners. Every new student must have at the time of registration a certificate of successful vaccination against smallpox performed within the last three years. A form for this purpose is provided by the University. Tests for tuberculosis are a part of the physical examination of all new students.

Applicants with contagious diseases will be excluded. Any having physical conditions that grossly disturb the classwork of other students should not apply for admission and will be disqualified when detected.

Each prospective student is advised to have a physical examination by his own physician to determine his fitness for college work before coming to the University. Any defects capable of remedial treatment, such as diseased tonsils or imperfect eyesight, should be corrected to prevent possible loss of time from studies.

Students returning after an absence must comply with the University requirements regarding smallpox vaccination and must have a health evaluation at the Student Health Service.

Supplementary Health Insurance

A supplementary health insurance plan is available at the time of registration. This insurance supplements the Student Health program and is used for medical care needed between quarters and when away from the campus. It likewise provides for surgical-professional fees and other benefits as outlined in the Supplementary Health Insurance brochure. Procurement of this insurance is strongly urged, and a waiver must be signed if it is not obtained.

Foreign Students. The acquisition of health insurance is a condition of registration for all nonimmigrant foreign students. At the time of registration, all nonimmigrant foreign students will enroll in the Associated Students supplementary health plan.

Student Health Service

The Student Health Service, by preventing and treating acute illnesses, conserves the time of students for their classwork and studies. This service is made possible, for the most part, by the incidental fee. It is not a health insurance. The service is limited by the staff and facilities available.

Each regularly enrolled student may have such medical care as the Student Health Service is staffed and equipped to provide from the first day of the quarter through the last day of the quarter. Additional services may be provided for seven days after the last day of the quarter at the discretion of the Director of the Student Health Service. Hospitalization up to thirty days may

be provided for illnesses. When, in the opinion of the Director of Student Health, serious illness or injury requires prolonged care and will obviously prevent continuation in college during the current quarter, the patient will be returned to his community or home for definitive treatment.

The Student Health Service does not take responsibility for dealing with chronic physical defects or illnesses present at the time of entrance to the University. Except for first aid and emergency care, the Student Health Service does not assume responsibility for dental treatment. It does not take responsibility for treatment of remedial defects where medical or surgical treatment is elective and not of an emergency nature, and where the student's best interest will be served by treatment during vacation.

The Student Health Service is designed as a medical facility to provide medical care while the student is away from home and in attendance at the University; it does not supplant the medical care of the family physician. Full cooperation is encouraged between the student, the Student Health Service, and the family physician.

PLACEMENT SERVICES

The services of the centralized Placement Center are available without cost to students and alumni of the Davis campus and other campuses of the University of California. Services offered are of three types.

Student Part-Time and Summer Employment

Many students who attend the University expect to earn part of their expenses. However, the undergraduate curricula are organized on the assumption that a student will give most of his time and attention to college studies. If possible, the student should avoid outside employment until he has become adjusted to his new environment, has established sound study habits, and is maintaining a good scholastic standing. By the end of the first quarter the student should know the demands of University life and his own capabilities well enough to plan a program combining studies and work.

Placement advisers help students to find part-time and summer employment. The office receives job listings from employers and refers qualified students to these openings. To receive assistance students must be interviewed personally, as satisfactory arrangements cannot be made by correspondence. Interested students should register with the Part-Time and Summer Employment Division after arriving on campus.

Educational Placement Service

Placement service is available to students and alumni who are interested in teaching. Information on the background, training, and professional experience of its candidates, which is kept in confidential files, enables this office to match qualifications with specifications of available positions. Placement advisers counsel candidates, communicate with employers, receive vacancy data, and arrange interviews. The University reserves the right to refer only those persons who are considered to be fully qualified.

Agricultural and Industrial Placement Service

Students and alumni seeking careers in business, industry, agriculture, and government are invited to use the services of the Placement Center. Placement advisers discuss matters of job choice and methods of obtaining jobs with registrants. In addition, they arrange employment interviews, receive job listings from employers, and refer suitable registrants to these employers. Seniors and graduate students are urged to register with the Center early in their final year of study. Alumni may use the placement services at any time.

COUNSELING SERVICE

The Counseling Service is staffed with trained psychologists, who provide educational, vocational, and personal counseling to all regularly enrolled students. Through individual interviews and group discussions, they

Assist the student in his choice of an academic major and future occupation.

Help students with personal-social problems.

Establish developmental-reading classes and study-skills classes on a non-credit, voluntary basis.

Provide a wide range of psychological testing when appropriate.

Make available information about various occupational opportunities for which students may wish to prepare.

SELECTIVE SERVICE

The Office of the Dean of Students will assist students in matters pertaining to their registration and possible educational deferment (II-S) under current Selective Service regulations. It is, however, each student's personal responsibility to keep in touch with his local draft board, which has exclusive authority to make determinations regarding all educational deferments.

Under present Selective Service regulations, any student who receives an educational deferment extends his liability to age 35. Students desiring a deferment on the basis of participation in the University ROTC program should consult the Department of Military Science.

All male students (undergraduate and graduate) will find it to their advantage to continually keep themselves aware of Selective Service laws and procedures. Any question or request for assistance may be brought to the Office of the Dean of Students at any time.

VETERANS AFFAIRS INFORMATION

The Office of the Dean of Students maintains liaison between certain veterans, veterans' dependents, and the State and Federal agencies of the Veterans Administration. Offices of the United States Veterans Administration are as follows:

Regional Office, 49 Fourth Street, San Francisco, California 94122
Regional Office, 1380 South Sepulveda Boulevard, Los Angeles, California 90025

Veterans and war orphans eligible for educational benefits should file a "Cer-

tificate for Education and Training" with the Office of the Dean of Students at time of registration. This form may be obtained from a regional office of the United States Veterans Administration.

Information regarding educational benefits available to veterans and veterans' dependents from the State of California may be obtained from the State Department of Veterans Affairs, Division of Education Assistance, located at:

P. O. Box 1559, Sacramento, California 95809
350 McAllister Street, San Francisco, California 94102
1707 West Garvey Boulevard, West Covina, California

MILITARY SCIENCE

The University has an Army Reserve Officers' Training Corps unit that offers both basic and advanced courses in general military science at Davis. Enrollment in military science is on a voluntary and selected basis. The ROTC Program is described in detail with the course offerings of the Department of Military Science on page 255.

INTERNATIONAL STUDENT SERVICES

International Students

An adviser is available to assist students from abroad in all matters pertaining to their attendance at the University and to their residence in the United States.

Education Abroad

Administrative assistance in the nonacademic aspects of the University's Education Abroad Program (see page 13) is provided by the Office of International Student Services. Application forms and information about the program may be obtained at this office, as well as information regarding other aspects of travel and study abroad, including passport and currency regulations.

Information pertaining to other means of study, travel, and employment opportunities abroad is also available in the Office of International Student Services.

STUDENT CONDUCT AND DISCIPLINE

The University authorities assume that the student has an earnest purpose and that his conduct will bear out this presumption. If, however, he should be guilty of unbecoming behavior or should neglect his academic duties, the authorities will take such action as, in their opinion, his conduct warrants. Students who fail to use properly the opportunities freely given to them by the University must expect to have their privileges curtailed or withdrawn.

Administration

The President of the University, through the Chancellor, administers student discipline and has full power to act. This duty is accomplished through the

assistance of the teaching staff, the administrative officers concerned with student welfare, and the Student Conduct Committee.

Degrees of Discipline

There are eight degrees of discipline: warning, censure, disciplinary probation, restitution, interim suspension, suspension, dismissal, and expulsion. Restitution involves reimbursement for damage to or misappropriation of property and may take the form of appropriate service to repair or otherwise compensate for damages. Interim suspension is exclusion from classes and other designated privileges or activities, pending final determination of an alleged violation. Suspension is exclusion from classes and other designated privileges or activities for a definite period of time. Dismissal is termination of student status for an indefinite period. The student may be readmitted to the University only with the specific approval of the Chancellor of the campus to which he applies. Expulsion is permanent termination of student status without possibility of readmission to any campus of the University.

Student Welfare Council

The Welfare Council of the Associated Students deals with student welfare, student conduct, and student-faculty relations. The Council fosters the Honor Spirit, a code which places the responsibility for good classroom and campus conduct with the individual student. The student's acceptance of this responsibility is a measure of his maturity.

THE ASSOCIATED STUDENTS AND STUDENT ACTIVITIES

The entire undergraduate student body holds membership in the Associated Students, University of California, Davis (ASUCD). The ASUCD, through its elected Executive Committee and appointed activities chairmen, is responsible for organized student activities on campus.

Independent student organizations are administered by the Dean of Students Office. Included in this category are departmental, honor, service, special-interest, political, and religious organizations, as well as an International Club.

A major effort of the ASUCD is *Picnic Day*, the campus open house welcoming the public each spring. Other special ASUCD events or activities include *Preview Day* (tours and discussions for high school and junior college students), *Judging Day* (competition in agricultural skills and knowledge for high school students), *Little International* (livestock show for Aggie students), *Cal Aggie Camp* (an annual summer encampment for underprivileged children in the area, financed by student fund-raising events), *Cal Aggie Study Center Project* (a weekly tutoring program for disadvantaged primary and secondary school children in Sacramento area schools), *Homecoming*, *Wild West Days*, *Radio KCD*, *Speakers Bureau*, *Student Forums*, *Blood Bank*, and the all-important *Orientation* for incoming students. The University Band is supported by the ASUCD, and the Memorial Union Student Council presents in the Memorial Union a

continuing educational and recreational program for students, as well as a concert series and a Spring Festival of the Arts.

The ASUCD publishes the *California Aggie*, a semi-weekly campus newspaper; *El Rodeo*, the yearbook; and *Motley*, a literary magazine.

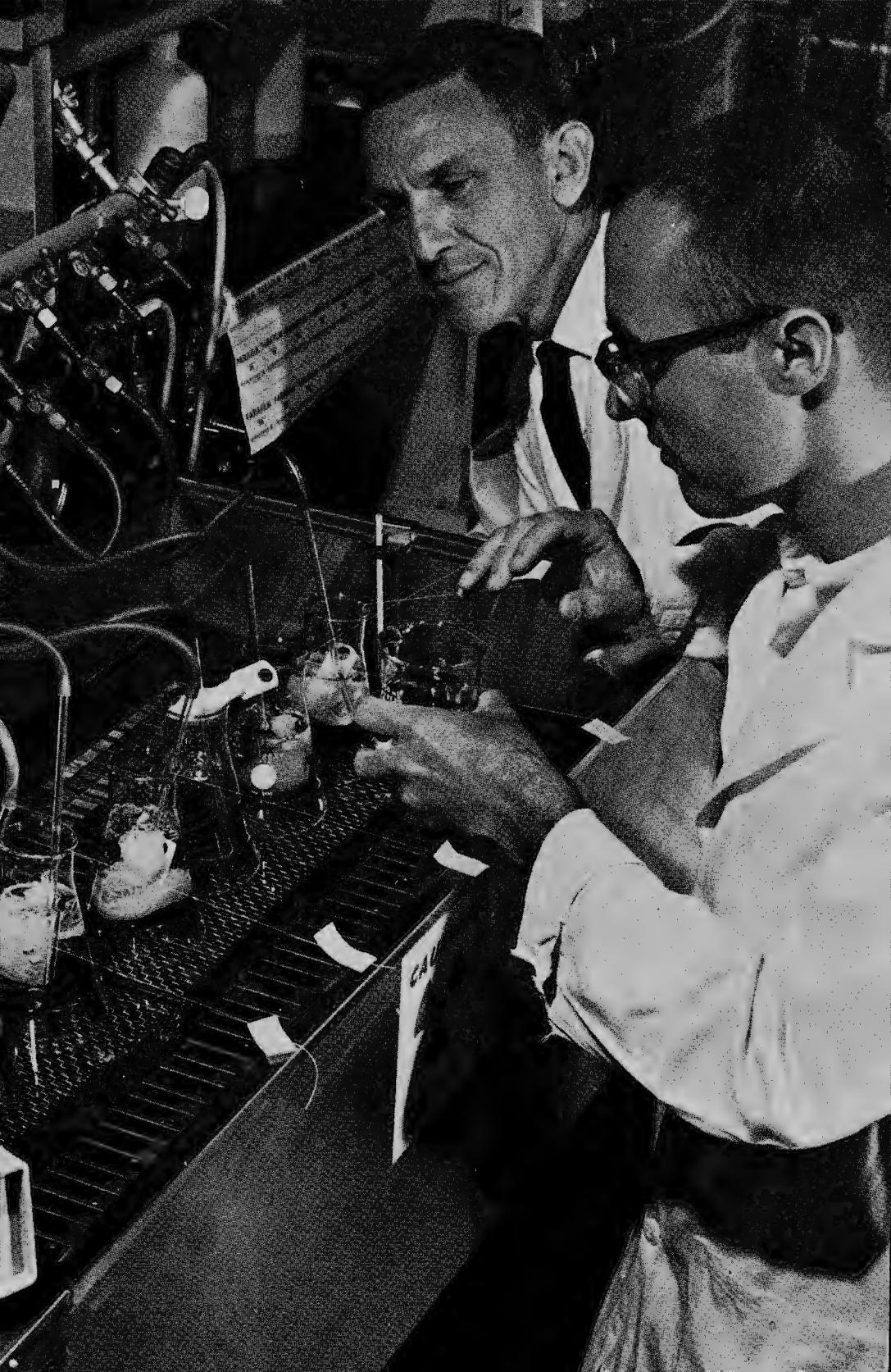
The *Associated Women Students* is composed of all undergraduate women students. It promulgates social regulations, recommends dress standards, sponsors an orientation program for new women students and educational seminars of particular interest to women, and holds social events including the *Co-ed Formal*.

Davis students join those of all other University campuses in All-University festivals featuring the arts, intramurals, and a graduate academy.



The University of California, Davis, is a member of the Far Western Inter-collegiate Athletic Conference and stresses intramural and recreational as well as intercollegiate athletics. Included are football, basketball, track, rifle, baseball, tennis, wrestling, golf, swimming, and water polo. Independent student clubs association sponsors sports and recreational activities for all women students, including intercollegiate playdays in basketball, volleyball, hockey, softball, badminton, tennis, rifle, and swimming.

Unity of student life on all campuses of the University is emphasized by the California Club, an organization of student leaders.



Requirements and Curricula

COLLEGE OF AGRICULTURE

The College of Agriculture provides a comprehensive education that prepares an individual for participation in the complex of businesses that make up modern agriculture.

Technological changes today are rapid and dramatic in agriculture as in everything else. Modern agriculture is characterized by new production and distribution technologies, new products, and different uses of old products. One of the most recent developments is the application of ionizing radiation to improve plant varieties, preserve foods, and control diseases and insects that attack agricultural products; another is the expansion of the roles of engineering, molecular biology, and biostatistics in world food production.

As technological advances have been made, the demand for new skills and trained workers has increased accordingly. Opportunities are no longer restricted to rural areas or to men. Women are finding increasing opportunities for employment as agricultural scientists in many fields. Studies related to the family and the consumer have taken on new importance. World agriculture now offers a wide variety of employment in research, industry, business, education, communications, conservation, recreation, and specialized service.

To prepare students to excel now and be able to keep abreast of inevitable continued change, curricula in the College are based on training in fundamentals in the natural sciences, combined with integrated supporting programs in the social sciences and humanities. On this foundation, students develop competencies in their chosen areas within the agricultural sciences. The undergraduate instruction leads to the Bachelor of Science degree. The specific requirements for the degree in the seven curricula offered at Davis appear beginning on page 51.

The preforestry and preveterinary medical two-year curricula required for admission to the forestry and veterinary medical schools are majors in the College of Agriculture. Requirements of the preprofessional programs appear on page 68.

Requirements for the Bachelor of Science Degree

The University of California awards the degree of Bachelor of Science to candidates who satisfy the general University requirements, the College requirements, and the specific major requirements.

General University Requirements

The bachelor's degree is awarded to those candidates who satisfy the University requirements (pages 31-33) in regard to:

Subject A

American History and Institutions

Scholarship

Residence

Application for Degree Candidacy

College of Agriculture Requirements

The Bachelor of Science candidate must complete a minimum of 180 units of University work. This total may include not more than 6 units of performance courses in each of the following: lower division physical education, art, dramatic art, music, and rhetoric. Of the total, 54 units must be in upper division courses (courses numbered 100-199). A maximum of 9 units of courses in the 300 and 400 series will be accepted toward satisfaction of the 54-unit upper division requirement.

The student must satisfy the requirements of one of the curricula in the College of Agriculture. These consist of *core requirements* common to all majors in the curriculum and the *major requirements* that give depth to the program.

Curricula Requirements of the College

The seven curricula offered are designed to provide extensive preparation in the natural, physical, and social sciences and in the humanities so that the student will gain breadth of learning as well as depth in specific areas. With the exception of Family and Consumer Sciences, each curriculum contains the following minimum unit requirements in subject matter:

Agricultural and closely related subjects	36
Natural and physical sciences	36
Social sciences and humanities	36
Unrestricted electives	24

Faculty Advisers

Students are assigned advisers according to the major selected and must consult with their advisers each quarter for guidance in planning their academic programs both as to required and optional courses to be taken the following quarter. Advisers are listed by major in the front portion of the *Schedule and Directory*. *It is the student's responsibility to see that he fulfills the University, the College, and the major requirements for graduation.*

A program of fewer than 12 or more than 18 units must be approved by the Dean of the College. However, a lower division course in physical education of not more than one unit may be added to the maximum number without such approval.

Entering students who are undecided about the area of agriculture in which they wish to major may, for purposes of registration, specify **Agricultural Science** as a major. Temporary advisers will be assigned by the Dean's office until an appropriate major is selected. Enrollment in introductory courses (Animal Science 1, 2; Plant Science 1, 2, etc.) is recommended to provide background for selection.

Agricultural Practices Program

Every student, when first registering in the College of Agriculture, except Family and Consumer Science majors, must register at the Agricultural Practices Office and complete a work-experience questionnaire.

Many students interested in careers in agriculture are without previous prac-

tical experience. The Agricultural Practices Program, made possible by a grant from the late Fred H. Bixby, gives students an opportunity to supplement their academic training with a program of supervised work. This is a voluntary activity given on a noncredit basis.

Students obtain experience in both agricultural production (farming or ranching) and agricultural business (industrial process and distribution). In a laboratory section (see "Agricultural Practices," page 129) students also learn the proper operation and care of agricultural equipment and acquire the basic skills involved in crop and livestock production.

In addition, the Agricultural Practices Office helps students to find summer employment in agricultural enterprises related to their major interest so that they may gain experience that will be valuable when they seek permanent employment.

Honors

Undergraduate Honors

The Dean's Honors List appears each quarter in the *Student Directory*. It includes the names of all students in the College of Agriculture who, in the preceding quarter, have completed at least 12 units on the Davis campus and have a grade-point average of at least 3.0 for all work undertaken in the University. Students whose names appear on this list have the privilege (subject to approval by the instructor concerned and the Dean) of taking one course each quarter not specifically required in the major program in which they are marked "pass" or "fail." Units gained this way do not count in grade-point standing; they represent a privilege available to honors students interested in intellectual exploration.

Senior students in honors status also have the privilege of taking courses in the 194H series entitled "Special Study for Honors Students."

Honors at Graduation

The graduating student who is completing his major with distinction may be recommended for honors or highest honors. The names of students to whom honors and highest honors have been awarded are published in the commencement program, and the distinction is noted on their transcripts and diplomas. The minimum grade-point averages required to qualify for these honors are shown in the following table:

<i>Units Completed at the University</i>	<i>Grade-Point Average</i>	
	<i>Honors</i>	<i>Highest Honors</i>
135 or more	3.15	3.50
90-134	3.35	3.70
45- 89	3.45	3.80
Less than 45	not eligible	

College of Agriculture Medal

Each year the outstanding graduating senior in the College is awarded a silver medal bearing the University Seal and known as the "Agriculture Medal." Scholastic excellence is the primary basis for choosing the recipient, but other considerations also receive attention.

Scholarships

To encourage capable young men and women to pursue a career in the agricultural industries, many companies and private individuals have established scholarships restricted to students majoring in agriculture.

Approximately one-third of the scholarships administered by the Committee on Undergraduate Scholarships are awarded to students in the College of Agriculture. Students with high scholastic standings who need additional financial support are, therefore, encouraged to apply (see page 35).

Graduate Instruction

Graduate instruction is under the jurisdiction of the Dean of the Graduate Division, and inquiries concerning the graduate program should be addressed to him. In addition to pursuing advanced studies, the graduate student may qualify for an assistantship to work with members of the research staff in the Agricultural Experiment Station. A number of assistantships providing half-time employment during the academic terms and full-time summer employment are available to outstanding students.

Programs for certain graduate degrees are offered by faculty of individual departments, and the degree normally bears the name of the department. Other graduate programs are offered by groups composed of faculty members from several departments, and the degree bears the name of the group, such as Agricultural Chemistry, Plant Physiology, Comparative Biochemistry, International Agricultural Development, etc. The *Announcement of the Graduate Division* should be consulted for complete information regarding graduate instruction, but work leading to advanced degrees may be pursued in the following departments of the College:

Agricultural Economics	Landscape Horticulture
Agricultural Education	Nematology
Agricultural Engineering	Nutrition
Agronomy	Plant Pathology
Animal Husbandry	Pomology
Animal Physiology	Poultry Husbandry
Biochemistry and Biophysics	Soils and Plant Nutrition
Consumer Sciences	Vegetable Crops
Entomology	Viticulture and Enology
Food Science and Technology	Water Science and Engineering
Genetics	

Teaching Credentials

Inquiries concerning preparation for teaching credentials in subject matter of concern to the College should be addressed to the Department of Agricultural Education, University of California, Davis 95616. Teacher education is provided not only in such specialized fields as home economics and vocational agriculture but also in more general areas.

Curriculum in Agricultural Biosciences

Majors: Animal Science, Entomology, Plant Science, Range Management, Plant Protection

The Agricultural Biosciences curriculum provides a broad training in the physical and biological sciences and in their application to the production and processing of animals and plants for human use. It furnishes a basic background necessary for success in agricultural production and related industries.

The curriculum provides an excellent base for graduate study in such fields as agricultural chemistry, agronomy, animal husbandry, animal physiology, botany, comparative biochemistry, endocrinology, entomology, genetics, horticulture, nutrition, plant pathology, plant physiology, poultry science, range management, soil science, and vegetable crops.

Undergraduates may select one of the five general majors or, within the animal science and plant science majors, they may choose a field of specialization.

Requirements for the major and for the field of specialization are met largely by upper division courses. The student's first two years should, therefore, be devoted chiefly to meeting core requirements, many of which are satisfied by courses in the lower division. The following subjects and units constitute the *core requirements* for the curriculum in Agricultural Biosciences:

Biological sciences (including one animal-oriented and one plant-oriented course)	20
Chemistry (including organic chemistry)	15
English and/or rhetoric	8
Mathematics (including calculus and statistics)	7
Physics	9
Social sciences and humanities electives	28
Unrestricted electives	24
	—
<i>Major requirements</i> (see below)	69
	—
Total units required for the Bachelor of Science degree	180

The requirements given above allow for considerable flexibility, permitting the student to make certain selections in accordance with his academic preparation and his particular interests. The following program is offered as a guide:

Freshman Year	Fall	Winter	Spring
Chemistry 1A, 1B	5	5	—
Biology 1	—	—	6
English or Rhetoric 1A, 1B	4	4	—
Animal and Plant Science 1	3	3	—
Electives*	3	3	9
	—	—	—
	15	15	15

* Electives to satisfy the requirements for the major; social sciences and humanities, including American History and Institutions; and unrestricted electives.

<i>Sophomore Year</i>			
Bacteriology 2 or Botany 2	—	5	—
Chemistry 8	5	—	—
Physics 2A, 2B, 2C	3	3	3
Mathematics 13, 16A	4	3	—
Electives*	3	4	12
	—	—	—
	15	15	15

Animal Science Major Requirements

This major centers on the basic science disciplines of nutrition, physiology, and genetics as they apply to animal and poultry production. A concentrated study program may be arranged in the following fields of specialization: *animal husbandry, nutrition, physiology, and poultry husbandry*. Students should consult the department for specific information concerning the specialization.

Subject and unit requirements are:

Biochemistry	6
Genetics	5
Nutrition	5
Physiology	6
Laboratory units in biochemistry, genetics, nutrition, or physiology.....	4
Specialized courses in animal sciences	18
Electives approved by adviser	25
	—
	69

A course in bacteriology (Bacteriology 2) and Animal Science 1 and 2 are recommended; these courses partially satisfy the biological sciences core requirement.

Students may also pursue a program in animal science under the Agricultural Science and Management curriculum described on page 60.

Entomology Major Requirements

This major provides an introduction to the many branches of entomology, such as the role of insects in the transmission of plant and animal diseases; control of insects with natural enemies and chemicals; bee biology; and a study of the insects themselves, their behavior, classification, and intricate structure. Graduates are eligible to work in many commercial fields and in local, state, and federal agencies. The course work also provides a basis for graduate studies.

Subject and unit requirements are:

Bacteriology	5
Botany or zoology (in addition to core requirements)	12
Genetics	5

* Electives to satisfy the requirements for the major; social sciences and humanities, including American History and Institutions; and unrestricted electives.

Plant physiology, plant pathology, or biochemistry	4
Introduction to entomology (Entomology 1)	5
Structure and function of insects (Entomology 101)	4
Insect physiology (Entomology 102)	4
Systematic entomology (Entomology 103)	4
Insect ecology (Entomology 104)	4
Field taxonomy and ecology (Entomology 109)	5
Electives approved by adviser	17
	—
	69

Plant Science Major Requirements

Opportunities for concentrated study in areas of plant science include the following fields of specialization: *agronomy, floriculture, landscape horticulture, park administration, plant pathology, pomology, vegetable crops, and viticulture*. Students should consult the department for specific information concerning the specialization.

Subject and unit requirements are:

Entomology	4
Genetics	5
Nematology or weed science	2
Plant pathology	4
Plant physiology	5
Soil and water science	6
Electives approved by adviser:	
a) Biochemistry, botany, chemistry, genetics, geography, geology, mathematics, microbiology, physics, or zoology	6
b) Entomology, nematology, plant nutrition, plant pathology, plant science, soils, water science, or weed science	9
c) Electives to complete major	28
	—
	69

Plant Science 1 and 2 are recommended; these courses partially satisfy the biological sciences core requirements.

Students may also pursue a program in Plant Science under the Agricultural Science and Management curriculum described on page 58.

Range Management Major Requirements

Students are prepared for careers as range technicians in state and federal agencies, as farm advisers, and as managers of commercial operations. This major also provides a basis for graduate studies. Emphasis is on the sciences needed in the sound management of lands used primarily for grazing—animal husbandry, agronomy, range management, forestry, wildlife, and soils and water science.

Subject and unit requirements are:

Animal sciences (in addition to core requirements)	9
Botany (in addition to core requirements)	14
Engineering	3
Genetics	5
Geology	4
Soil and water science	6
Specialized courses in range management and agronomy	22
Electives approved by adviser	6
	—
	69

Certain courses are required for the major and, where applicable, may be used in satisfaction of core and major requirements listed above: Animal Science 1 and 2; Zoology 2 or Animal Physiology 101; Botany 2; Economics 1A; Economics 1B or Agricultural Economics 1 and 2; Engineering 1; Animal Science 103 and 118; Botany 108 and 111; Botany 117 or Plant Science 101; Range Management 100, 103, 105, and 133; and Agronomy 112.

Plant Protection Major Requirements

This major is for students interested primarily in control of agricultural pests, whether insects, nematodes, plant diseases, vertebrates, or weeds. Career opportunities are available in technical sales and service with chemical companies, food-processing firms, Farm Advisers' Offices, and growers' organizations. Students who are eligible may benefit by one or more years of graduate study in entomology, plant pathology, or plant physiology (weed science).

Subject and unit requirements are:

Agricultural toxicology	3
Animal science (wildlife in land use)	4
Botany (physiology and weed science)	12
Entomology	12
Nematology	9
Plant pathology	12
Electives approved by adviser	17
	—
	69

The core requirements in social sciences must include three units of economics.

Curriculum in Agricultural Economics and Business Management

Majors: Agricultural Economics, Agricultural Business Management

This curriculum is concerned with the economics of the agricultural industry. Its basic goal is to improve the student's knowledge of economic forces and the environment in which agricultural production and distribution take place. The programs offered enable students to develop a specialization in land economics, management, marketing, and policy.

The requirements for the major are met largely by upper division courses. The student should, therefore, devote his first two years chiefly to meeting core requirements. The following subjects and units constitute the *core requirements* for this curriculum:

Accounting	6
Agriculture other than agricultural economics	18
Chemistry and physics	9
Economics	9
English	4
English or rhetoric	4
Mathematics (discrete, analytical geometry, and calculus)	6
Natural science electives	17
Statistical methods	4
Social sciences and humanities electives approved by adviser	19
Unrestricted electives	24
<hr/>	
<i>Major requirements</i> (see below)	60
<hr/>	
Total units required for the Bachelor of Science degree	180

The requirements given above allow for considerable flexibility, permitting the student to make certain selections in accordance with his academic preparation and his particular interests. The following two-year program is offered as a guide:

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
English 1A, 1B	4	4	-
Plant Science 1, 2	3	3	-
Animal Science 1, 2	3	-	3
Biology 1 (natural science electives)	-	-	6
Chemistry 1A	5	-	-
Electives [*]	-	8	6
<hr/>		<hr/>	
	15	15	15

<i>Sophomore Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Soils and Water Science 1, 2	3	3	-
Economics 1A, 1B	-	5	5
Economics 11A, 11B	-	4	3
Mathematics 15, 16A	3	3	-
Physics 10	4	-	-
Electives [*]	5	-	7
<hr/>		<hr/>	
	15	15	15

^{*} Electives to satisfy the requirements for the major; agriculture other than agricultural economics; natural science; social sciences and humanities, including American History and Institutions; and unrestricted electives. (Mathematics 16B is required for agricultural economics majors; Agricultural Economics 18 is required for majors in agricultural business management.)

Agricultural Economics Major Requirements

This major considers the economics of agricultural production, marketing, use of resources, prices, and policy. It permits the student a choice of specialization best adapted to his plans.

Subject and unit requirements are:

Agricultural Economics 100A, 100B, 100C, 106A, 106B	15
Agricultural economics electives	15
Macro-economic theory, upper division	3
Mathematics beyond core requirements	3
Senior research project in major field	3
Electives approved by adviser	21
	—
	60

Agricultural Business Management Major Requirements

This major provides training in the managerial aspects of agricultural business. It emphasizes the decision-making function of management, the use of management controls, personnel policies, and procurement and marketing methods.

Subject and unit requirements are:

Agricultural Economics 18, 100A, 100B, 100C, 106A, 106B, 112, 116, 117 . . .	27
Agricultural economics electives	3
Senior research project in major field	3
Electives approved by adviser	27
	—
	60

Curriculum in Agricultural Education and Development

Majors: Agricultural Education, International Agricultural Development

In this program coordinated training in agricultural and related biological and physical sciences is combined with a solid liberal arts education.

This curriculum should be particularly useful to students considering careers in agricultural teaching, production, or service, or in foreign service activities in educational, commercial or technical fields. Its breadth also provides excellent preparation for advanced study in several areas of the agricultural sciences.

The requirements for the major are satisfied largely by upper division courses. The student should, therefore, devote his first two years chiefly to meeting *core requirements*, which are as follows:

Agricultural science (introductory)	3
Biological sciences (including genetics)	21
Chemistry (including organic)	15
Economics	5
English	8
Mathematics (statistics)	4
Physics	6

Social sciences and humanities	15
Unrestricted electives	24
<i>Major requirements</i> (see below)	79
Total units required for the Bachelor of Science degree	180

The requirements given above provide considerable flexibility, allowing the student to make certain selections in accordance with his academic preparation and particular interests. The following two-year program is offered as a guide:

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
English 1A, 1B	4	4	-
Chemistry 1A, 1B	-	5	5
Agricultural science (introductory)	3	-	-
Mathematics 13	-	4	-
Electives*	8	2	10
—	—	—	—
	15	15	15
<i>Sophomore Year</i>			
Economics 1A	-	5	-
Chemistry 8	5	-	-
Physics 2A, 2B	-	3	3
Biology 1	6	-	-
Electives*	4	7	12
—	—	—	—
	15	15	15

Agricultural Education Major Requirements

The following subjects and units constitute the requirements for the major:	
Agricultural Education 160 or 187, 320A	4
Agricultural economics	9
Agricultural engineering	11
Animal science	16
Plant and soil science (including Plant Pathology 120)	16
Social sciences and humanities	8
Electives approved by adviser (including Nutrition 103, Entomology 110, Soil and Water Science 1, Water Science 110A, 110B)	15
—	—
	79

Curricula for Teacher Education

Students may make appointments with credential counselors and obtain a statement of the complete requirements for the credential at the departmental office.

* Electives to satisfy the requirements for the major; social sciences and humanities, American History and Institutions; unrestricted electives.

Required courses for professional preparation include: Education 110, 120; Agricultural Education 160, 320B, 320C, 320E, 323; and 9 quarter units of subject-matter courses.

International Agricultural Development Major Requirements

The student will partially satisfy the social sciences and humanities core requirements in the upper division. He must select three courses from the following: History 174A, 174B, 176A, 176B, 178A, 178B, 179A, 179B, and 180; Political Science 102, 105, 113, 128A, 163, and 166.

Basic requirements, subjects and units, for the major are:

International Agricultural Development 101 or 102, 190	6
Economics or agricultural economics	6
Foreign language,* humanities, and social sciences (anthropology or sociology, geography and/or psychology)	32
Primary field of specialization: animal science or plant science	14
Secondary field of specialization: agricultural economics, agricultural engineering, animal science, plant science, or soil and water science (at least 8 units upper division)	12
Agricultural and other science electives approved by adviser (to be selected from agricultural engineering, animal physiology, bacteriology, biochemistry, entomology, nutrition, plant pathology, soil science, water science, and weed science)	9
	<hr/> —
	79

Curriculum in Agricultural Science and Management

Major: Agricultural Science and Management

Graduates of this curriculum are prepared for production-management positions in California's complex and changing agriculture. It provides alternatives of a four-year program leading to a B.S. degree or a five-year program leading to the M.S. degree. In bringing several disciplines to bear on the same problem, its approach is that of the professional school, introducing the student to the opportunities in agricultural production, processing, and marketing.

The undergraduate spends three years in a general, preprofessional curriculum, which includes at least four introductory courses in agriculture and a basic foundation in the sciences and humanities. He enrolls as an Agricultural Science major while completing the preprofessional requirements.

Before the start of his senior year (130 quarter units) the student applies for admission to the professional program. Application forms may be obtained from the Registrar or the Office of the Dean of Agriculture and must be filed by August 1 for the fall quarter; November 1 for the winter quarter; and February 1 for the spring quarter. Students transferring from other institutions see Admission to Advanced Standing (page 20).

* The language requirement is proficiency in a single foreign language equivalent to passing course 4.

Depending on his objectives and his grades, the student has two opportunities:

1. He can complete the requirements for the Bachelor of Science degree in one additional year. During this final year he pursues intensive study in a technical field of agricultural science and in agricultural economics.

2. He can select a two-year program leading to the Master of Science degree. During these two years he specializes in a) the *economics of agricultural management* and b) a technical field of agricultural science chosen from *animal science, plant science, food technology, or resource technology*.

Preprofessional Curriculum

Preprofessional requirements for this curriculum are:

Introductory agricultural science (to be selected from the following: Agricultural Economics 1 and 2, Animal Science 1 and 2, Food Science and Technology 100, Plant Science 1 and 2, Soil and Water Science 1 and 2)	20
Biological sciences	16
Chemistry (including organic)	15
Economics	10
English or rhetoric	8
Mathematics (statistics, calculus, and discrete mathematics recommended) ..	10
Physics	9
Social sciences and humanities electives	18
Unrestricted electives	24
<hr/>	
Total units required in the preprofessional curriculum	130
<i>Major requirements (see below)</i>	50
<hr/>	
Total units required for the Bachelor of Science degree	180

The requirements given above allow for considerable flexibility, enabling the student to make certain selections in accordance with his academic preparation and his particular interests. The following two-year program is offered as a guide:

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
English 1A, 1B	4	4	-
Chemistry 1A, 1B	5	5	-
Animal Science 1, 2	3	-	3
Plant Science 1, 2	-	3	3
Biology 1	-	-	6
Mathematics 16A, 16B	-	3	3
Electives*	3	-	-
<hr/>		<hr/>	<hr/>
	15	15	15

* Electives to satisfy the requirements for the major: social sciences and humanities, including American History and Institutions; and unrestricted electives.

<i>Sophomore Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Chemistry 8	5	—	—
Economics 1A, 1B	5	5	—
Soil and Water Science 1, 2	3	3	—
Agricultural Economics 1, 2	—	3	3
Bacteriology 2, or Botany 2	—	—	5
Physics 2A, 2B, 2C	3	3	3
Mathematics 13	—	—	4
	—	—	—
	16	14	15

One-Year Program Leading to the Bachelor of Science Degree

Requirements beyond the completion of the three-year preprofessional curriculum:

Agricultural Economics	15
Animal science, food technology, plant science or resource technology specialization	18
Electives approved by adviser	17
	—
	50

Total units required for the Bachelor of Science degree 180

Certain courses are required. All students must complete the requirements in Economics of Agricultural Management and one other specialization.

Economics of Agricultural Management

Agricultural Economics: recommended for the one-year program, course 100A and two chosen from 112, 114, 116, 117, and 140; recommended for students who may take the two-year program leading to the M.S. degree, courses 100A–100B, 106A–106B, and Economics 1A–1B, 11A–11B.

Animal Science

Animal Genetics 107, and 107A, 107B, 107C, or 107D; Nutrition 103 or 110;* Animal Science 114A–114B,* 116A–116B,* 118, or any two from Animal Science 10,* 11,* 12, or 149;* 5 units animal science electives. The starred (*) courses are recommended for students who may change to the two-year program leading to the M.S. degree.

(Students may also pursue a program in the animal sciences under the Agricultural Biosciences curriculum described on page 52).

Food Technology

Bacteriology 2; Biochemistry 101A–101B; food science, 18 units including Food Science and Technology 100, 101, 104A–104B, and a food-processing course. Recommended: Chemistry 5.

Plant Science

Biology 1; Botany 2, 111; Plant Science 2, 101, 102; Soil and Water Science 1, 2; 12 units related to agronomy, floriculture, landscape horticulture, park

administration, plant pathology, pomology, vegetable crops, or viticulture; 8 units from Entomology 110, Genetics 100, Plant Pathology 120, Nematology 110, or Plant Science 120.

(Students may also pursue a program in the plant sciences under the Agricultural Biosciences curriculum described on page 53.)

Resource Technology

A new area of study intended for students who need broad preparation in subject matter relating to the evaluation, conservation, renewal, and management of land, water, and atmospheric resources for human use and enjoyment. Some of the fields demanding such training are park administration, water resource development, wilderness protection, soil conservation, and land appraisal.

Plant Science 101; Soil Science 120A; Water Science 110A; 10 units to be selected from Geography 161, 162, Geology 102, 112, Water Science 110B, 150, Soil Science 105, 120B, 135, Agricultural Engineering 106, 107, Plant Science 102, 116, Botany 111, 117, Genetics 100, or related courses with approval of the adviser.

Two-Year Program Leading to the Master of Science Degree

Requirements beyond the completion of the three-year preprofessional curriculum:

1. Complete the one-year program or equivalent:	
Agricultural economics	15
Animal science, food technology, plant science or resource technology	18
Electives approved by adviser	17
	—
	50
Total units to complete the Bachelor of Science degree	180
2. Complete the Graduate Division requirements of one year of graduate residence and 36 units, including 21 units of graduate credit, in addition to the requirements for a Bachelor of Science degree.	
a. Graduate units (200 series)	
Seminar	3
Agricultural economics	6
Animal science, food technology, plant science, or resource technology	6
Additional graduate work in agricultural economics or the specialization	6
	—
	21
b. Electives approved by adviser (upper division or graduate)	15
	—
	36
3. A comprehensive oral examination in agricultural economics and the second field of specialization	00
	—
Total units required for the Master of Science degree	216

All students must complete the requirements in Economics of Agricultural Management and one other specialization. Certain courses are required.

Economics of Agricultural Management

Agricultural Economics including 100A-100B, 106A-106B, 3 units from 155, 160, 170, 176, and Economics 1B, 11B. The 6 graduate units must be selected from Agricultural Economics 250, 253A-253B, 257, and 260.

Animal Science

Biochemistry, 6 units; physiology (excluding 101, 101L), 6 units.

The starred (*) courses listed under the one-year program are recommended.

Food Technology

Program of courses to be developed in consultation with the adviser.

Plant Science

Entomology 110; Genetics 100; Plant Pathology 120; and Nematology 110 or Plant Science 120.

Resource Technology

Soil Science 105, 120B; Water Science and Engineering 110B; a course in climatology.

Recommended: Geography 161; Political Science 181.

Curriculum in Family and Consumer Sciences

Majors: Child Development, Design, Dietetics and Nutrition, Foods, Home Economics, Textile Science

Broad training in natural and social sciences and in the humanities is combined with studies that emphasize the interests and problems of people as consumers and families. The major in *Child Development* prepares students for work with children and for further study in such areas as clinical psychology, teaching, research with children, counseling, or pediatric nursing. Students interested in art may prepare for a career by majoring in *Design*, which emphasizes interior design, costume design, and fabric design, with supporting courses in drawing, painting, sculpture, graphic design, architecture, and ceramics. Completing this major prepares students for professional training in design. The major in *Dietetics and Nutrition* can qualify students for a one-year postgraduate internship which leads to professional work as a dietitian in institutions and hospitals, or to teaching and research. This major also prepares students for technical work on the nutritional properties and formulation of human foods and animal feeds, and for nutrition work in community and governmental agencies. The major in *Foods* explores the chemical and physical properties of foods to find out why they behave as they do during processing and preparation for the table. Students are prepared for technical work in test kitchens or in the control laboratories of food-processing establishments and for industrial work in food production and marketing. The *Textile Science* major emphasizes technical study of fibers, yarns, and fabrics; it includes not only the physics and

chemistry of textiles but also study of color and design, as well as economics and business administration. It prepares students for careers as technicians in testing laboratories, with laundry and dry-cleaning organizations, or with manufacturers of textiles or detergents. General studies over the entire field are included in the *Home Economics* major and can be combined with a program leading to an academic credential for secondary school teaching. The various majors also provide good preparation for graduate studies in preparation for careers in research, college teaching, or extension work.

Graduate Study. The departments that provide the courses for the multi-discipline curriculum in Family and Consumer Sciences also participate in graduate study programs leading to advanced degrees in Agricultural Chemistry (Ph.D.), Agricultural Economics (M.S., Ph.D.), Food Science (M.S.), Microbiology (M.A., Ph.D.), and Nutrition (M.S., Ph.D.). The Master of Science degree in Home Economics is offered with specialization in child development, consumer economics, foods, nutrition, or textile sciences.

The following subjects and units constitute the *core requirements* for the curriculum in Family and Consumer Sciences:

Natural Sciences

Chemistry, one course	
Physics, one course	
Statistics or other mathematics, one course	
One course in each of two areas of biological sciences	
Additional courses in the natural sciences to make a total of	27

Social Sciences

One course in each of two areas of:	
Psychology, sociology, cultural anthropology	
One course in each of two areas of:	
Economics, political science, history*	
Additional courses in the social sciences to make a total of	27

Humanities

English, 8 units	
Design, one course	
Literature, foreign language, or philosophy, one course	
Art, dramatic art, rhetoric, or music, one course	
Additional courses in the humanities to make a total of	27

Major requirements and electives (see below) 99

Total units required for the Bachelor of Science degree 180

* Units earned in satisfaction of the American History and Institutions requirement may be used in partial satisfaction of this requirement.

Since many of the courses required for the various majors are in the lower division, the entering student can begin to satisfy both core and major requirements in the first year. English 1A, 1B, for example, which is required of every major in this curriculum, also satisfies the core requirement of 8 units of English. Similarly, other courses required for a major contribute to satisfying their corresponding core subject requirements.

Although there is wide variation among the six majors, the following two-year program is offered as a guide:

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Chemistry 1A, 1B	—	5	5
Art 2	4	—	—
English 1A, 1B	4	4	—
Physiology 1	4	—	—
Psychology 1A	—	—	4
Electives*	3	6	6
	—	—	—
	15	15	15
<i>Sophomore Year</i>			
Bacteriology 2	—	—	5
Biology 1	—	6	—
Chemistry 8	5	—	—
Economics 1A	—	5	—
Mathematics 13	—	—	4
Physics 10	4	—	—
Textiles and Clothing 7	—	—	2
Electives*	6	4	4
	—	—	—
	15	15	15

The requirements for each of the six majors are as follows:

Child Development Major

Anthropology 1 or 2; Biology 1; Chemistry 1A, 1B, 8; English 1A, 1B; Genetics 115; Human Development 131, 133, 136, 137, 138A, 138B, 139A, 139B; Mathematics 13; Nutrition 112A, 112B, 114; Physiology, one course; Psychology 1A, 1B, 1C; Sociology 1, 2, 126.

Design Major

Anthropology 2; Art 2, 3, 16; Design 160A, 160B, 160C, 191, 192A–192B or 196A–196B, 193 or 195, 197; English 1A, 1B; Philosophy 123; Psychology 1A, 1C; two courses chosen from the following list: Art 12A, 12B, 14A, 14B; three courses in the history of art.

* Electives to satisfy the requirements for the major; social sciences and humanities, including American History and Institutions; and unrestricted electives.

Dietetics and Nutrition Major

Bacteriology 2; Biochemistry 101A, 101B; Biology 1; Chemistry 1A, 1B, 8; Economics 1A, 1B; English 1A, 1B; Foods 100A, 100B, 101A, 101B; Mathematics 13; Nutrition 112A, 112B, 113A, 113B; Physiology with laboratory; Psychology 1A; plus either group A (dietetics) or group B (nutrition) as follows:

Group A: Economics 11A, 11B; Education 110; Management 121, 122A, 122B; Nutrition 115.

Group B: Biochemistry 101L; Chemistry 1C, 5; Nutrition 117.

Foods Major

Bacteriology 2; Biochemistry 101A; Biology 1; Chemistry 1A, 1B, 1C, 5, 8; Consumer Economics 141; English 1A, 1B; Foods 100A, 100B, 101A, 101B, 104A, 104B, 104C; Food Science and Technology 107; Mathematics 13; Nutrition 112A, 112B, 113A, 113B; Physics 2A, 2B, 2C; Physiology, one course; Psychology 1A.

Home Economics Major

Bacteriology 2; Biology 1; Chemistry 1A, 1B, 8; Consumer Economics 142; Design 130, 150; Economics 1A; English 1A, 1B; Foods 100A, 100B; Human Development 131, 133, 137; Mathematics 13; Nutrition 112A, 112B; Physiology, one course; Psychology 1A; Home Management 140; Textiles and Clothing 7, 160. Students planning to meet the secondary teaching credential requirements or to qualify for agricultural extension positions should also complete the following: Design 130L; Foods 101A, 101B; Nutrition 113A, 113B; Home Management 140L; Textiles and Clothing 160L, 172, 370, 375.

Textile Science Major

Bacteriology 2; Biology 1; Chemistry 1A, 1B, 1C, 5, 8; Consumer Economics 141, 142; Economics 1A, 1B; English 1A, 1B; Mathematics 13; Physics 2A, 2B, 2C; Psychology 1A; Textiles and Clothing 7, 160, 160L, 161, 162, 172.

Curriculum in Food Science

Major: Food Science

Food science is the key to converting raw agricultural materials into a wide variety of processed and preserved foods. It applies the physical and biological sciences in solving fundamental problems leading to technological advances in the processing of foods.

The chemical, microbial, and engineering aspects of food processing are emphasized in this program. The curriculum is sufficiently flexible to satisfy a student's individual interests and needs in specialized areas. Such specializations include *brewing technology, dairy technology, enology, fruit and vegetable technology*, and the *technology of meat and poultry processing*.

Graduates qualify for supervisory, technical, sales, and executive positions in the food and allied industries. Students who pursue graduate work in food science find additional opportunities, such as research and teaching positions in universities or research in governmental and industrial organizations.

The student's first two years are devoted primarily to meeting the following *core requirements* in the various sciences and humanities:

Bacteriology	5
Biochemistry	6
Biology	6
Chemistry (including physical)	29
English and/or rhetoric	8
Mathematics (including calculus and statistics)	13
Physics	12
Social sciences and humanities electives	28
Unrestricted electives	24
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<i>Major requirements</i> (see below)	49
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Total units required for the Bachelor of Science degree	180

The following two-year program is offered as a guide:

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Biology 1	—	—	6
Chemistry 1A, 1B, 1C	5	5	5
English and/or Rhetoric 1A, 1B	4	4	—
Food Science 1	3	—	—
Mathematics 13	—	—	4
Electives*	3	6	—
<hr/>		15	15
<hr/>		15	15

Sophomore Year

Bacteriology 2	—	5	—
Chemistry 5	—	—	4
Chemistry 8	5	—	—
Mathematics 16A, 16B, 16C	3	3	3
Physics 2A, 2B, 2C	3	3	3
Physics 3A, 3B, 3C	1	1	1
Electives*	3	3	4
<hr/>		15	15
<hr/>		15	15

Food Science Major Requirements

Introduction to food science (Food Science 1)	3
Food chemistry (Food Science 101, 103)	8
Food engineering (Food Science 110A, 110B)	8
Food microbiology (Food Science 104A, 104B, 105A, 105B)	8
Electives approved by adviser	22
<hr/>	
	49

(A food technology specialization is available to interested students under the Agricultural Science and Management curriculum described on page 20.)

* Electives to satisfy the requirements for the major; social sciences and humanities, including American History and Institutions; and unrestricted electives.

Curriculum in Soil and Water Science

Major: Soil and Water Science

Soil and water resource use, conservation, and development are recognized as critical in the welfare of nations. Management of these two vital resources requires increasing numbers of technically qualified persons to deal with the complex, interdisciplinary problems posed by population pressures on these limited resources.

This curriculum provides fundamental training in the natural and physical sciences along with an understanding of the principles of proper soil and water management. Topics considered in undergraduate programs include surface- and ground-water supply, soil fertility and irrigation management, water quality and pollution, drainage, soil salinity and reclamation, land preparation and irrigation methods, land classification and use, water-soil-plant relationships, and water rights.

Excellent employment opportunities are available for graduates of this curriculum in organizations such as irrigation districts and water companies, state and federal agencies, consulting firms and other domestic and international organizations dealing with soil and water use and conservation, fertilizer and irrigation equipment companies and other agricultural businesses, public utilities, agricultural extension service, and in private employment as technical specialists and farm operators.

Students interested in graduate work may progress toward higher degrees in the fields of soil, water, and plant science. (A resource technology specialization is available to interested students under the Agricultural Science and Management curriculum described on page 20.)

Courses specifically required for the major occur entirely in the upper division. The student's first two years should, therefore, be devoted chiefly to meeting core requirements.

The following subjects and units constitute the *core requirements* for the curriculum:

Biology	6
Botany	5
Chemistry (including quantitative analysis)	19
Economics	5
English	8
Geology	4
Mathematics (including calculus)	9
Physics	12
Plant science	3
Soil and water science	6
Social sciences and humanities electives	23
Unrestricted electives	24
<hr/>	
<i>Major requirements</i> (see below)	56
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Total units required for the Bachelor of Science degree	180

The requirements given above allow the student considerable flexibility in planning his program. The following two-year program is offered as a guide:

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Chemistry 1A, 1B, 1C	5	5	5
English 1A, 1B	4	—	4
Biology 1	—	6	—
Plant Science 1	3	—	—
Physics 2A, 2B, 2C	3	3	3
Physics 3A, 3B, 3C	1	1	1
	—	—	—
	16	15	13
<i>Sophomore Year</i>			
Mathematics 16A, 16B, 16C	3	3	3
Soil and Water Science 1, 2	3	3	—
Chemistry 5	—	—	4
Geology 1, 1L	4	—	—
Electives*	4	8	4
Botany 2	—	—	5
	—	—	—
	14	14	16

Soil and Water Science Major Requirements

Field and specialization electives	9
Physics of soil and water systems (Soil and Water Science 101)	5
Soil and water chemistry (Soil and Water Science 102)	5
Water quality, salt control, and reclamation (Soil and Water Science 103)....	4
Water-soil-plant relationships (Soil and Water Science 104)	4
Electives approved by adviser	29
	—
	56

Preparatory Curricula for Professional Schools

Preforestry

The School of Forestry, located on the Berkeley campus, educates men for the profession of forestry through its undergraduate and graduate programs. For admission to the School of Forestry, a student must have at least 84 quarter units of credit, including the prescribed subjects listed below, and a grade average of C or higher. The preforestry curriculum given at Davis prepares the student for the School of Forestry.

The undergraduate forestry program has three parts:

1. *The preforestry curriculum*, which occupies the two lower division years and provides the necessary foundation in natural and social sciences.
2. *The summer field program*, Forestry 46, 47, 48, which is prerequisite to all required courses in the upper division forestry curriculum. This ten-week

* Electives to satisfy the requirements for the major; social sciences and humanities, including American History and Institutions; and unrestricted electives.

program, normally taken after the sophomore year, is offered only at Meadow Valley in Plumas County.

3. *The forestry curriculum*, which occupies the last two undergraduate years and provides the basic core of professional subject matter needed to insure thorough grounding in the principles of forestry. This curriculum is offered only at Berkeley.

The following required subjects and units make up the two-year lower division preforestry curriculum:

Biological sciences (including the equivalent of at least 4 units of botany and at least 3 units of zoology, genetics, or microbiology)	12
Chemistry (including not less than 5 units of organic chemistry or biochemistry)	10
Economics (elements of economics)	8
Engineering (plane surveying)	3
English and/or rhetoric	8
Geology	3
Mathematics (calculus required; linear algebra recommended)	8
Physics (general physics)	9
Statistical methods	4
<hr/>	
Total quarter units of preforestry requirements	63
Minimum quarter units of electives	21
Minimum quarter units to enter School of Forestry	84

The two-year program shown below is designed to serve as a guide in planning an efficient distribution of courses covering these requirements.

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Chemistry 1A, 1B, 8	5	5	5
English 1A-1B or Rhetoric 1A-1B	4	4	-
Physics 2A, 2B, 2C	3	3	3
Economics 1A	-	-	5
Electives*	4	4	3
<hr/>		<hr/>	<hr/>
	16	16	16
<i>Sophomore Year</i>			
Biology 1	6	-	-
General Botany 2	-	5	-
Zoology 2	-	-	6
Economics 1B	-	5	-
Engineering 1	3	-	-
Mathematics 16A, 15, 13	3	3	4
Geology	3	-	-
Electives*	-	-	4
<hr/>		<hr/>	<hr/>
	15	13	14

* Electives to complete the requirements of the curriculum; social sciences and humanities, including American History and Institutions; and unrestricted electives.



Preveterinary Medicine

Students must complete at least 90 quarter units, including the required courses listed below. This normally requires a minimum of two years of study and satisfies the course requirements for admission to the School of Veterinary Medicine. For further information see page 105.

Subject and unit requirements for the preveterinary medical curriculum are:

Chemistry (general, qualitative, organic, and quantitative)	24
Physics (general)	9
Biology, zoology, embryology	17
English composition and additional English or rhetoric	8
Animal science†	3
Restricted electives in social sciences and humanities‡	17
Additional electives in social sciences, humanities or agriculture.	12
	—
	90

† May be waived if not available.

‡ Art, anthropology, economics, foreign languages, geography, history, music, philosophy, political science, psychology, and/or additional English, rhetoric, and mathematics.



COLLEGE OF ENGINEERING

The University's curricula in engineering emphasize design, development, and research. Mathematical analysis, the basic sciences, and design are stressed in preparing the student for a professional engineering career.

Engineering curricula on the Davis campus include aerospace, agricultural, chemical, civil, electrical, and mechanical engineering. Each curriculum is a four-year undergraduate program leading to the Bachelor of Science degree. Graduate programs leading to the degrees Master of Engineering, Doctor of Engineering, Master of Science, and Doctor of Philosophy are offered.

Admission to Freshman Standing

General requirements for admission to the University are given on page 17.

High School Preparation for Engineering

It is important that students who plan to study engineering at the University include in their high school programs the following subjects:

	<i>Units</i>
Algebra*	2
Plane geometry*	1
Trigonometry*	½
Chemistry or physics (both are desirable)	1
Mechanical drawing	1

These subjects are prerequisite to certain basic courses in the freshman engineering program. A student who is admitted without all this preparation will be required to make up equivalent work while in college. As a result, he probably will be delayed in advancement to upper division status and in graduation.

Advancement to Upper Division Standing

The student who enters the College of Engineering in lower division standing is eligible for advancement to the upper division when he completes the lower division program with an overall grade-point average of 2.00 or better.

Admission to Upper Division Standing

To qualify for admission to the College of Engineering in upper division standing, the applicant must have completed at least 60 semester units (or 90 quarter units), including the following subjects, with an overall C (2.00) average.

	<i>Minimum number of semester units</i>
Analytic geometry and calculus	12
Chemistry (for engineering and science students)	8
Physics (for engineering and science students)	10
Engineering (subjects such as graphics, properties of materials, surveying, engineering measurements, statics, and circuit theory)	10
Humanistic-social studies (must be selected from the list of courses approved by the Committee on Undergraduate Study)	6

* Or equivalent integrated courses covering the same subject material.

	<i>Minimum number of semester units</i>
Unspecified subjects (6 units may be in humanistic-social studies; the remaining units should be in engineering, science, and mathematics, and may include units in mathematics, physics, chemistry and engineering in addition to the minimum numbers specified above. Students preparing for the Chemical Engineering curriculum at Davis should take in their sophomore year quantitative analysis and one course in organic chemistry with laboratory. None of these units may be in military science or physical education)	14
	<hr/> 60

The student admitted to upper division standing on this basis will not be required to take additional lower division courses except those which are prerequisite to upper division courses in his curriculum or are specified requirements for the B.S. degree.

Note that the above subject requirements are *minimum*. Students who enter with only 60 semester units* will probably require more than six quarters to complete an upper division engineering curriculum in the University.

With certain minor exceptions noted in the lower division program, students registered in the College of Engineering are not permitted to enroll in upper division engineering courses until they have been admitted to upper division standing.

The Bachelor of Science Degree

GENERAL UNIVERSITY REQUIREMENTS

The degree of Bachelor of Science is awarded to those candidates who satisfy the requirements of the University (pages 31-33) in regard to:

- Subject A
- American History and Institutions
- Scholarship
- Residence
- Application for Degree Candidacy

COLLEGE OF ENGINEERING REQUIREMENTS

The candidate for the degree of Bachelor of Science in Engineering must:

1. Satisfactorily complete the subjects and units prescribed in one of the engineering curricula.
2. Satisfy the requirement in English (see page 75).
3. Attain a grade C average in all courses of upper division level taken in satisfaction of required technical subjects and technical electives in the curriculum.

* Semester units of credit earned prior to September, 1966, will be converted to quarter units by multiplying by the factor 1.50. The term "units" used herein, refers to the quarter-system units.

HONORS WITH THE BACHELOR'S DEGREE

Honors at graduation may be awarded to students who achieve distinguished scholarship records in all work undertaken after admission to the upper division as attested by recommendation of the Committee on Undergraduate Study of the College of Engineering. Students who display marked superiority may be awarded highest honors at graduation.

FACULTY ADVISERS AND STUDY-LIST REQUIREMENTS

Upon admission to the College, each student is assigned to a faculty adviser and is under the guidance of the Dean of the College of Engineering and the Committee on Undergraduate Study. All programs of study are arranged in conference with the adviser and must be approved by him. However, *the student is held responsible for planning his program and for the satisfactory completion of graduation requirements.* Questions regarding deviations from a regular program of study should be discussed with the adviser and resolved at the earliest possible date.

A student who gives full time to University responsibilities is expected to enroll for the number of units specified in the curriculum in which he intends to graduate. Students may not enroll for more than 19 units or less than 14 units, exclusive of physical education, without the approval of the Dean of the College of Engineering.

REQUIREMENT IN ENGLISH

Proficiency in written English is a requirement of the College of Engineering. Any student whose instructors report that his use of English in course work is unsatisfactory may be required to take remedial work in English composition. This supplementary course work will be assigned by the Associate Dean of the College of Engineering and will be added to the normal degree requirements.

HUMANISTIC-SOCIAL STUDIES

The curricula, in conformance with the regulations of the College of Engineering, include a minimum of 27 quarter units of study in the humanities and social sciences (exclusive of military science, physical education, Subject A, and any matriculation subjects). These studies are intended to help the student gain an understanding and appreciation of areas of learning other than engineering and the physical sciences. At least 9 quarter units (or 6 semester units) must be completed while the student is in the lower division and at least 9 quarter units of upper division courses must be completed after he has been advanced to upper division status in the College of Engineering. The courses must be selected from an approved list that is reviewed annually by the College Committee on Undergraduate Study. The list includes courses from such fields as history, economics, government, literature, sociology, and fine arts; it does not include such courses as accounting, hygiene, industrial management, finance, and personnel administration.

TECHNICAL ELECTIVES

Each upper division program includes a substantial number of technical elective units and lists suggested courses that may be taken as technical electives. With the adviser's approval, other appropriate courses in engineering, science, or mathematics may be taken in partial satisfaction of the technical elective requirement. A student who wishes to combine two or more technical areas may arrange such a program with the help of his adviser. Students who expect to undertake graduate study should elect additional courses in mathematics, the sciences, and basic engineering subjects as early as possible in their undergraduate program. The entire upper division program should be planned, at least tentatively, early in the junior year. Careful attention should be given to course sequences so that prerequisite courses will be taken at the proper time.

Lower Division Program

The following two-year program is prescribed for all lower division students in the College of Engineering. It provides the beginning student with the fundamentals of science, mathematics, and engineering essential as preparation for the engineering sciences and professional studies of the upper division. The 9 units of elective courses scheduled in the sophomore year may be used for military science. Students enrolling in ROTC will thus normally enroll in one more unit per quarter during the freshman year and one less unit per quarter during the sophomore year than indicated in the program.

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Engineering 3A ... 2	Engineering 3B 2	Chemistry 1C 5	
Chemistry 1A 5	Chemistry 1B 5	Mathematics 1C ... 4	
Mathematics 1A ... 4	Mathematics 1B ... 4	Physics 4B 4	
Humanities-Social Sciences 4	Physics 4A 4	Humanities-Social Sciences 4	
—	—	—	—
15	15	15	17

<i>Sophomore Year</i>			
Technical Elective* . 3(4)	Engineering 35 3	Technical Elective* . 4(3)	
Engineering 5 2	Mathematics 2B ... 4	Mathematics 2C ... 4	
Mathematics 2A ... 4	Physics 4D 4	Physics 4E 4	
Physics 4C 4	Humanities-Social Sciences 3	Elective† 3	
Elective 3	Elective 3		
—	—	—	—
16(17)	17	17	15(14)

Upper Division Curricula

The upper division curricula in the several engineering areas (Aerospace, Agricultural, Chemical, Civil, Electrical, and Mechanical) are described in the following pages. Several courses required in the first quarter of the junior year are the same in most of the programs. The total undergraduate curriculum

* Students who plan to follow the upper division program in Chemical Engineering take Chemistry 5 and Engineering 102A; all others take Engineering 4 and Engineering 45.

† Engineering 107 may be taken as an elective in the sophomore year.

normally requires twelve quarters (or eight semesters) of study and leads to the Bachelor of Science degree.

AEROSPACE ENGINEERING CURRICULUM (188 Units)

Aerospace engineering is the application of scientific knowledge to flight in the atmosphere and beyond. Specific objectives are the design, development, and manufacture of airplanes, helicopters, missiles, rockets, satellites, and space stations. The undergraduate curriculum combines the study of basic engineering disciplines with courses in aerodynamics, guidance, propulsion, and structures. A broad range of technical elective courses is available from which the student may select subjects of a more specialized nature such as aeronautics, aerostructures, and astronautics.

The curriculum is organized to develop the student's ability to apply basic engineering principles in the design of engineering systems. This training is intended to prepare him for technical leadership in this rapidly changing field.

<i>Junior Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Engineering 102A ... 3	Engineering 100 2		Engineering 103B ... 3
Engineering 104A ... 3	Engineering 101 2	Mechanical	
Engineering 105A ... 3	Engineering 102B 3	Engineering 111 .. 4	
Engineering 107 3	Engineering 103A 3	Mechanical	
Humanities-Social	Engineering 104B 3	Engineering 121 .. 3	
Sciences 4	Engineering 105B 3	Electrical	
		Engineering 160A . 3	
		Electrical	
		Engineering 161A . 2	
	—	—	—
	16	16	15
<i>Senior Year</i>			
Mechanical	Engineering 106 3	Engineering 190 3	
Engineering 123A . 2	Mechanical	Mechanical	
Mechanical	Engineering 128 .. 3	Engineering 123B . 2	
Engineering 127 .. 3	Humanities-Social	Humanities-Social	
Engineering 185 3	Sciences 4	Sciences 4	
Humanities-Social	Technical Elective .. 6	Technical Elective .. 6	
Sciences 4			
Technical Elective .. 3			
	—	—	—
	15	16	15

Suggested technical electives are: Engineering 180, 183, 186, 187; Applied Science 100, 115; Civil Engineering 131A, 131B, 135, 189; Electrical Engineering 180, 181A, 182, 187A, 187B; Mechanical Engineering 124, 125, 130A, 130B, 135A, 135B, 185A, 185B, 188.

AGRICULTURAL ENGINEERING CURRICULUM (191 Units)

The program of study in agricultural engineering prepares the student to apply engineering principles to the problems of agriculture and related industries. Agricultural engineering involves extensive utilization of basic knowledge

and techniques from several other fields of engineering; it is unique in that it also requires a general understanding and appreciation of biological and soil-management aspects of agriculture.

The technical electives in the program permit specialization in the areas of farm power and machinery, farm structures, agricultural processing, or some combination of these. Soil and water management is included in the civil engineering program.

The *power and machinery* area involves the design, development, and application of field machines and power units utilized in crop production and related activities. Economic aspects and the effects of machines on soils and crops are considered. Procedures for developing machine components and synthesizing them into an engineering system are treated.

Engineering in *farm structures* involves analysis of the structure in terms of space and labor utilization in relation to an overall enterprise, determination of the economic value to the enterprise, and consideration of basic design features. The structure is also considered as a means of providing an optimum environment for animal production, product storage and conditioning, or crop production in greenhouses. Thus, the biological aspects and the various meteorological factors are recognized in the basic analysis and design of structures.

Agricultural processing deals with the transformation of raw agricultural products into different, more usable, or more valuable forms, usually at the farm level. The basic aspects of drying, sorting, cleaning, handling, storage, size reduction, and heat and energy transfer, as well as the biological characteristics of the materials, are considered in the design of processing systems.

<i>Junior Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Engineering 100 . . . 2	Engineering 102B . . . 3	Engineering 103B . . . 3	
Engineering 101 . . . 2	Engineering 103A . . . 3	Engineering 104B . . . 3	
Engineering 102A . . . 3	Engineering 104A . . . 3	Technical Elective* . . 6	
Engineering 105A . . . 3	Engineering 105B . . . 3	Humanities-Social	
Engineering 107 . . . 3	Electrical	Sciences 4	
Humanities-Social	Engineering 160A . 3		
Sciences 4			
	—	—	—
	17	15	16
<i>Senior Year</i>			
Agricultural	Agricultural	Agricultural	
Engineering 114 . . 4	Engineering 125 . . 4	Engineering 116 . . 4	
Engineering 185 . . . 3	Engineering 106 . . . 3	Agricultural	
Mechanical	Engineering 190 . . . 3	Engineering 132 . . 4	
Engineering 118 or	Technical Elective* . . 3	Technical Elective* . . 3	
Civil Engineering	Humanities-Social	Humanities-Social	
131A 3	Sciences 4	Sciences 4	
Technical Elective* . . 6			
	—	—	—
	16	17	15

* The 18 units of technical electives must include at least 3 units of agricultural engineering courses from the list of suggested technical electives and 6 units in agricultural science fields (animal science, plant science, soil and water science). Students not electing military science should consider taking a lower division agricultural science course in their sophomore year.

Suggested technical electives are: Agricultural Economics 140; Agricultural Engineering 106, 117, 118, 126; Agronomy 100; Animal Science 2; Applied Science 115; Civil Engineering 131B, 132A, 132B, 132C, 142; Electrical Engineering 160B; Mathematics 105A; Mechanical Engineering 114, 115, 121, 122, 184; Plant Science 2; Soil and Water Science 1; Water Science and Engineering 110A, 160; Vegetable Crops 100.

CHEMICAL ENGINEERING CURRICULUM (193 Units)

Chemical engineering is concerned with converting raw materials into useful products. The products of the chemical and process industries range from antibiotics to zirconium, from petroleum to plutonium, from agricultural chemicals and foods to synthetic plastics. Preparation for careers 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 give the student a sound knowledge of the engineering and chemical sciences so that he may achieve competence in treating not only current technical problems but also those that will arise in the technologies of the future. In the upper division, attention is focused on basic engineering courses, particularly thermodynamics, fluid mechanics, and energy and mass transfer. In the senior year these fundamentals are drawn together and applied in process and plant design. The program is strengthened and broadened with introductory courses in the electrical and mechanical sciences.

The curriculum includes several technical electives which allow for special training in an area of particular interest. For example, Davis offers a unique opportunity for specialization in biochemical engineering because of the extensive staff and facilities available in the biological and food sciences. By including elective courses from the Bacteriology, Biochemistry, and Food Science and Technology Departments, the student can obtain excellent preparation for graduate work or industrial employment in food processing and related biological fields.

<i>Junior Year</i>	<i>Fall</i>		<i>Winter</i>		<i>Spring</i>
Engineering 104A . . . 3		Engineering 103B . . . 3		Chemical	
Engineering 103A . . . 3		Engineering 105A . . . 3		Engineering 152 . . . 3	
Chemical		Chemistry 112A . . . 5		Engineering 185 . . . 3	
Engineering 151 . . . 3		Chemistry 110B . . . 3		Chemistry 112D . . . 3	
Chemistry 110A . . . 3		Mathematics Elective* 3		Chemistry 110C . . . 3	
Humanities-Social Sciences 4				Chemistry 111 4	
	—		—		—
	16		17		16

* A course to be selected from the suggested list of mathematics electives.

<i>Senior Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Engineering 100 2	Chemical	Chemical	
Engineering 101 2	Engineering 155A . 1	Engineering 155B . 2	
Engineering 107 3	Chemical	Chemical	
Chemical Engineering 154A . 3	Engineering 154B . 3	Engineering 158 . . 3	
Technical Elective 3	Chemical	Chemical	
Humanities-Social Sciences 4	Engineering 156A . 3	Engineering 156B . 3	
	Technical Elective 3	Technical Elective 3	
	Economics Elective† . 3	Economics Elective† . 3	
	Humanities-Social Sciences 4	Humanities-Social Sciences 4	
	— 17	— 17	— 15

Suggested technical electives are: Engineering 102B, 104B; Applied Science 115; Bacteriology 2; Biochemistry 101; Biology 1, 2; Chemistry 121, 124, 126, 131, 150A, 150B; Civil Engineering 142, 147A, 147B; Electrical Engineering 160A, 160B, 180, 181, 182; Food Science and Technology 101, 103, 105, 106, 131; Mathematics 118A, 118B, 119, 127A, 127B, 128A, 128B, 131A, 131B, 131C, 132, 185; Mechanical Engineering 125, 185A, 185B, 186; Physics 115A, 115B, 121, 129A, 129B, 140.

CIVIL ENGINEERING CURRICULUM (190 Units)

Areas of specialization in civil engineering are environment engineering, structural engineering and mechanics, and water resources engineering.

Environment Engineering is concerned with improving and maintaining the qualities of the air, land, and water environment that affect the health and well-being of man in the face of increasing population and expanding industrial activity. The program depends on a firm basic science and civil engineering foundation and emphasizes the design of waterborne, solid, and airborne waste-management systems, the design of potable water-supply systems, and environment monitoring.

Structural Engineering and Mechanics is concerned with the conception, design, and construction of structures. Structural engineering involves buildings, bridges, highways, dams, economics of the construction industry, and construction practices. Consideration is given to the response of structures not only to gravity loading but also to earthquake, wind, and blast loading. Structural mechanics emphasizes the more analytical aspects of structural engineering. Principles of structural analysis applicable to structures of all kinds, from office buildings to space vehicles, are examined. Special topics include the mechanics of deformable bodies and the theory of elasticity.

Water Resources Engineering includes programs in Hydraulics, Irrigation and Drainage, and Water Resources Systems Design. *Hydraulics* is concerned with flow in pipe and open-channel water-distribution systems and through hydraulic structures, and depends upon a strong foundation in fluid mechanics, systems analysis, and hydrology. *Irrigation and Drainage* provides a unique program aimed at the solution of water-oriented agricultural problems by emphasizing

† To be chosen from Engineering 106, Agricultural Economics 18, or Economics 1A.

the application of hydrologic sciences, hydraulic engineering, agricultural sciences, and system analysis to the design and operation of irrigation and drainage projects. Special topics include study of water-soil-plant relations, water rights, land preparation and water application, water quality, and soil and water pollution. *Water Resources Systems Design* is concerned with the comprehensive development of water resources for multiple use. Emphasis is placed on principles of planning, analysis, and engineering design and operation as related to the water needs and wastes of industry, agriculture, recreation, and other activities. The program may include elective courses in the geography, economics, and politics of water resources.

<i>Junior Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Engineering 100 2	Engineering 102B ... 3	Engineering 103B ... 3	Civil Engineering
Engineering 101 2	Engineering 103A ... 3	131A 3	Civil Engineering
Engineering 102A ... 3	Engineering 104B ... 3	132B 3	Civil Engineering
Engineering 104A ... 3	Civil Engineering	132C 2	Civil Engineering
Engineering 105A ... 3	132A 3	Humanities-Social Sciences 4	Humanities-Social Sciences 4
Engineering 107* ... 3	Geology 150 4		
<hr/> 16	<hr/> 16	<hr/> 16	<hr/> 15
<i>Senior Year</i>			
Civil Engineering	Engineering 106 3	Engineering 190 3	
131B 2	Technical Elective ... 9	Technical Elective ... 9	
Civil Engineering	Humanities-Social Sciences 4	Humanities-Social Sciences 4	
133A 3			
Civil Engineering 142	4		
Humanities-Social Sciences			
4			
Technical Elective			
3			
<hr/> 16	<hr/> 16	<hr/> 16	<hr/> 16

Suggested technical electives are:

Environment Engineering: Agricultural Engineering 106; Bacteriology 1; Biochemistry 101A, 101B; Chemistry 8, 110A-110B; Civil Engineering 145, 146, 147, 148, 149; Geography 3; Mechanical Engineering 185A-185B; Park Administration 110.

Structural Engineering and Mechanics: Engineering 180, 183, 187; Agricultural Engineering 125, 126; Applied Science 115; Civil Engineering 133B, 134, 135, 137, 138, 139, 160; Mathematics 185; Mechanical Engineering 122, 184, 188.

Water Resources Engineering: Applied Science 115; Chemistry 5; Civil Engineering 141, 143, 144, 145, 146, 148, 189; Electrical Engineering 180, 182; Mechanical Engineering 185A-185B; Soil and Water Science 103; Water Science 10, 110A, 116, 141, 150, 160, 170.

* Engineering 107 may be taken in sophomore year concurrently with Mathematics 2C.

ELECTRICAL ENGINEERING CURRICULUM (190 Units)

Present-day electrical engineering embraces a broad spectrum of disciplines based upon the physical and mathematical sciences. For example, the marvels of electronics are being applied to such diversified fields as automation and control, information processing and computers, micro-miniaturization of circuits and components, biomedical applications, communications and microwaves, and stimulated energy emission by means of quantum effects (masers and lasers).

The course of study in electrical engineering allows the student maximum freedom to develop himself in special technical areas of his choice, while required courses insure his attainment of a broad background in basic electrical engineering. The common engineering core courses of the lower division provide a strong foundation for the specialized topics to follow. In addition, a specified group of upper division courses in network theory, field theory, systems, electronics, and communications theory prepares the student for the technical electives of his senior year.

Technical electives are a substantial part of the senior-year program. They may be selected from a wide range of courses in electrical engineering, other engineering fields, mathematics, and the physical and biological sciences. Typical fields of specialization are information and data processing, control theory, computers, communications, electronics, biomedical engineering, system theory, solid state, and high-frequency phenomena and devices.

The variety of course offerings permits the student to prepare himself for graduate study in electrical engineering, or to stop at the bachelor level with a sound background in his specialty. In the electrical engineering curriculum the close correlation between theory and experiment is emphasized.

<i>Junior Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Engineering 100 . . . 2	Electrical	Electrical	
Engineering 101 . . . 2	Engineering 160A . 3	Engineering 160B . 3	
Engineering 102A . . . 3	Electrical	Electrical	
Engineering 104A . . . 3	Engineering 161A . 2	Engineering 161B . 2	
Engineering 105A . . . 3	Electrical	Electrical	
Engineering 107 . . . 3	Engineering 181A . 3	Engineering 170 . . . 3	
	Electrical	Electrical	
	Engineering 182 . . 3	Engineering 181B . 3	
	Humanities-Social	Engineering 103A . . . 3	
	Sciences 4	Physics 121 3	
—	—	—	—
16	15	17	
<i>Senior Year</i>			
Electrical	Engineering 106 . . . 3	Engineering 190 . . . 3	
Engineering 166 . . 2	Technical Elective . . 6	Technical Elective . . 9	
Electrical	Mathematics or	Humanities-Social	
Engineering 169 . . 3	Physics Elective . . 3	Sciences 4	
Humanities-Social	Humanities-Social		
Sciences 4	Sciences 4		
Technical Elective . . 6			
—	—	—	—
15	16	16	

Suggested technical electives are: Applied Science 115; Electrical Engineering 163, 164, 165A, 165B, 165C, 167, 171A, 171B, 171C, 180, 187A, 187B; Mathematics 105A, 105B, 128A, 128B, 128C, 129, 131A, 131B, 131C, 132A, 132B, 150A, 150B, 151A, 151C, 152, 185; Mechanical Engineering 124; Engineering 180; Physics 115A, 115B, 129A, 129B, 140.

MECHANICAL ENGINEERING CURRICULUM (188 Units)

The modern mechanical engineer uses basic science in the design and manufacture of complex engineering systems. This requires the application of physical and mechanical principles in the development of machines, energy conversion systems, materials, and equipment for guidance and control. Preparation for this broad field of engineering requires a thorough knowledge of mathematics, physics, chemistry, fluid mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufacturing processes, properties of materials, and economics.

The mechanical engineering curriculum is based on a common core of engineering courses taken in the first two years. The third year is spent in further study of fundamental courses, and in the fourth year the student may tailor his studies to his own interests by selecting courses in the fields of heat transfer, fluid mechanics, thermodynamics, mechanical design, or material science. With the range of electives available, the student can prepare himself for graduate study in mechanical engineering, or obtain a broad background for entering engineering practice at the bachelor's level.

<i>Junior Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Engineering 102A ... 3	Engineering 100 2		Engineering 103B ... 3
Engineering 104A ... 3	Engineering 101 2		Mechanical
Engineering 105A ... 3	Engineering 102B ... 3		Engineering 111 .. 4
Engineering 107 3	Engineering 103A ... 3		Mechanical
Humanities-Social	Engineering 104B ... 3		Engineering 121 .. 3
Sciences 4	Engineering 105B ... 3		Electrical
			Engineering 160A . 3
			Electrical
			Engineering 161A . 2
	<hr/> 16	<hr/> 16	<hr/> 15
<i>Senior Year</i>			
Engineering 185 3	Engineering 106 3		Engineering 190 3
Mechanical	Humanities-Social		Mechanical
Engineering 118 .. 3	Sciences 4		Engineering 123B . 2
Mechanical	Technical Elective ... 9		Humanities-Social
Engineering 123A . 2			Sciences 4
Humanities-Social			Technical Elective ... 6
Sciences 4			
Technical Elective ... 3			
	<hr/> 15	<hr/> 16	<hr/> 15



Suggested technical electives are:

Heat transfer—fluid mechanics—thermodynamics option: Engineering 180; Applied Science 100, 115; Electrical Engineering 160B, 180, 181A, 182, 187A, 187B; Mechanical Engineering 124, 125, 127, 128, 130A, 130B, 185A, 185B, 186.

Mechanical Design option: Engineering 180, 183, 187; Agricultural Engineering 118; Applied Science 115; Civil Engineering 189; Electrical Engineering 160B, 161B, 163, 180, 182, 187A, 187B; Mechanical Engineering 114, 115, 120, 122, 124, 184, 188.

Graduate Study

Scholastically qualified students who expect to make a profession of teaching, research, or analytical design are encouraged to undertake graduate work. Programs leading to advanced degrees (M.S., Ph.D., M.Eng., D.Eng.) can be arranged in the following areas of study:

Applied chemical kinetics

Thermodynamics

Fluid mechanics

Agricultural power and machinery,

Heat and mass transfer

processing, or structures

Hydraulics

Irrigation, drainage and water re-

Hydrology

sources engineering

Solid and structural mechanics

Electromagnetic fields and waves

Control and communications systems

Computer sciences

Solid state and quantum electronics

The graduate courses offered in the College of Engineering are described in the departmental listings (pages 192-207).

For admission and degree requirements write to the Associate Dean, College of Engineering, or to the Dean of the Graduate Division, University of California, Davis.

GRADUATE STUDY IN APPLIED SCIENCE

The Department of Applied Science in the College of Engineering at the University of California, Davis, provides instruction at the graduate level leading to the degrees Master of Science in Engineering and Doctor of Philosophy in Engineering. The curriculum integrates studies in physics, chemistry, mathematics, and engineering. Courses are offered both on the Davis campus and at the Livermore site of the University of California Lawrence Radiation Laboratory. The exceptional facilities of the Livermore site are used for study and research in such fields as reactor engineering, plasma physics, the behavior of materials, and computing technology. Much of the research necessary for the doctorate is conducted at the Livermore Laboratory.

The graduate courses offered by the Department of Applied Science are described on page 196.



COLLEGE OF LETTERS AND SCIENCE

The College of Letters and Science offers curricula that enable the student to pursue fundamental knowledge primarily for its own sake and to learn basic intellectual disciplines. Programs of study in the College expose the student to man's social, aesthetic, and material achievements, as well as to the challenge of his ethical, political, and physical environment. In many cases the pursuit of cultural truths will also lead the student to an appreciation of the individual's capacity for unique creative expression. Such a liberal education has increasing vocational value, since more and more career opportunities presuppose a basic letters and science degree; nevertheless, the main emphasis in the College rests on the ends of living rather than on the means. A well-balanced liberal education, including specialized knowledge in his major field, prepares the graduate for a satisfying life whatever his career.

Graduation from the College of Letters and Science presupposes fulfillment of the general University requirements. In addition, to achieve its educational objectives, the College has established certain specific standards relating to scholarship, senior residence, and unit distribution within the student's program of study. The two most important standards determining the unit-distribution pattern are those which relate to the Breadth Requirements, and to the Departmental Major Requirement. The *Breadth Requirements* are designed to provide a broad background of knowledge and to create a sensitivity in the student for cultural interrelationships. The *Major Requirement* enables the student to gain intellectual depth and competence in his chosen field of specialization. Requirements within the various departmental major programs are determined and administered by the separate departments, or, in the case of interdepartmental or individual group majors, by an interdepartmental committee or group.

The College offers the undergraduate degrees of Bachelor of Arts and Bachelor of Science. These degrees are conferred upon completion of the general University and College requirements, detailed below for each of these degrees. *Every student is responsible for seeing that he meets the University, College, and departmental or committee requirements for graduation.*

The specific subject requirements for the bachelor's degree may be satisfied only by:

1. Courses in regular sessions of the University of California or University summer session courses identified with the letter "S."
2. Courses for which transfer credit is granted from another college or university.
3. With the written permission of the academic Dean, courses in University Extension, University of California, with numbers having the prefix "X" either singly or combined with other letters. The Dean of the College only under exceptional circumstances permits students in residence to enroll in Extension courses for credit. No grade points are assigned for courses completed in University Extension.

General University Requirements

All candidates for the bachelor's degree are obligated to satisfy the University requirements (pages 31-33) in regard to:

Subject A

American History and Institutions

Scholarship

Residence (additional College stipulations are discussed on page 89)

Application for Degree Candidacy

College of Letters and Science Requirements

UNIT DISTRIBUTION REQUIREMENTS

Satisfactory completion of a minimum of 180 units is required for graduation from the College of Letters and Science.

A. At least 160 units must be completed from the "Letters and Science List of Courses" (page 98) so as to provide the following distribution:

1. Breadth Requirements. (No course applied toward satisfaction of one breadth requirement may be offered to satisfy another.)

a. *English 1A-1B* (English Reading and Composition), to be completed directly after meeting the Subject A requirement.

b. *Foreign Language* (for details of this requirement see page 91).

<i>A.B. degree:</i>	18 units or the equivalent in one language.	<i>B.S. degree:</i>	16 units or the equivalent in one language begun in high school, or 12 units in one language begun in college.
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c. *Area Requirements* (see pages 96-98 for lists of acceptable courses).

<i>A.B. degree:</i>	<i>Units</i>	<i>B.S. degree:</i>	<i>Units</i>
Humanities		Humanities	22
Natural Sciences	56	Social Sciences	
Social Sciences		Natural Sciences	90
(20 units in each of two of the above areas, 16 in the third)			—
			112

2. At least 54 units must be in upper division courses from the "Letters and Science List of Courses."

3. Not more than 12 units of the 160-unit total may be offered in performance courses (chorus, debate, painting, theatre laboratory, etc.).

B. Of the 20 units permitted from courses not on the "Letters and Science List of Courses,"

1. Not more than 9 units may consist of courses in the 300 and 400 series, and

2. Not more than 6 units may consist of Physical Education courses 1 or 26.

C. Not more than 66 semester units (99 quarter units) of junior college *transfer credit* are applicable toward the degree, and at least the final 80 graduation units must be completed in four-year collegiate institutions. (See below for the senior residence requirement of the College.)

D. Not more than 45 upper division units in one department may be counted toward the A.B. degree. For exceptions applying to honors students, see page 95.

E. Study programs totaling less than 12 units per quarter must be approved by the Dean of the College. The maximum program permissible without special approval by the Dean is 17 units for all freshmen, as well as for transfer students who are in their first quarter of residence.

SCHOLARSHIP REQUIREMENTS

In addition to the general University requirements of a C average (2.00) for all University work, the College stipulates separate averages of at least C for:

1. All courses required in the major program, and for
2. All upper division courses required for the major program.

At the option of the department or interdepartmental committee administering the major, students failing to meet the above conditions may be denied the privilege of pursuing that major.

SENIOR RESIDENCE REQUIREMENTS

Students admitted to senior standing on the basis of credit from other institutions or from other colleges within the University must complete 27 of the final 36 residence units in upper division courses of the College, including at least 18 in the major program. For students in this category entering the University immediately after a period in the armed forces, the requirement is reduced from 27 to 24 units.

These requirements also apply to students in any overseas study program who plan to take a bachelor's degree in this College. Waivers are granted only in exceptional cases and must be arranged before leaving this campus.

REQUIREMENTS IN THE MAJOR

The number of upper division units a student must complete in the subject of his major varies among departments, the requirement ranging from 36 to 45 units. Major programs are designed by the Faculty of the College to insure that all students pursuing the same major will acquire certain knowledge in common. In addition, each student is encouraged to engage in independent study within the major.

A student must declare his major program or department by the time he has completed 84 units, but he may designate his preference as early as he wishes. As soon as a student has been accepted for a major program, he is assigned a major adviser.

A student may change from one major to another with the approval of the Dean of the College and with the consent of the department or committee in charge of the new major. Petitions for change of major are made on forms obtainable from the Registrar or the Dean of the College. After the beginning

of the senior year, a student may not transfer from one major program to another, or from B.S. to A.B. (or vice versa). A student may not elect an individual group major after beginning the final quarter of his junior year.

Any student who fulfills the requirements of two major programs in the College of Letters and Science may elect to receive a bachelor's degree in both fields.

Three types of programs satisfy requirements for the major: departmental, interdepartmental, and individual group programs.

A. Departmental Majors. The requirements for departmental major programs are described in detail under departmental listings. Major programs leading to a Bachelor of Arts degree are offered in the following departments; those departments also offering programs leading to a Bachelor of Science degree are indicated by an asterisk:

Anthropology	Geography	Physical Education
Art	Geology*	Physics*
Bacteriology*	German	Political Science
Botany*	Greek	Psychology
Chemistry*	History	Rhetoric
Dramatic Art	Latin	Russian
Economics	Mathematics*	Sociology
English	Music	Spanish
French	Philosophy	Zoology*

B. Interdepartmental Majors. These programs are intended for students interested in broader scope than that provided by a departmental major. Interdepartmental major programs leading to a Bachelor of Arts degree are offered in:

- American History and Literature (see page 131)
- Biological Sciences (see page 153)
- International Relations (see page 247)
- Physical Sciences (see page 269)

The Biological Sciences and the Physical Sciences programs also offer a Bachelor of Science degree.

C. Individual Group Majors. A student wishing to elect other than an established departmental or interdepartmental major may satisfy his particular interests by petitioning for an individual group major offered by a group of departments. The petition must be presented to the Dean and approved by the Executive Committee of the College by the beginning of the fourth quarter before graduation. To insure proper breadth and depth, an individual group major involving two or more departments must consist of not fewer than 45 upper division units nor more than 54. This plan must be prepared in consultation with a member of the department in which the student will do most of his work. It should describe the special educational aims of the major and indicate that it meets University standards with respect to major programs. On approval of the plan, an appropriate adviser will be designated to supervise the major program.

Planning the Program

Before instruction begins each quarter, the student should prepare a tentative program of study. He will then meet with his faculty adviser to review the proposed program and to obtain approval of an official study list. Faculty advisers are assigned to each new student at the beginning of the registration period. The official study list as approved must be filed with the Registrar according to the procedures described in the *Schedule and Directory*, available at the beginning of each quarter.

A study list totaling fewer than 12 units requires the approval of the academic dean, and will be allowed only in cases of poor health or regular outside occupation. Freshmen and transfer students in their first quarter of residence may not undertake more than 17 units without special permission from the Dean. For purposes of calculating program load, the total number of units shown on the study list must include the unit value of repeated courses and of any course work not carrying degree credit (for example, Subject A and foreign language courses which duplicate high school training).

No course may be added to the study list after the second week of instruction, and except in the case of prolonged illness or emergency, students will receive a grade of F in any course dropped after the third week of instruction.

Entering Freshmen

Because of the wide choice of subjects open to the Letters and Science student, a sample first-year program is not feasible. The entering freshman should, however, be able to plan his first-year program satisfactorily by keeping in mind the following points.

1. English 1A-1B must be completed during the freshman year (or directly after the Subject A requirement has been met).

2. The foreign language requirement should be completed by the end of the first or second year, as program priorities permit. Upon admission to the College, a student electing to continue a language studied in high school must take the Foreign Language Placement Test in that language. His performance in this examination determines the amount of additional course work, if any, he needs to satisfy the requirement in that language. Students placed below the course they normally would enter on the basis of their high school preparation will receive one-half of the quarter-hours credit for the course just preceding the minimum placement listed below and no credit for earlier courses if these must be repeated.

Years of high school language	0	1	2	3	4	5
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Minimum initial course:

French, German, Italian,

Latin, and Spanish	1	1	3	4	5	6
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Russian and Greek	1	1	2	3	4	
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Students *continuing* a language studied in high school must for the A.B. degree complete the first 18-unit sequence and for the B.S. degree, a 16-unit sequence.

Students *beginning* the study of a language at the University and enrolled in an A.B. program must also complete the first 18-unit sequence, or through the fifth-quarter course, while those enrolled in a B.S. program are obliged to complete the first 12-unit sequence, or through the third-quarter course.

3. The Breadth Requirement in the areas of the humanities, natural sciences, and social sciences, for students enrolled in an A.B. program, calls for a total of 56 units, which should be completed by the junior year (see pages 96-98 for the three Breadth Lists).

These area requirements are particularly important for the entering freshman who has not decided on a major. Careful consultation with his adviser and thoughtful selection from each of the three groups will help the student to determine his preference for a major. Entering freshmen who feel certain of their major field should consult the requirements of that major in planning their first-year program, as a first-year course may be a prerequisite for further studies in that field.

Preparation for Admission to Professional Schools

Although students preparing for admission to a professional school cannot declare any preprofessional program as their major, they should select courses which fulfill College requirements as well as their preprofessional needs. If transfer to a professional school is not made by the time he has completed 84 units, the student must enroll in one of the major programs listed on page 90.

Students planning to seek admission to a professional school or College should communicate as early as possible with the dean of that school for precise admission requirements. Official announcements detailing the specific admission requirements may be obtained from the Registrar for the following schools within the University of California:

Business Administration
Dentistry
Law (see page 101)
Medicine

Nursing
Optometry
Pharmacy
Physical Therapy

Entering students are assigned an adviser for the preprofessional programs at the beginning of each registration period. Those curricula preparing students for admission as undergraduates to professional schools in the University of California are described below (scholarship stipulations refer to students with permanent legal residence in California).

Business Administration

A minimum scholarship average of 2.00, completion of 90 quarter units of unduplicated college work, and fulfillment of the following specific requirements:

- a. American History and Institutions.
- b. English 1A-1B or Rhetoric 1A-1B; 4 additional units in English composition, rhetoric, or literature.

- c. Mathematics: 1A-1B or 16A-16B.
- d. Statistics: Mathematics 13 or Economics 12.
- e. Foreign Language: 12 units (through 3rd-quarter course) in one language, or the high school equivalent (6 units for the first two years, 6 units for each subsequent year). See additional requirement for B.S. degree in Business Administration.
- f. Natural Sciences: 9 units (see additional degree requirement).
- g. Social Sciences: Economics 1A-1B, 11; Psychology 1A or Sociology 1; Anthropology 2, or Psychology 1A, or Sociology 1.

Dentistry

A minimum scholarship average of 2.50, completion of 90 quarter units of unduplicated college work, and fulfillment of the following specific requirements:

- a. American History and Institutions.
- b. English 1A-1B or Rhetoric 1A-1B.
- c. Chemistry: 1A, 1B, 1C; 5, 8.
- d. Physics: 2A, 2B, 2C; 3A, 3B, 3C.
- e. Biology 1; Zoology 2.
- f. Foreign Language: 18 units (through 5th-quarter course) in one language, or the high school equivalent (6 units for the first two years, 6 units for each subsequent year). Under certain conditions, students may petition to substitute 12 units in one department of the social sciences or humanities (in addition to g below).
- g. Humanities and Social Sciences: 18 units altogether (in addition to requirement b above), including at least one one-year sequence within a single department. No more than 3 units of mathematics may be offered in partial satisfaction of this requirement.

Medicine

A minimum scholarship average of 2.80, completion of 135 quarter units of unduplicated college work, and fulfillment of the following specific requirements:

- a. American History and Institutions.
- b. English 1A-1B or Rhetoric 1A-1B.
- c. Chemistry: 1A, 1B, 1C; 5, 8.
- d. Physics: 2A, 2B, 2C; 3A, 3B, 3C.
- e. Biology 1; Zoology 2, 100.
- f. Foreign Language: 12 units (through 3rd-quarter course) in one language, or 3 years of one language in high school.
- g. Humanities and/or Social Sciences: 18 units.
- h. Electives (to complete total of 135 units): recommended are courses satisfying Letters and Science College and departmental major requirements, but not anatomy, physiology or bacteriology, which are part of the Medical School curriculum.

Nursing

A minimum scholarship average of 2.20, completion of 90 quarter units of unduplicated college work, and fulfillment of the following specific requirements:

- a. American History and Institutions.
- b. English 1A-1B.
- c. Chemistry 1A-1B.
- d. Biological Sciences: Biology 1; Bacteriology 2; Physiology 1, 1L; Zoology 25.
- e. Foreign Language: 18 units (through 5th-quarter course) in one language, or the high school equivalent thereof.
- f. Humanities: 18 units.
- g. Social Sciences: 18 units, including Psychology 1A, Sociology 1, Anthropology 2.

Optometry

A minimum scholarship average of 2.00, completion of 90 quarter units of unduplicated college work, and fulfillment of the following specific requirements:

- a. American History and Institutions.
- b. English 1A-1B or Rhetoric 1A-1B.
- c. Mathematics 16A-16B.
- d. Physics 2A, 2B, 2C; 3A, 3B, 3C.
- e. Psychology 1A-1B, 1C or 33.
- f. Biology 1; Bacteriology 2; Physiology 1, 1L.
- g. Chemistry 1A-1B, 8.

Pharmacy

A minimum scholarship average of 2.00, completion of 90 quarter units of unduplicated college work, and fulfillment of the following specific requirements:

- a. American History and Institutions.
- b. English 1A-1B or Rhetoric 1A-1B.
- c. Chemistry 1A, 1B, 1C.
- d. Physics 2A, 2B, 2C; 3A, 3B, 3C.
- e. Mathematics 16A, 16B, 16C.
- f. Biology 1, 2; Zoology 2.
- g. Electives: 9 units in a single department.

Physical Therapy

A minimum scholarship average of 2.50, completion of 135 quarter units of unduplicated college work, and fulfillment of the following specific requirements:

- a. American History and Institutions.
- b. English 1A-1B or Rhetoric 1A-1B.
- c. Chemistry 1A-1B.
- d. Physics 10.
- e. Psychology 1A, 168.

- f. Foreign Language: 18 units (through 5th-quarter course) in one language, or the high school equivalent thereof (6 units for the first two high school years, 6 units for each subsequent year).
- g. Physiology 1, 1L; Zoology 25.
- h. Natural Sciences: 39 units (courses such as general biology, kinesiology, and bacteriology may be used to satisfy this requirement).
- i. Humanities: 18 units (should include 4 units of American History and Institutions requirement).
- j. Social Sciences: 18 units (should include 4 units of the American History and Institutions requirement).

Preparation for postgraduate training in *Medical Technology* can be accomplished by completing the regular undergraduate major programs in Bacteriology and Biological Sciences (see pages 150 and 153).

Students preparing for postgraduate training in *Social Welfare* are referred to the introduction to Sociology course offerings (see page 298).

The Teaching Credential

The teacher-training program is administered by the Graduate Division. Certain undergraduate courses, however, are required as preparation for the program. Students interested in obtaining the elementary or general secondary teaching credential should consult the appropriate adviser in the Department of Education as early as possible, preferably by the end of the freshman year (see also page 114).

Honors

THE DEAN'S HONORS LIST

The College publishes each quarter in the *Student Directory* an honors list, which includes the names of all students who have completed at least 12 units in the College and who also have at least grade B averages for all College, all University, and all collegiate transfer work undertaken.

A student on the honors list gains certain privileges:

1. Having completed 40 units in the College and subject to approval by the instructor concerned, he may take one elective course each quarter to apply *only* toward the 180-unit degree requirement and not carrying grade-point credit in which he shall be marked "pass" or "fail." Petitions to enroll in elective courses under these circumstances must be filed with the Registrar not later than the third week of classes, and this commitment may not be reversed after that date.

2. Subject to the instructor's approval, he is eligible to take any course 194H or other honors program offered, for which other students may qualify only with the special permission of the Dean. In the case of such courses, the Dean may waive the normal "add" and "drop" deadlines for an honors student, as well as any attendant penalty fee.

3. Senior students on the honors list who have a grade B average for their junior year's work at the University are eligible for the following additional privileges:

- a. Their study list may total less than 12 units per quarter.
- b. They may earn more than 45 units of upper division degree credit in one department.
- c. The department or committee supervising their major program may waive its requirements concerning specific courses or sequences in the major program.

HONORS PROGRAMS

Special programs for honors students are available in connection with certain major programs. These are described in the introduction to the department's course offerings. Interested students should consult their major advisers.

A student on the honors list may enroll, upon recommendation of his major adviser, in the honors program in his major at any time not later than the first quarter of his senior year.

BACCALAUREATE HONORS

Students may qualify for honors, high honors, or highest honors with the bachelor's degree upon recommendation of the department or committee supervising the major program, the Committee on Honors, and the Executive Committee of the College of Letters and Science.

A list of students so honored is published in the annual Commencement Program.

AWARDS FOR ACADEMIC EXCELLENCE

In addition to eligibility for the University Medal (see page 34), graduating seniors with superior scholastic records in the College may be recommended by the faculty for the Letters and Science Medal. Academic excellence is the primary basis for choosing the recipient of this award.

Each year the College also honors high scholastic achievement through its award of the Herbert A. Young—Letters and Science Medal to a student with a distinguished academic record in the College.

Area Requirement Lists

Only courses listed below will be accepted in fulfillment of the area requirements of the College. No course applied toward satisfaction of one area requirement may be offered to satisfy another. No courses marked with an "H," or numbered 198 or 199, or taken by honors students on a "pass" or "fail" basis may be counted toward the breadth requirements.

HUMANITIES LIST

1. No more than 8 units of History or Political Science courses on this list may be counted as Humanities.

2. Of the units offered in satisfaction of the American History and Institutions requirement, half shall be counted as Humanities and half shall be counted as Social Science.

3. Not more than 6 units in performance courses may be counted toward the Humanities requirement.

Art. All undergraduate courses except 16, 190. Performance courses: 2, 3, 4, 12A, 12B, 14A, 14B, 16, 102, 104, 129, 141, 142, 143.

Classics. All undergraduate courses.

Dramatic Art. All undergraduate courses except 24, 124A, 124C. Performance courses: 30, 180.

English. All undergraduate courses except 1A, 1B, 25, 26.

French. All undergraduate courses except 1, 2, 3, 4, 5.

German. All undergraduate courses except 1, 2, 3, 11, 12.

Greek. All undergraduate courses except 1, 2, 3.

History. 4A, 4B, 4C, 111A, 111B, 111C, 121A, 121B, 121C, 131A, 131B, 131C, 133, 134A, 134B, 175A, 175B, 178A, 178B, 190A, 190B.

Italian. All undergraduate courses except 1, 2, 3, 4, 5.

Latin. All undergraduate courses except 1, 2, 3, 4, 5.

Music. All undergraduate courses except 10. Performance courses: 41, 42, 43, 44, 46, 141, 142, 143, 144, 146.

Oriental Languages. All undergraduate courses except Chinese 1, 2, 3, 4, 5; Hebrew 1, 2, 3, 4, 5; Japanese 1, 2, 3, 4, 5; Telugu 1.

Philosophy. All undergraduate courses.

Political Science. 118A, 118B, 119.

Rhetoric. All undergraduate courses. Performance course: 141.

Russian. All undergraduate courses except 1, 2, 3, 4, 5.

Spanish. All undergraduate courses except 1, 2, 3, 4, 5.

NATURAL SCIENCES LIST

1. Students lacking an advanced high school year course with laboratory must offer one of the following courses or course sequences toward satisfaction of the Natural Science requirement: Biology 1, Chemistry 1A, Entomology 1, Geology 4, Physics 3A, 3B, Physics 3A, 3C, Physics 3B, 3C, Physics 4A, 4B, Physics 4A, 4C, Physiology 1L.

2. A minimum of 4 units *each* must be offered from the Biological Sciences list and from the Physical Sciences list.

Biological Sciences

Anthropology. 1, 152, 153, 154A, 154B, 154C.

Bacteriology. All undergraduate courses except 106.

Biology. 1, 2.

Botany. All undergraduate courses except 8, 107, 155.

Entomology. 1.

Physical Sciences

Chemistry. All undergraduate courses.

Geography. 1, 3.

Geology. All undergraduate courses except 102A, 102B, 111, 150.

Mathematics. All undergraduate courses except 30, 129.

Physics. All undergraduate courses.

*Biological Sciences (Cont.)***Genetics.** All undergraduate courses.**Geology.** 111.**Physiology.** 1, 1L.**Psychology.** 1B, 108, 150A, 150B.**Zoology.** All undergraduate courses except 104, 116.**SOCIAL SCIENCES LIST**

Of the units offered in satisfaction of the American History and Institutions requirement, half shall be counted as Humanities and half shall be counted as Social Science.

Anthropology. All undergraduate courses except 1, 152, 153, 154A, 154B, 154C.

Economics. All undergraduate courses except 11A, 11B, 12.

Education. 110.

Geography. All undergraduate courses except 1, 3, 105, 161.

History. All undergraduate courses except 4A, 4B, 4C, 111A, 111B, 111C,

121A, 121B, 121C, 131A, 131B, 131C, 133, 134A, 134B, 175A, 175B, 178A, 178B, 190A, 190B.

Political Science. All undergraduate courses except 118A, 118B, 119.

Psychology. All undergraduate courses except 1B, 3, 108, 150A, 150B, 165.

Sociology. All undergraduate courses except 185.

Letters and Science List of Courses

Of the 180 units required for graduation, at least 160 units must be selected from this list with at least 54 units in upper division courses and not more than 12 units in performance courses.

Any course not included in the Letter and Science List of Courses but required, or accepted, as part of a major program in the College or as a prerequisite therefor shall, for students offering that major at graduation, be treated as if it were on the Letters and Science List of Courses. In addition, any course offered outside the College but appearing on the Area lists shall be similarly treated.

The following list refers to the courses as given in the departmental offerings for the academic year 1966-67.

American History and Literature. All undergraduate courses.

Anthropology. All undergraduate courses.

Art. All undergraduate courses. Performance courses: 2, 3, 4, 12A, 12B, 14A, 14B, 16, 102, 121A, 121B, 128A, 128B, 128C, 141, 142, 143.

Bacteriology. All undergraduate courses except 106.

Biochemistry and Biophysics. All upper division courses.

Biological Sciences. All undergraduate courses.

Botany. All undergraduate courses except 8, 107; 180.

Chemistry. All undergraduate courses.

Classics. All undergraduate courses.

Dramatic Art. All undergraduate courses. Performance courses: 30, 180.

- Economics.** All undergraduate courses.
Education. 110.
English. All undergraduate courses.
French. All undergraduate courses.
Genetics. All undergraduate courses.
Geography. All undergraduate courses.
Geology. All undergraduate courses except 150.
German. All undergraduate courses.
Greek. All undergraduate courses.
History. All undergraduate courses.
Latin. All undergraduate courses.
Linguistics. 140.
Mathematics. All undergraduate courses.
Military Science. All lower division courses.
Music. All undergraduate courses. Performance courses: 41, 42, 43, 44, 46, 110, 141, 142, 143, 144, 146.
Oriental Languages. All undergraduate courses.
Philosophy. All undergraduate courses.
Physical Education. 103A, 103B, 104, 110.
Physics. All undergraduate courses.
Physiology. 1, 1L.
Political Science. All undergraduate courses.
Psychology. All undergraduate courses.
Rhetoric. All undergraduate courses. Performance course: 141.
Russian. All undergraduate courses.
Sociology. All undergraduate courses.
Spanish. All undergraduate courses.
Zoology. All undergraduate courses.



SCHOOL OF LAW

The School offers a three-year curriculum of graduate study leading to the degree of Bachelor of Laws. Only a first-year class is being accepted in the fall of 1966.

The primary purposes of the School are to prepare students for the practice of law and to foster legal research and development. Particular attention (especially in research and public service) is paid to problems involving agriculture, natural resources, and state and local government.

Preparation for the Study of Law

No specific college major is required for admission to the School of Law, and there is no prescribed prelegal program. Degrees from the Colleges of Agriculture, Engineering, and Letters and Science are all acceptable. The individual student's college record and Admission Test score must, of course, demonstrate that he is qualified for law study.

Prelegal students should plan a course of study that will give them a broad cultural background and include intensive work for a substantial period of time in a selected field of study. It is most important that prelegal students obtain mastery of the English language. They should be able to read rapidly and with comprehension and to express themselves clearly, completely, and concisely, both orally and in writing.

Requirements for Admission to the School of Law

Applicants for admission to the professional curriculum of the School of Law, leading to the degree of Bachelor of Laws, must have received a bachelor's degree or an equivalent degree from a college or university of approved standing before beginning their work in the School of Law. The applicant's college record must be of sufficiently high quality to demonstrate that he is qualified for the study of law. The work of the last two college years will be considered more heavily than that of earlier years.

The applicant must also achieve a satisfactory score on the Law School Admission Test. All applications are reviewed by the Law School Admissions Committee. Students are admitted only on a full-time basis and only in September.

Law School Admission Test

All applicants are required to take the Law School Admission Test administered by the Educational Testing Service. Testing centers have been established for the convenience of applicants in all parts of the United States and in many foreign countries. Applicants are urged to take the test as early as possible, and in any event not later than February in the academic year prior to that in which they seek admission to the School.

Applicants should write to: Law School Admission Test, Educational Testing Service, Princeton, New Jersey 08540, to obtain application forms and information about the test and the location of testing centers.



Admission Procedures

1. Application for admission to the School of Law should be made on forms which will be supplied by the School and should be addressed to: Dean, School of Law, University of California, Davis, California 95616. The last date for filing completed application forms is May 1 of the year in which admission is sought, but earlier filing is strongly recommended.
2. Transcripts of college work through the first semester or quarter of the applicant's senior year should accompany or immediately follow his application forms. As soon as they are available, the applicant should submit supplementary transcripts to cover any work he completes *after* making application.
3. The applicant should take the Law School Admission Test and request that his score be reported to the School of Law.
4. Acceptance by the School of Law is always subject to the admissions action taken by the Graduate Division of the University. Normally, applicants accepted by the School of Law will also be accepted by the Graduate Division. It is suggested that the applicant defer submitting his application to the Graduate Division until he has been notified of acceptance by the School of Law. If the applicant is admitted to the School of Law, Graduate Division application materials will be enclosed with the admission notification from the School. The separate application, including transcripts, must then be submitted with a \$10.00 fee to the Graduate Division.

Professional Curriculum and Degree

The course of study in the professional curriculum requires nine quarters for completion and extends over a period of three years. The work of the first year is prescribed; courses constituting the first-year curriculum are listed on page 248. This work provides the essential foundation for subsequent legal study, and the satisfactory completion of the first-year courses is in all cases a prerequisite to courses of the second and third years. First-year students who fail to attain satisfactory grades at the end of their first year may be required to withdraw from the School.

A second-year curriculum will be introduced in September 1967 and a third-year curriculum in September 1968. Detailed information concerning these curricula will be announced.

The curriculum of the School is designed for full-time students only.

Students who have been admitted to the School as candidates for the professional degree and who have completed satisfactorily the professional curriculum and the required period of resident study will be recommended for the degree of Bachelor of Laws.



SCHOOL OF VETERINARY MEDICINE*

The degree Doctor of Veterinary Medicine may be obtained by pursuing a course of study requiring a minimum of six years. The final four years must be spent in the professional veterinary medical curriculum.

Students planning a career in veterinary medicine should consider broadening their educational experience by completing the baccalaureate degree before applying to the professional school.

PREVETERINARY MEDICAL REQUIREMENTS

Students must complete a minimum of 90 quarter units (60 semester units) of college work including the required courses listed in the preveterinary medical curriculum (page 106) before they will be admitted to the School of Veterinary Medicine. Those who have met these requirements with excellent scholastic achievement may be admitted at the end of two years of study. However, all preveterinary medical students, in addition to satisfying the preprofessional course requirements, should plan their program so they can obtain a baccalaureate degree in four years.

APPLICATION

Students are admitted to the School of Veterinary Medicine in the fall of each year. Application forms may be obtained after October 1 from the Office of Admissions, University of California, Davis 95616; they must be completed and returned to that office *before February 28* of the year for which application is made. Students may apply before completing all the requirements. However, they must submit a detailed list of courses in progress and a list of all courses to be completed by June 15 of the year they wish to be considered. *Applications lacking this information will not be processed.*

ADMISSION TO THE SCHOOL OF VETERINARY MEDICINE

Enrollment is limited, and applicants are selected primarily on the basis of scholarship with particular emphasis placed on achievement in chemistry, physics, and zoology. In addition, candidates should have sufficient experience with animals to justify their decision to pursue a lifetime career in veterinary medicine.

Personal qualifications also receive consideration. An interview may be required to enable the Committee on Admissions to make the most accurate judgment possible. Applicants will be notified before July 15 of their admission status.

The School of Veterinary Medicine at the University of California participates in the student program administered by the Western Interstate Commission for Higher Education (WICHE). Students residing in western states without a school of veterinary medicine who wish to participate in this program must be certified by their home state. For addresses of state certifying officers, write to the Western Interstate Commission for Higher Education, University East Campus, 30th Street, Boulder, Colorado.

* For additional information prospective students should consult the *Announcement of the School of Veterinary Medicine*, obtainable without charge from the Dean, School of Veterinary Medicine, University of California, Davis.

AFTER ADMISSION

After admission to the School of Veterinary Medicine, the student completes a four-year professional curriculum leading to the degree Doctor of Veterinary Medicine. At the end of the first two years of the professional curriculum students who do not hold a baccalaureate are eligible to receive a Bachelor of Science degree in Veterinary Science.

Preveterinary Medical Curriculum

Applicants for admission to the School of Veterinary Medicine must complete:

1. Mathematics through trigonometry;* Subject A; and American History and Institutions.

2. At least 90 quarter units or 60 semester units of credit in the University of California or other accredited institution, including the prescribed subjects listed below. (Minor shortages may be waived by the Admissions Committee of the School of Veterinary Medicine.)

3. Subject Requirements:

	<i>Quarter Units</i>
Chemistry (general, qualitative, organic, and quantitative)	24
Physics (general)	9
Biology, zoology, embryology	17
English composition and additional English or rhetoric	8
Animal science†	3
Restricted electives in social sciences and humanities‡	17
Additional electives in social sciences, humanities or agriculture ..	12
	<hr/>
	90

Students completing the preveterinary medical requirements in institutions other than University of California, Davis, are urged to check the catalog of their college carefully to be sure they are taking equivalent courses.

Plan of Study

<i>Freshman Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Chemistry 1A, 1B, 1C	5	5	5
English 1A and additional English or rhetoric	4	4	—
Biology 1	—	—	6
Animal Science 2	—	—	3
Electives	6	6	1
	<hr/>	<hr/>	<hr/>
	15	15	15

Sophomore Year

Physics 2A, 2B, 2C	3	3	3
Chemistry 8, 5	4	—	5

* Should be completed in high school.

† May be waived if not available.

‡ Art, anthropology, economics, foreign languages, geography, history, music, philosophy, political science, psychology, sociology, and/or additional English, rhetoric, and mathematics.

<i>Sophomore Year (Cont.)</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Zoology 2	6	-	-
Zoology 100 (vertebrate embryology)	-	5	-
Electives	2	7	7
	—	—	—
	15	15	15

Requirements for the Degree Doctor of Veterinary Medicine

1. The candidate for the degree Doctor of Veterinary Medicine must have completed the general University requirements for a baccalaureate degree (page 31).

2. He must possess good moral character.

3. He must have studied veterinary medicine for the equivalent of twelve quarters of twelve weeks each. The last six quarters must have been spent in the University of California School of Veterinary Medicine.

4. He must have completed the required work, satisfactorily fulfilled all special requirements, and received throughout the entire veterinary medical curriculum satisfactory grades as determined by the Faculty of the School and by the Graduate Council.

Plan of Study

<i>First Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Anatomy 150	3	Anatomy 155	2
Anatomy 151	4	Anatomy 156	2
Anatomy 152	1	Anatomy 157	2
Genetics 100	5	Physiological Sciences 101B	3
Physiological Sciences 101A	4	Physiological Sciences 102B	2
Physiological Sciences 102A	1	Physiological Sciences 140A	5
		Physiological Sciences 141A	1
	—	—	—
	18	17	17

6

Second Year

Pathology 122A	5	Pathology 122B	5	Anatomy 180	4
Physiological Sciences 124	5	Veterinary Microbiology 122 .	4	Clinical Sciences 103 .	4
Veterinary Microbiology 120 .	2	Veterinary Microbiology 123 .	3	Nutrition 109	3
Veterinary Microbiology 121 .	3	Veterinary Microbiology 125 .	5	Pathology 122C	4
Veterinary Microbiology 124 .	2			Public Health 140 ...	1
	—				—
	17		17		16



<i>Third Year</i>	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
Clinical Pathology 201 . 3		Avian Medicine 208 . 3	Clinical Pathology 202 3
Clinical Sciences 204A 3		Clinical Sciences 204B 4	Clinical Sciences 204C 3
Clinical Sciences 210A 1		Clinical Sciences 210B 1	Clinical Sciences 210C 1
Clinical Sciences 220 . 4		Clinical Sciences 221 . 5	Clinical Sciences 222. 5
Clinical Sciences 230 . 6		Clinical Sciences 260 . 2	Public Health 240 ... 3
		Veterinary Microbiology 201 . 2	Public Health 250 ... 2
	<hr/> 17	<hr/> 17	<hr/> 17

Fourth Year

Avian Medicine 209 . 2	Clinical Pathology	Clinical Pathology
Clinical Pathology 250A 1	250B 1	250C 1
Clinical Sciences 204D 5	Clinical Sciences 204E 3	Clinical Sciences 204F 3
Clinical Sciences 250A 8	Clinical Sciences 250B 8	Clinical Sciences 250C 7
Pathology 250A 1	Clinical Sciences 270 . 1	Pathology 250C 1
	Pathology 250B 1	Public Health 260 ... 1
	Electives 3	Electives 4
	<hr/> 17	<hr/> 17

Requirements for the Degree Bachelor of Science

Upon recommendation of the Faculty of the School of Veterinary Medicine the degree Bachelor of Science with a major in Veterinary Science is granted to students in the School of Veterinary Medicine who do not hold a baccalaureate and who:

1. Satisfy the general University requirements (page 31).
2. Complete in the School of Veterinary Medicine all courses prescribed in the first two years of the professional curriculum. Exceptions may be made to students admitted in advanced standing.

Admission in Advanced Standing

An applicant requesting admission to advanced standing in the School of Veterinary Medicine may be accepted under the following conditions:

1. He must furnish evidence that he was eligible for admission to the first quarter of the School of Veterinary Medicine.
2. He must show that he has satisfactorily completed courses equivalent in kind and amount to those given in the School of Veterinary Medicine in the quarter or quarters preceding that in which admission is desired.
3. He may be required to pass examinations in any or all subjects for which credit is asked.

Graduate Study

The graduate study program of the School of Veterinary Medicine provides varied opportunities to launch careers in research.

Information on graduate degrees beyond the D.V.M. will be found in the *Announcement of the Graduate Division* which may be obtained from the Dean of the Graduate Division, Davis, California.



GRADUATE DIVISION

Graduate study and research are administered by the Graduate Council, elected by the Academic Senate at Davis, and by the Dean of the Graduate Division. A University-wide Coordinating Committee on Graduate Affairs determines certain policies and establishes common procedures. Detailed information appears in the *Announcement of the Graduate Division*.

Advanced Degrees

On the Davis campus the following advanced degrees are offered: Master of Arts, Master of Science, Master of Education (in Agriculture), Master of Engineering, Bachelor of Laws, Doctor of Engineering, Doctor of Veterinary Medicine, and Doctor of Philosophy.

The majors for graduate study and the advanced degrees offered in each are shown below:

Organization of Graduate Study

Agricultural Chemistry (Ph.D.)	Geology (M.S., Ph.D.)
Agricultural Economics (M.S., Ph.D.)	German (M.A., Ph.D.)
Agricultural Education (M.Ed.)	History (M.A., Ph.D.)
Agricultural Science and Management (M.S.)	Home Economics (M.S.)
Agronomy (M.S.)	Horticulture (M.S.)
Animal Husbandry (M.S.)	International Agricultural Development (M.S.)
Animal Physiology (M.S., Ph.D.)	Irrigation (M.S.)
Anthropology (M.A., Ph.D.)	Law (L.L.B.)
Art (M.A.)	Linguistics (M.A.)
Biophysics (Ph.D.)	Mathematics (M.A., Ph.D.)
Botany (M.A., M.S., Ph.D.)	Microbiology (M.A., Ph.D.)
Chemistry (M.S., Ph.D.)	Music (M.A.)
Comparative Biochemistry (M.A., Ph.D.)	Nutrition (M.S., Ph.D.)
Comparative Pathology (M.S., Ph.D.)	Philosophy (M.A.)
Comparative Pharmacology and Toxicology (M.S., Ph.D.)	Physics (M.A., Ph.D.)
Dramatic Art (M.A.)	Plant Pathology (M.S., Ph.D.)
Economics (M.A., Ph.D.)	Plant Physiology (M.S., Ph.D.)
Education (Teaching Credential)	Political Science (M.A., Ph.D.)
Engineering (M.Eng., D.Eng., M.S., Ph.D.)	Poultry Science (M.S.)
English (M.A., Ph.D.)	Psychology (M.A.)
Entomology (M.S., Ph.D.)	Range Management (M.S.)
Food Science (M.S.)	Sociology (M.A.)
French (M.A., Ph.D.)	Soil Science (M.S., Ph.D.)
Genetics (M.S., Ph.D.)	Spanish (M.A.)
Geography (M.A.)	Vegetable Crops (M.S.)
	Veterinary Medicine (D.V.M.)
	Zoology (M.A., Ph.D.)

This list is under constant revision as graduate work expands into new areas of study, and prospective students seeking further information should consult the Graduate Division Office. The general requirements for these degrees are published in the *Announcement of the Graduate Division*, and the specific requirements are generally available from the office of the department concerned. The list includes a number of "group majors," sponsored not by one department only but by several. The faculty members of these group committees are named under the section titled "Courses of Instruction."

Admission Standards

Students seeking admission to graduate status at the University of California must hold a bachelor's degree or its equivalent from an institution of acceptable standing. The program of preparation should be substantially equivalent in both the distribution of academic subject matter and in scholarship achievement to the requirements for a comparable degree at the University of California. Applications for admission are evaluated in terms of scholastic qualifications and formal preparation for the graduate field of study.

The Dean of the Graduate Division or the department in which the applicant wishes to pursue an advanced degree may deny him admission if his scholastic record or his undergraduate program of study is judged not adequate as a foundation for advanced academic or professional study. This procedure applies to all applicants, whether they come from schools or colleges within the University of California or elsewhere. Individual departments may have special requirements for admission to graduate status, and certain departments and schools require an additional and special application for admission to their advanced-degree program.

Application for Admission

Students seeking admission for graduate work may obtain application forms from the Office of the Graduate Division of the University at Davis. Applications should be filed as early as twelve weeks before the date of registration but in no case later than July 15, 1966, November 15, 1966, and February 15, 1967, for the fall, winter, and spring quarters respectively. The application must be accompanied by a money order or bank draft for \$10.00, made payable to The Regents of the University of California, in payment of the application fee, which will not under any circumstances be refunded. If the complete record as specified below is not filed in time, the student may not be allowed to register or he may be allowed to register late on payment of an additional fee of \$10.00.

Official transcripts of record covering all college and university work completed to date, together with official evidence of degrees conferred, must accompany or immediately follow the application. A separate original and official record must be presented from each institution previously attended. Unless all of these are on file in the Graduate Division, registration cannot be permitted. In addition, the student should have in his possession a second copy of his official records for his use in conference with departments.

A separate and additional application is required for admission to the School of Law and the School of Veterinary Medicine. Students are referred to pages 102 and 105 for further details.

Every new student and every student returning to the University after an absence of one or more semesters must satisfy the medical requirements as described under "Medical Evaluation" (see page 39).

Readmission

Persons formerly registered in a regular session as graduate students who wish to return after an absence must apply for readmission. The form for this purpose is obtainable from the Registrar, and no fee is charged.

Foreign Students

Applicants for admission to the Graduate Division on credentials from universities and colleges in foreign countries are advised to make their initial inquiry as early as six months before the date of intended enrollment to permit processing of their records.

Students whose undergraduate preparation has been in a language other than English should furnish positive evidence that their command of both spoken and written English will permit them to profit by the instruction offered and to compete with American students. Certificates of proficiency in English by individuals (usually professors) are helpful, and consular testing at the time the I-20 form is processed is valuable, but neither of these is standardized or quantitative. A number of other tests given by authorized examiners abroad are acceptable. These include the Michigan Test (English Language Institute Test, University of Michigan), the interview reports supervised by the directors of the Institute of International Education overseas office, and the American University Language Center (A.U.L.C.) Test. Prospective students are encouraged, however, to submit scores on the Test of English as a Foreign Language (TOEFL) administered by the Educational Testing Service for the College Board. These tests are given at many testing centers abroad three times a year, and full information is available from the Educational Testing Service, Princeton, New Jersey 08540.

On arrival all foreign students take the special University examination in English; those who do not pass are assigned to remedial courses which may delay their graduate program. Even though the student has been admitted, his registration may be delayed until he acquires an adequate command of English.

Admission Without an Advanced Degree Objective

Students who do not wish to become candidates for a higher degree may be admitted to a specified field of study for course work only. Their program, which requires the approval of the Dean, must have a definite scholarly or professional purpose. The scholastic requirements for admission are the same as for those who are candidates for degrees. All such students who are not residents of the State of California will have to pay the regular tuition fee.

Program of Study

When the student registers and declares his degree objective he is assigned to the appropriate adviser, who will advise him on his program of study. This will depend to some degree on the undergraduate training, and the student may be assigned to undergraduate courses to complete deficiencies.

Each student must satisfy the specific requirements for the degree sought as published in the *Announcement of the Graduate Division*. The general program in an area of study, as established by the department or group and approved by the Graduate Council, often includes a core of required courses, but considerable flexibility is permitted to suit the individual student's needs or main interest. More detailed information is available from the department or group concerned. Undergraduates at Davis who plan to pursue graduate study should confer with their major adviser early in their senior year to guarantee adequate preparation.

Teacher Credential Program

Programs leading to a Standard Teaching Credential with specialization in elementary teaching and in secondary teaching are offered under the jurisdiction of the Graduate Division. Graduate students who are prospective candidates for an advanced degree may take special professional courses and qualify for the junior college teachers credential.

The curricula for teacher education are offered by the Department of Education and the Department of Agricultural Education, and interested students should obtain detailed information at either department. The courses in professional education required for the credential are specified in this catalog under the Departments' listing of courses of instruction (see pages 126 and 174). Subject-matter requirements for the teaching major and minor are specified with departmental offerings.

Only students who have completed the bachelor's degree are eligible, and they must be admitted to the program by the Graduate Division. Final filing dates and the application forms may be obtained from the Graduate Division Office. The student must maintain a scholarship record of 2.75 or better in all graduate work undertaken.

Since the requirements for the credential are set up by both the State Department of Education and by the University, all students who intend to work for the credential are urged to consult the adviser in one of the departments named above early in their undergraduate career (preferably by the end of their freshman year).

Curricula are offered which lead to the Standard Teaching Credential with a specialization in elementary teaching or in secondary teaching and to the secondary credentials required for teaching classes reimbursed under the National Vocation Acts. Two routes for obtaining each type of credential are available: a student-teaching program (the usual route) and an internship program (limited in enrollment). Application for the intern program should be made to the department early in the senior year.

Intercampus Exchange Program

A graduate student registered on any campus of the University may become an Intercampus Exchange Student with the approval of his graduate adviser and the Dean of the Graduate Division on both the home and the host campus. The Intercampus Exchange Student has library, infirmary, and other student privileges on the host campus but is considered as a graduate student in residence on his home campus. The grades obtained in courses on the host campus are transferred to his home campus and entered on his official record. Forms for application for the intercampus exchange may be obtained at the office of the Dean of the Graduate Division.

Fellowships, Assistantships, and Loans

Fellowships are awarded by the Fellowship Committee of the Graduate Council on the bases of scholarship and promise of outstanding academic and professional contribution. For further information as to the awards available and application forms the student may consult the Fellowship announcement published in November for the following academic year. Applications with all the supporting records should be filed by February 1 to receive consideration.

Teaching assistantships and research assistantships are available in many departments, and interested students should inquire at the office of the department in which they wish to study.

Certain departments may be authorized to offer a limited number of fellowships under the National Defense Education Act and traineeships under the National Science Foundation or the National Institute of Health. For these the student may write directly to the department or to the Graduate Division of the University. Information regarding Graduate Fellowships supported by various federal agencies and others is also available at the Office of the Graduate Division.

Application for loan funds for graduate students should be addressed to the Office of the Dean of Students (see page 35).



Courses of Instruction

Explanatory Note

Credit for academic work undertaken at the University is evaluated in terms of units. The value of a course is reckoned at the rate of one unit for three hours' work per week per quarter, on the part of the student. Included in these three hours may be one hour of lecture or discussion, or two to three hours of laboratory. For most courses, it is expected that the average student will spend two hours in preparation for one hour of lecture or recitation. If the number of hours of lecture or discussion given in the catalog is less than the number of units of credit assigned to the course, this means that some form of additional non-classroom work (for example, a term paper) is required of the student in that course. Students should inquire of the instructor at the first class meeting concerning this point.

The credit value of each course in quarter units is indicated for each quarter by a number in parentheses following the title.

The quarter in which the course is given is shown as follows: I, fall quarter (September to December); II, winter quarter (January to March); III, spring quarter (April to June); Yr., throughout the three quarters.

When a course is listed as offered in even-numbered years or odd-numbered years, this refers to the calendar year in which the involved quarter occurs. For example:

"Philosophy 132. III. Offered in odd-numbered years," would be given in the spring quarter of 1967, 1969, and so on, whereas

"Philosophy 146. III. Offered in even-numbered years," would be given in the spring quarter of 1966, 1968, and so on.

Information concerning class hours is given in the *Schedule and Directory*.

A course number followed by two or three letters (for example, Mathematics 131A-131B-131C) is continued through three successive quarters, ordinarily from September to June; occasionally, however, a course of two quarters may begin in the winter quarter. The first quarter of such courses is prerequisite to the second, and the second to the third. Where A and B portions of a course are listed separately (for example, Economics 100A and Economics 100B), the A course is not prerequisite to B unless it is specifically mentioned in the listing of the B course.

Classification and Numbering

Courses are classified and numbered as follows:

Undergraduate courses. These are of two kinds, *lower division* (numbered 1-49) and *upper division* (numbered 100-199). Freshman and sophomore students are not normally encouraged to take upper division courses.

Special study courses (numbered 198 and 199) are designed for students having an adequate background in the subject proposed for special study. This would normally require a sound background in upper division courses in the field of 198 or 199 course study. Credit in a special study course may not exceed 5 units per quarter.

Departments may offer special *honors courses* (marked H) in reading and research, with credit to be determined by the instructors in charge, according to the performance of the individual students, subject to such general restrictions as may be imposed by the department, the college, or the Committee on Courses of Instruction of the Academic Senate. The work of the student in an honors course may consist of additional work in connection with other courses of instruction.

Graduate courses. Graduate courses (numbered 200–299) are open only to students who have adequate preparation; admission is subject to the approval of the instructor in charge.

Professional teacher-training courses in the Department of Education and courses in other departments that are specially intended for teachers or prospective teachers are numbered 300–399.

Professional courses in departments other than the Department of Education are numbered 400–499.

Extra-session courses. Extra-session courses (laboratory, field, or other individual work done out of session under the direction of a department of instruction) may be accepted upon the recommendation of the department in partial fulfillment of the residence requirement for the bachelor's degree.

University Extension courses. Simultaneous enrollment in resident courses and in extension courses is permitted only when the entire program of the student is duly approved by the appropriate dean or study-list authority.

Credit for summer session work at other schools. It is possible for students to gain credit for courses taken during the summer at other institutions, provided the courses parallel those given in the University of California. However, assurance that such credit will be accepted can be given only after the courses have been completed. Students should arrange to have the transcripts of their summer session grades sent to the Registrar for evaluation.

SYMBOLS

The following numerical footnotes and their accompanying symbols are used throughout the course section:

- ¹ Absent on leave, 1966–67.
- ² Absent on leave, fall quarter 1966.
- ³ Absent on leave, winter quarter 1967.
- ⁴ Absent on leave, spring quarter 1967.
- ⁵ Sabbatical leave in residence, 1966–67.
- ⁶ Sabbatical leave in residence, fall quarter 1966.
- ⁷ Sabbatical leave in residence, winter quarter 1967.
- ⁸ Sabbatical leave in residence, spring quarter 1967.
- ^{*} Not to be given, 1966–67.
- [†] Not to be given, fall quarter 1966.
- [‡] Not to be given, winter quarter 1967.
- [§] Not to be given, spring quarter 1967.
- # To be given if a sufficient number of students enroll.

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AGRICULTURAL CHEMISTRY (A Graduate Group)

Walter G. Jennings, Ph.D., *Chairman of the Group*
Group Office, 106 Roadhouse Hall

Members of the Group:*Professors:*

- Maynard A. Amerine, Ph.D. (*Viticulture and Enology*)
 Lawrence J. Andrews, Ph.D. (*Chemistry*)
 Clinton O. Chichester, Ph.D. (*Food Science and Technology*)
 Edwin B. Collins, Ph.D. (*Food Science and Technology*)
 Eric E. Conn, Ph.D. (*Biochemistry and Biophysics*)
 Walter L. Dunkley, Ph.D. (*Food Science and Technology*)
 Robert E. Feeney, Ph.D. (*Food Science and Technology*)
 James F. Guymon, Ph.D. (*Viticulture and Enology*)
 John L. Ingraham, Ph.D. (*Bacteriology*)
 Lloyd L. Ingraham, Ph.D. (*Biochemistry and Biophysics*)
 Walter G. Jennings, Ph.D. (*Food Science and Technology*)
 Raymond M. Keefer, Ph.D. (*Chemistry*)
 Richard E. Kepner, Ph.D. (*Chemistry*)
 Max Kleiber, Sc.D. (*Animal Husbandry; Emeritus*)
 George L. Marsh, M.S. (*Food Science and Technology*)
 Emil M. Mrak, Ph.D. (*Food Science and Technology*)
 Thomas A. Nickerson, Ph.D. (*Food Science and Technology*)
 Edgar P. Painter, Ph.D. (*Chemistry*)
 Herman J. Phaff, Ph.D. (*Food Science and Technology*)
 Harlan K. Pratt, Ph.D. (*Vegetable Crops*)
 Harold G. Reiber, Ph.D. (*Chemistry*)
 Clarence Sterling, Ph.D. (*Food Science and Technology*)
 George F. Stewart, Ph.D. (*Food Science and Technology*)
 Perry R. Stout, Ph.D. (*Soils and Plant Nutrition*)
 Aloys L. Tappel, Ph.D. (*Food Science and Technology and Nutrition*)

Nikita P. Tarassuk, Ph.D. (*Food Science and Technology*)

David H. Volman, Ph.D. (*Chemistry*)

A. Dinsmoor Webb, Ph.D. (*Viticulture and Enology*)

Frederick P. Zscheile, Jr., Ph.D. (*Agronomy*)

Associate Professors:

Richard A. Bernhard, Ph.D. (*Food Science and Technology*)

Ray C. Huffaker, Ph.D. (*Agronomy*)

Mendel Mazelis, Ph.D. (*Food Science and Technology*)

Daniel W. Peterson, Ph.D. (*Poultry Husbandry*)

Lloyd M. Smith, Ph.D. (*Food Science and Technology*)

John R. Whitaker, Ph.D. (*Food Science and Technology*)

Assistant Professor:

William E. Thiessen, Ph.D. (*Chemistry*)

*Lecturers:*

Donald G. Crosby, Ph.D. (*Food Science and Technology*)

Jerome J. Jurinak, Ph.D. (*Soils and Plant Nutrition*)

Bor S. Luh, Ph.D. (*Food Science and Technology*)

Vernon L. Singleton, Ph.D. (*Viticulture and Enology*)

Masatoshi Yamaguchi, Ph.D. (*Vegetable Crops*)

*Graduate Courses***290. Seminar (1) I, II.**

Seminar—1 hour. Prerequisite: consent of instructor.
Mr. Jennings

299. Research. (1-9) I, II, III, S.

Prerequisite: graduate standing and consent of instructor. Open to qualified graduate students who wish to pursue original investigation. Arrangements should be made well in advance with a member of the Group in Agricultural Chemistry who will supervise the research and determine the credit value.

The Staff

AGRICULTURAL ECONOMICS

Benjamin C. French, Ph.D., *Chairman of the Department*
Department Office, 118 Voorhies Hall

Professors:

- Harold O. Carter, Ph.D.
- Gerald W. Dean, Ph.D.
- Daniel B. DeLoach, Ph.D., D.Lit.
- ²Jerry Foytik, Ph.D.
- ¹Benjamin C. French, Ph.D.
- Trimble R. Hedges, Ph.D.
- Gordon A. King, Ph.D.
- Chester O. McCorkle, Jr., Ph.D.
- J. Herbert Snyder, Ph.D.
- James M. Timley, Ph.D. (*Emeritus*)
- Edwin C. Voorhies, B.S., LL.D. (*Emeritus*)

Associate Professors:

- ¹J. Edwin Faris, Jr., Ph.D.
- Stephen H. Sosnick, Ph.D.

Assistant Professors:

- Warren E. Johnston, Ph.D.
- Samuel H. Logan, Ph.D.

◊ ◊ ◊

Professor:

- Wilfred Candler, Ph.D. (*Visiting*)

Lecturer:

- Alice R. Taylor, LL.B. (*Business Law*)

Department Major Advisers.—See *Schedule and Directory Listing*.

Graduate Advisers.—See *Schedule and Directory Listing*.

Bachelor of Science Major Program and Graduate Study. See page 54.

Lower Division Courses

1. Economic Basis of the Agricultural Industry. (3) II.

Lecture—3 hours. Prerequisite: Economics 1A. Brief history of agriculture and man; the agricultural industry and its relation to the U.S. and world economies; production and supply, marketing and demand for agricultural products.

Mr. McCorkle

2. Economic Basis of the Agricultural Industry. (3) III.

Lecture—3 hours. Prerequisite: course 1. Nature of agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy, particularly those relevant to California.

Mr. Snyder

² Absent on leave, fall quarter, 1966.

¹ Absent on leave, 1966-67.

18. Business Law. (4) I.

Lecture—4 hours. Prerequisite: sophomore standing. Not open to students with credit for Business Administration 18. Introduction to law; contracts, sales, and agency. Mrs. Taylor

Upper Division Courses

100A. Economic Analysis in Agriculture. (3) I.

Lecture—3 hours. Prerequisite: Economics 1A, 1B. Theory of production and supply of agricultural products, with particular reference to the individual firm; pricing, output determination, and employment of resources under pure competition. Mr. French

100B. Economic Analysis in Agriculture. (3) II.

Lecture—3 hours. Prerequisite: course 100A. Theory of individual consumer and market demand for agricultural products; pricing, output determination, and employment of resources under imperfect competition. Mr. Carter

100C. Economic Analysis in Agriculture. (3) III.

Lecture—3 hours. Prerequisite: course 100B. Theory of regional specialization, location, and trade for agricultural products; general economic equilibrium. Mr. Logan

106A-106B. Quantitative Methods in Agricultural Economics. (3-3) II-III.

Lecture—2 hours: laboratory—2 hours. Prerequisite: Mathematics 13 and 16A. Evaluation and treatment of agricultural economics data, including sampling methods, statistical inference, and estimation of relationships among variables. II. Mr. Johnston; III. Mr. Foytik

112. Fundamentals of Business Organization and Management. (3) I.

Lecture—3 hours. Principles and practices of organization and management; nature and structure of business; functions and operations; management tools; decision-making processes; taxation. Mr. DeLoach

113. Cooperative Organization and Management. (3) II.

Lecture—3 hours. Prerequisite: course 112. Scope and objectives of agricultural cooperation; management and operating policies and practices; legal, political, and social aspects.

Mr. DeLoach

114. Production Management. (3) III.

Lecture—3 hours. Prerequisite: course 112. Principles and procedures for efficient use of resources in production; production scheduling;

materials purchasing and handling; methods analysis; plant layout; and job evaluation.

Mr. Logan

116. Financial Organization and Management. (4) II.

Lecture—3 hours; discussion—1 hour. Recommended: course 112. Principles of credit; capital needs of agricultural industries; agencies; government credit policy. Occasional field trips.

Mr. Voorhies

117. Managerial Accounting. (4) III.

Lecture—4 hours. Prerequisite: Economics 11A–11B. Recommended: course 112. Basic concepts of accounting as a managerial tool; procedures for financial reporting; systems and internal control; cost accounting; budgeting; interpretation of administrative reports.

Mr. Hedges

120. Agricultural Policy. (3) I.

Lecture—3 hours. Analytical treatment of recent and current economic problems and governmental policies and programs affecting American agriculture.

Mr. Johnston

125. Comparative Agriculture. (3) II.

Lecture—3 hours. The agriculture of the principal countries of the world, with special reference to the influence of food supply upon the development of man.

Mr. Hedges

130. Agricultural Marketing. (4) I.

Lecture—4 hours. The nature, function, organizational structure, and operation of agricultural markets; prices, costs, and margins; market information, regulation, and controls; cooperative marketing.

Mr. Sosnick

140. Farm Management. (5) III.

Lecture—4 hours; laboratory—2 hours. Farm organization and resources; economic and technological principles in decision making; analytical techniques and management control; problems in organizing and managing the farm business.

Mr. McCorkle

145. Farm and Rural Resources Appraisal. (3) I.

Lecture—2 hours; laboratory—3 hours. Principles of farm and ranch appraisal; land utilization in relation to problems of development and valuation. One field trip is required.

Mr. Johnston

148. Economic Planning for Regional and Resource Development. (3) II.

Lecture—3 hours. Relation of resources to economic growth, including regional problems; planning economic development with particular emphasis on resource used in agriculture; selected resource development programs in the United States and certain foreign countries, including land reform experiences.

Mr. Snyder

155. Quantitative Analysis for Business Decisions. (3) I.

Lecture—3 hours. Prerequisite: course 106B; Mathematics 16A. Introduction to selected topics in operations research, including mathematical programming, applied decision theory, game theory, and inventory models.

Mr. Dean

160. Advanced Agricultural Marketing. (3) III.

Lecture—3 hours. Recommended: course 155. The marketing firm in its economic context: market structures; pricing and price policies; empirical demand analysis; marketing cost and efficiency; public policies toward marketing.

Mr. King

170. Advanced Farm Management. (3) II.

Lecture—3 hours. Prerequisite: course 155. The farm firm in its economic context: resource and enterprise combinations; size of firm; uncertainty considerations; replacement policies; demand for inputs; nonfarm influences.

Mr. Candler

176. Economic Analysis in Resource Use. (3) III.

Lecture—3 hours. An analytical treatment of resource use problems, including public policy issues; economic productivity and natural resources; determinants, principles, and patterns of natural resource use; resource conservation; land tenure problems and policies.

Mr. Snyder

190. Senior Research Project. (3) II, III.

Supervised research and reporting. May be repeated for additional credit.

II. Mr. Sosnick; III. Mr. Hedges

198. Directed Group Study. (1–5) I, II, III.

Prerequisite: consent of instructor. The Staff

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

Prerequisite: senior standing and approval of department. Limited to majors in agricultural economics with a B average or higher.

The Staff

Graduate Courses

200A–200B–200C. Economics of Agricultural Production, Consumption and Trade.

(3–3) I–II–III.

Lecture—3 hours. Theory of the firm and industry, with particular reference to production; market structures, single and multiple products; uncertainty; theory of demand and consumption; and location theory and interregional trade.

I. Mr. Dean; II. Mr. Sosnick; III. Mr. King

210. Econometric Methods. (4) III.

Lecture—4 hours. Prerequisite: Mathematics 131B. Statistical models and their use in estimation of economic relationships; single and multiple equation systems.

220. Agricultural Policy. (4) I.

Lecture—4 hours. Welfare considerations and efficiency criteria as related to agricultural policy; an appraisal of agricultural policy in a changing economy. —

250. Institutional Setting for Agricultural Business. (3) I.

Lecture—3 hours. Study of economic and social influences of the institutional environment on agriculture-related industries; historical development and present structure of the American economy; governmental activities; financial aspects; labor problems. Mr. DeLoach

253A-253B. Quantitative Analysis of Operational Problems. (3-3) I-II.

Lecture—3 hours. Selected topics in operations research, including mathematical programming, decision theory, inventory, waiting line, and replacement models; simulation of business operations; statistical quality control.

I. Mr. Carter; II. Mr. Candler

257. Production Planning and Market Analysis. (3) II.

Lecture—3 hours. Quantitative analysis of production systems by statistical, economic, and

engineering methods; sales analysis for the individual firm; problems of investment, location, scale of operations. Mr. Logan

260. Administrative Organization and Policy Formation. (3) III.

Lecture—3 hours. Concepts and techniques of administration in the business firm; formulation and implementation of management goals; planning, procuring, organizing, and controlling physical factors and personnel. Mr. Foytik

280A-280B-280C. Analysis of Research in the Economics of Agriculture. (3-3-3) I-II-III.

Lecture—3 hours. Current research problems and methods of analysis in agricultural economics. A comprehensive approach to economic problems of agriculture, including analysis of production, supply, and demand for firm and industry; regional economics and interregional trade.

I. Mr. Carter; II. Mr. French; III. Mr. King

299. Individual Study. (1-4) I, II, III.

The Staff

299D. Special Study for Doctoral Dissertation.

(1-9) I, II, III.

The Staff

AGRICULTURAL EDUCATION

Orville E. Thompson, Ph.D., *Chairman of the Department*
Department Office, 272 Voorhies Hall

Professors:

Frederick L. Griffin, M.S. (*Emeritus*)
Sidney S. Sutherland, M.S. (*Emeritus*)
Glenn R. Hawkes, Ph.D.

Associate Professors:

Elwood M. Juergenson, Ph.D. (*also Coordinator of Vocational Teacher Education*)

Orville E. Thompson, Ph.D.
Emmy E. Werner, Ph.D.

Assistant Professors:

Robert F. Barnes, Ph.D.
Roberta R. Collard, Ph.D.
Mary C. Regan, Ph.D.

**Lecturers:**

Arline Johnson, M.S. (*Also Supervisor of Teacher Training—Home Economics*)
Jane N. Welker, M.A.
Department Major Advisers—See Schedule and Directory Listing.
Credential Counselors: ——.

Secondary Credentials — Agriculture. — Mr. Juergenson

Secondary Credentials—Homemaking.—Miss Johnson

Junior College Credentials—Agriculture.—Mr. Juergenson

Bachelor of Science Major Program and Graduate Study. See page 56.

Lower Division Course

10. Introduction to Agricultural Education. (3) I.

Lecture—3 hours. Survey of entire field of education in agriculture. Vocational surveys, occupational analysis. The role and relationship of agriculture in California and the nation to occupational opportunities. Study of professions relating to agriculture. Mr. Thompson

Upper Division Courses

160. Vocational Education. (3) III.

Lecture—3 hours. Philosophy and organization of vocational education, with particular reference to educational principles for agriculture, commerce, home economics, and industry. Mr. Thompson

186. Research Design and Analysis. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 13. Survey of major types of research design in agricultural extension and agricultural education. Tests of statistical significance such as Chi square, analysis of variance, and related topics. Use of computer in data processing.

Miss Regan

187. Extension Education in Agriculture and Home Economics. (3) III.

Lecture—2 hours; laboratory—3 hours. A study of the Agricultural Extension Service in California, the United States, and other countries. Emphasis on organization and programs.

Miss Regan

188. Technical Journalism. (4) I.

Lecture—4 hours. Style structure, organization, and presentation of technical information. Includes mass communication theory, mass media analysis, and audience analysis.

Miss Regan

189. Adult Education. (3) II, III.

Lecture—3 hours. Prerequisite: Education 110 (may be taken concurrently). Principles of adult education. Application of the principles of group leadership and group dynamics to the teaching of adults and to extension education in agriculture and home economics. Mr. Barnes

198. Directed Group Study. (1-5) I, II, III.

The Staff (Mr. Thompson in charge)

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

The Staff (Mr. Thompson in charge)

Graduate Courses**290. Seminar. (1) I, II, III.**

Seminar—1 hour. Reports and discussions of topics of interest in the fields of agricultural education, home economics education, agricultural extension, and adult education.

Mr. Thompson, Miss Regan

299. Research. (1-6) I, II, III.

Research in agricultural education, home economics education, vocational education, agricultural extension, or adult education.

The Staff (Mr. Thompson in charge)

AGRICULTURAL ENGINEERING

Coby Lorenzen, Jr., M.S., *Chairman of the Department*

Department Office, 207 Walker Engineering Building

Professors:

Norman B. Akesson, M.S.

Roy Bainer, M.S. (*Agricultural Engineering and Engineering*)

Supervised Teaching Courses**320A. Introduction to Teaching. (1) I, II, III.**

Lecture—1 hour. Observations and participation in some form of public school work.

Mr. Juergenson

320B. Instructional Materials and Procedures. (3) III.

Lecture—2 hours; laboratory—3 hours. Introduction to the materials and procedures used in teaching. Use of audio-visual, radio and other teaching aids. Preparation of teaching materials; collecting, organizing, processing, and evaluating community resources.

Mr. Juergenson

320C. Supervised Teaching; Sec. 1, Agriculture. (12) I, II, III.

Field work—student teaching—36 hours. Prerequisite: course 320A; course 320E must be taken concurrently. Directed teaching for candidates for the credential in agriculture

Mr. Juergenson

320C. Supervised Teaching; Sec. 2. Home Economics. (12) I, II, III.

Field work—student teaching—36 hours. Prerequisite: course 320A; course 320E must be taken concurrently. Directed teaching for candidates for the credential in home economics.

Miss Johnson

320E. Methods of Teaching; Sec. 1, Agriculture. (3) I.

Discussion—3 hours. Prerequisite: all students enrolled in 320E must enroll in 320C concurrently. The principles and methods of teaching agriculture in the secondary schools of California in accordance with the provisions of the Federal and State Vocational Education Acts. Development of courses of study, teaching units, and lesson plans.

Mr. Juergenson

320E. Methods of Teaching; Sec. 2. Home Economics. (3) I, II.

Discussion—3 hours. Prerequisite: all students enrolled in 320E must enroll in 320C concurrently. Planning and organizing an effective curriculum, including teaching methods and classroom aids.

Miss Johnson

Robert A. Kepner, B.S.
 Coby Lorenzen, Jr., M.S.
 Loren W. Neubauer, Ph.D.
 Herbert B. Schultz, Ph.D. (*Agricultural Engineering and Lecturer in Geography*)

Associate Professors:

William J. Chancellor, Ph.D.
 John R. Goss, M.S.
 John C. Harper, D.Sc.
 Samuel A. Hart, Ph.D.
 Wesley E. Yates, M.S.

Assistant Professors:

Robert B. Fridley, M.S.
 Stanton R. Morrison, Ph.D.
 Errol D. Rodda, Ph.D.
 Cletus E. Schertz, Ph.D.

**Lecturers:**

John B. Dobie, M.S.
 Roger E. Garrett, M.S.
 Joe P. Gentry, M.S.
 Charles R. Kaupke, M.S.
 Michael O'Brien, Ph.D.

Bachelor of Science Major Program and Graduate Study (College of Engineering).
 See page 78.

Lower Division Course**12. Engineering in Agricultural Operations. (3) II.**

Lecture—3 hours. Introduction of engineering principles to tillage, harvesting, application of power, utilization of heat, materials handling, processing, structures, environment control, and systems concept. Mr. Bainer, Mr. Dobie

Upper Division Courses**103. Agricultural Power. (4) III.**

Lecture—3 hours; laboratory—3 hours. Prerequisite: Physics 2A–2B or 4A–4B; open to qualified lower division students by permission. Principles of operation, construction, and utilization of internal-combustion engines; tractors and electric motors. Mr. Kaupke

104. Agricultural Machinery. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Physics 2A or 4A. Principles of construction, operation, selection, and utilization of equipment for tillage, planting, harvesting, and the application of agricultural chemicals. Mr. Yates

105. Farm Structures. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Physics 2A or 4A. Functional and structural design of unified physical plants for livestock production and other enterprises; prin-

ciples of feed mills, materials conveying, water and electrical systems, feed storage; labor-efficiency studies; materials for and design of beams, columns, trusses, and tanks.

Mr. Schertz

106. Micrometeorology in Agriculture. (3) III.

Lecture—3 hours. Prerequisite: Mathematics 16B or equivalent. Solar and terrestrial radiation; temperature and moisture fields near the surface; momentum and turbulent transfers; energy balance near the surface; practical applications to agriculture and air pollution.

Mr. Coulson

107. Agricultural Meteorology. (3) I.

Lecture—3 hours. Prerequisite: Geography 1 or 3. Daytime radiation intensities, nocturnal heat losses, climatic elements over different ground cover and terrain. Modification of microclimate by sheltering, frost-protection devices, and windbreaks. Probabilities of temperatures, rainfall, and climatic hazards to agriculture (risk figures).

Mr. Schultz

198. Directed Group Study. (1–5) I, II, III.

Prerequisite: consent of the instructor.

The Staff

199. Special Study for Advanced Undergraduates. (1–5) I, II, III.

(1–5) I, II, III.

The Staff

Graduate Courses**298. Group Study. (1–5) I, II, III.**

The Staff

299. Research. (1–6) I, II, III.

The Staff

Professional Courses**314A. Agricultural Engineering Problems and Techniques for Teachers. (3) II.**

Laboratory—9 hours. Prerequisite: Agricultural Education major or consent of instructor. The application of engineering and mechanical principles to the construction, maintenance, and repair of agricultural structures, machinery, and utilities. Offered in even-numbered years.

Mr. Gentry

314B. Agricultural Engineering Problems and Techniques for Teaching. (3) II.

Laboratory—9 hours. Prerequisite: Agricultural Education major or consent of instructor. The application of engineering and mechanical principles to the construction, maintenance, and repair of agricultural structures, machinery, and utilities. Offered in odd-numbered years.

Mr. Garrett

317. Problems in Teaching Farm Mechanics. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: 12 units in Agricultural Engineering

including courses 314A, 314B; Physics 2A-2B or 4A-4B. Demonstrations of and practice in the methods of teaching farm mechanics in secondary schools. School-shop planning including the

selection, arrangement, and management of equipment. Curriculum planning, including the relation of teaching materials, references, and visual aids.

Mr. O'Brien

AGRICULTURAL PRACTICES

Harry O. Walker, Ed.D., *Chairman of the Department*
Department Office, 3 TB-6

Lecturer:

Harry O. Walker, Ed.D.

Lower Division Course

49. Field Practice in Agriculture.
(No credit) I, II, III.

Laboratory—3 hours. Operation and maintenance of tractors and specialized equipment used

for producing and harvesting food and forage crops; familiarization with basic soil, water, and land management techniques. For students planning careers in production, processing, distribution, or service elements of the agricultural industry.

AGRICULTURAL SCIENCE AND MANAGEMENT

William C. Weir, *Chairman of the Committee*
Committee Office, 162 Animal Science

Committee in Charge:

Gerald W. Dean, Ph.D. (*Agricultural Economics*)

C. C. Delwiche, Ph.D. (*Soils and Plant Nutrition*)

Walter L. Dunkley, Ph.D. (*Food Science and Technology*)

Thomas A. Nickerson, Ph.D. (*Food Science and Technology*)

Harry O. Walker, Ed.D. (*Agricultural Practices*)

William C. Weir, Ph.D. (*Animal Husbandry*)

William A. Williams, Ph.D. (*Agronomy*)

Major Advisers.—See *Schedule and Directory Listing.*

Bachelor of Science Major Program and Graduate Study. See page 58.

Lower Division Course

11. Natural and Social Sciences in Agriculture.
(1) S.

Lecture—2 hours. A survey of major activities of the departments in the College of Agriculture. Contributions of the natural, physical, and social sciences to agricultural research, education, and management. The importance of agriculture to our society and the opportunities it has to offer.

Mr. Gary

Agricultural Economics

Lower Division Courses

1. Economic Basis of the Agricultural Industry. (3) II.

Lecture—3 hours. Prerequisite: Economics 1A. Brief history of agriculture and man; the agricultural industry and its relation to the U. S. and world economies; production and supply, marketing and demand for agricultural products.

Mr. McCorkle

2. Economic Basis of the Agricultural Industry. (3) III.

Lecture—3 hours. Prerequisite: course 1. Nature of agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy, particularly those relevant to California.

Mr. Snyder

Animal Science

Lower Division Courses

1. Domestic Animals and Man. (3) I.

Lecture—2 hours; discussion—1 hour. Animal domestication and the ecologic historic social and economic factors affecting characteristics and distribution of species. Their use by man for food, work, fiber, drugs, research, and recreation; projected effects of population expansion, urbanization, and multiple land usage.

Mr. Weir

2. Introductory Animal Science. (3) III.

Lecture—2 hours; laboratory—3 hours. Recommended: course 1; Biology 1. Growth, reproduction, lactation, inheritance, nutrition, and disease control in domesticated animals; the application of sciences to animal production.

Mr. Bradford

and environmental factors; utilization and development of renewable natural resources; characteristics of soil, water, and air and their relation to management and planning concepts. Open to non-majors.

Mr. Henderson

Plant Science**Lower Division Courses****1. Plants and Man. (3) I.**

Lecture—3 hours. Plants as a basic resource for food, fiber, shelter, and recreation; their use and effect on man, past, present, and future.

Mr. Smeltzer, Mr. Williams

2. Production of Cultivated Plants. (3) II.

Lecture—2 hours; laboratory—3 hours. Recommended: course 1. Principles of crop improvement, propagation, production, processing, storage, and marketing; conservation and utilization of land and water resources.

Mr. Flocker, Mr. Lider

Soil and Water Science**Lower Division Courses****1. Soil, Water, and Air Resources. (3) I.**

Lecture—3 hours. Prerequisite: Biology 1 or consent of instructor. Interrelationships of man

2. Soil, Water, and Air Resources. (3) II.

Lecture—3 hours. Prerequisites: course 1; Biology 1; recommended: Physics 2A. Development and properties of soils; source and properties of water; properties of the atmosphere; soil, water, and air management in relation to crop production; planning concepts related to agricultural development and production.

Mr. Whittig

Food Science and Technology**Upper Division Course****100. Processing Agricultural Products. (5) I.**

Lecture—4 hours; laboratory—3 hours. Prerequisites: Biology 1; Chemistry 8. Processing of foods, feeds, and fibers to provide desirable qualities such as convenience, economy and utility. Principles used in raw product selection, conversion, preservation, and quality control.

Mr. Miller, Mr. Dunkley

AGRICULTURAL TOXICOLOGY

George F. Stewart, Ph.D., *Chairman of the Committee*

Committee Office, 111 Agricultural Toxicology Building

Committee in Charge:

Herman F. Beckman, Ph.D. (*Entomology*)

Donald G. Crosby, Ph.D. (*Food Science and Technology*)

Wendell W. Kilgore, Ph.D. (*Food Science and Technology*)

Eugene M. Stafford, Ph.D. (*Entomology*)

George F. Stewart, Ph.D. (*Food Science and Technology*)

Dorothy E. Woolley, Ph.D. (*Animal Physiology and Agricultural Toxicology*)

Upper Division Course**180. Agricultural Toxicology. (3) I.**

Lecture—3 hours. Prerequisite: Chemistry 8 or 112B. Recommended: Biochemistry 101A.

A unified introduction to the principles of agricultural toxicology. Pesticides, food additives, natural toxicants; their legal, commercial, and health significance.

The Staff (Mr. Crosby in charge)

Graduate Courses**290. Seminar. (1) I, II, III.**

Seminar—I hour.

The Staff

298. Group Study. (2-7) I, II, III.

Prerequisite: consent of instructor. Directed group study in selected topics such as trace analysis of toxicants, natural toxicants, and new pesticides. The Staff (Mr. Crosby in charge)

AMERICAN HISTORY AND LITERATURE

C. Bickford O'Brien, Ph.D., *Chairman of the Committee*
Committee Office, 222 Sproul Hall

Committee in Charge:

Professor:

C. Bickford O'Brien, Ph.D. (*History*)

Associate Professors:

David L. Jacobson, Ph.D. (*History*)
Irwin Unger, Ph.D. (*History*)

Assistant Professors:

Herbert Bogart, Ph.D. (*English*)
John F. Gallagher, Ph.D. (*Political Science*)
H. Phelps Gates, Jr., M. A. (*Acting; Classics and Sanskrit*)
Kenneth C. W. Kammeyer, Ph.D. (*Sociology*)
John L. Magnus, Jr., Ph.D. (*English; Acting*)
Alan A. Stambusky, Ph.D. (*Dramatic Art*)

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Group Major Adviser.—Mr. Jacobson.

The Major with Honors.—See description, page 96.

Major Adviser.—See *Schedule and Directory Listing*.

The subject matter of this major is confined to materials within the history and literature of the United States. Its focus is upon that area of investigation where the departments of English and History share a common interest in method and interpretation. Literary texts are subjected to a descriptive, analytical, and evaluative examination within the intellectual and cultural context of the history of the United States.

Preparation for the Major.—Required: History 17A, 17B, and English 30A, 30B, 30C, 45. In addition, History 4A, 4B, 4C is required for students electing History in Group 3. Recommended: English 46A, 46B, 46C for those electing History in Group 3; History 4A, 4B, 4C for those electing literature in group 3.

ANATOMY

Walter S. Tyler, D.V.M., Ph.D., *Acting Chairman of the Department*
Department Office, 1042 Haring Hall

Professor:

Logan M. Julian, D.V.M., Ph.D.

Associate Professors:

Larry Z. McFarland, D.V.M., Ph.D.
Walter S. Tyler, D.V.M., Ph.D.

The Major Program.—A total of 52 units in upper division courses, distributed as follows:

Group 1. Sixteen units of history selected from the following courses: History 170A, 170B, 170C; 171A, 171B, 171C; 174A, 174B; 175A, 175B; 176A, 176B; 178A, 178B; 179A, 179B.

Group 2. Sixteen units of literature selected from the following courses: English 140, 141, 142, 143, 144; 146, 147, 152, 158A, 158B, 175; Dramatic Art 150.

Group 3. In consultation with his adviser, the student must select 20 additional units in either English or History. Those students who elect History in this group must take History 101A and 101B.

The Honors Program.—Students admitted to the honors program will take American History and Literature 194H and 197H in the senior year. These courses will count in Group 3.

Teaching Major.—Elementary and Secondary Credentials.

Subject Representative: Mr. Jacobson

Teaching Major.—Requirements are the same as for the departmental major. There is no teaching minor in American History and Literature.

Upper Division Courses

194H. Special Study for Honors Students.

(4) I, II, III.

Lecture—2 hours; discussion—2 hours. Prerequisite: enrollment limited to honors students in American History and Literature. The Staff

197H. Special Study for the Comprehensive Examination for Honors Students.

(4) I, II, III.

Prerequisite: completion of all other major requirements for the A.B. degree in American History and Literature. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Assistant Professors:

Leslie J. Faulkin, Jr., Ph.D.
Benjamin L. Hart, D.V.M., Ph.D.
(Anatomy and Psychology)



Senior Lecturer:

Ida G. Schmidt, Ph.D.

Lecturer:

Marjan Merala, Ldo.Vet., M.S. (*Medical Bibliography*)

Upper Division Courses

100. Systematic Anatomy. (3) II.

Lecture—3 hours. Prerequisite: Zoology 2 and consent of instructor. Course 100L should be taken concurrently. Lectures emphasizing the typical structure of the major anatomical systems of the ruminant, carnivore, fowl, and primate. Offered in even-numbered years.

The Staff (Mr. McFarland in charge)

100L. Systematic Anatomy Dissection. (5) II.

Laboratory—15 hours. Prerequisite: course 100 (should be taken concurrently). Dissection and demonstration of the major anatomical systems of the sheep, dog, chicken, monkey, and man, with comparisons to related species. Offered in even-numbered years.

The Staff (Mr. McFarland in charge)

110. Ultramicroscopic Anatomy. (3) I.

Lecture—3 hours. Prerequisite: Zoology 107. The electron microscopic appearance of cells, tissues, and organs of animals emphasizing the structural basis for their physiological functions. Offered in even-numbered years.

Mr. Tyler, Mr. McFarland, Mr. Faulkin

150. Functional Comparative Anatomy of the Locomotor and Nervous Systems:

Lecture. (3) I.

Lecture—3 hours. Prerequisite: freshman standing in School of Veterinary Medicine, or Zoology 100 and consent of instructor. Gross, subgross, light microscopic and electronmicroscopic anatomy of the locomotor and nervous systems of domesticated species.

Mr. Julian, Mr. Hart, Mrs. Schmidt

151. Functional Comparative Anatomy of the Locomotor and Nervous Systems: Gross Laboratory. (4) I.

Laboratory—12 hours. Prerequisite: course 150 (should be taken concurrently). Dissection and demonstration of the locomotor and nervous systems of domesticated species.

Mr. Julian, Mr. Hart, Mrs. Schmidt

152. Functional Comparative Anatomy of the Locomotor and Nervous Systems:

Microscopic Laboratory. (1) I.

Laboratory—3 hours. Prerequisite: course 150 (should be taken concurrently). Microscopic anatomy of the basic tissue types as represented in the locomotor and nervous systems.

Mrs. Schmidt, Mr. Julian, Mr. Hart

155. Functional Comparative Anatomy of Internal Organ Systems: Lecture. (2) II.

Lecture—2 hours. Prerequisite: freshman standing in School of Veterinary Medicine, or Embryology and consent of instructors. Functional comparative gross, subgross, light microscopic, and electronmicroscopic anatomy of the organs in the abdomen and thorax.

Mr. Tyler, Mr. Faulkin, Mrs. Schmidt

156. Functional Comparative Anatomy of Internal Organ Systems: Gross Laboratory. (2) II.

Laboratory—6 hours. Prerequisite: course 155 (to be taken concurrently). Dissection and demonstration of organ systems in abdomen and thorax. Mr. Tyler, Mr. Faulkin, Mrs. Schmidt

157. Functional Comparative Anatomy of Internal Organ Systems: Microscopic Laboratory. (2) II.

Laboratory—6 hours. Prerequisite: course 155 (to be taken concurrently). Laboratory study and demonstration of microscopic and submicroscopic structure of organs of abdomen and thorax.

Mr. Faulkin, Mr. Tyler, Mrs. Schmidt

160. Functional Comparative Anatomy of Poultry and Experimental Animals: Lecture. (2) III.

Lecture—2 hours. Prerequisite: course 155 or consent of instructor. The gross, subgross, microscopic, and submicroscopic anatomy of poultry and conventional laboratory mammals.

The Staff (Mr. Julian in charge)

161. Functional Comparative Anatomy of Poultry and Experimental Animals: Laboratory. (1) III.

Laboratory—3 hours. Prerequisite: course 160 (should be taken concurrently). Dissection and demonstration of the gross and microscopic anatomy of poultry and conventional laboratory mammals.

The Staff (Mr. Julian in charge)

170. Principles of Normal and Abnormal Animal Behavior. (3) III.

Lecture—3 hours. Prerequisite: course 150 and Physiological Sciences 140A-B. An examination of normal behavioral patterns of domestic animals with emphasis on the historical, environmental, and organismic determinants of behavior. An analysis of factors contributing to abnormal behavior in domestic animals.

Mr. Hart

180. Surgical Anatomy. (4) III.

Laboratory—12 hours. Prerequisite: second-year standing in the School of Veterinary Medicine. Topographical, radiological, and regional anatomy as applied to the clinical sciences.

Mr. McFarland

198. Directed Group Study. (2-5) I, II, III.

Laboratory—6-15 hours. Prerequisite: consent of instructor.

The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Laboratory—3-15 hours. Prerequisite: consent of instructor.

The Staff

Graduate Courses

200. Functional Comparative Neuroanatomy. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: one of the following: course 100, 100L; Animal Science: Physiology 110A-110B, 120A; Anthropology 154B; Psychology 108; Zoology 106A-106B, 107 or the equivalent. A comparative gross and microscopic study of the nervous system of birds and mammals, with strong emphasis on function. Animals studied include the chicken, Japanese quail, rat, dog, cat, rabbit, cow, sheep, subhuman primates, sea mammals and man. Offered in odd-numbered years.

Mr. Hart, Mr. McFarland, Mrs. Schmidt

202. Organology. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 157, and consent of instructor. The comparative development, growth patterns, and composition of selected animal organs: liver, kidney, lung, brain, a viscera and a skeletal muscle. Offered in odd-numbered years.

The Staff (Mr. Julian in charge)

204. Functional Comparative Anatomy of the Reproductive Systems. (3) I.

Lecture—3 hours. Gross, microscopic, and ultramicroscopic structure of the male and female reproductive systems in birds and mammals. Offered in odd numbered years.

Mr. McFarland, Mr. Faulkin

ANIMAL PHYSIOLOGY (A Graduate Group)Harold H. Cole, Ph.D., *Chairman of the Group*

Group Office, 202 Animal Science

Members of the Group:*Professors:*Hans Abplanalp, Ph.D. (*Poultry Husbandry*)Norman F. Baker, D.V.M., Ph.D. (*Veterinary Microbiology*)Arthur L. Black, Ph.D. (*Physiological Sciences*)James M. Boda, Ph.D. (*Animal Husbandry and Animal Physiology*)Leo K. Bustad, D.V.M., Ph.D. (*Physiological Sciences*)Harold H. Cole, Ph.D. (*Animal Husbandry; Emeritus*)Perry T. Cupps, Ph.D. (*Animal Husbandry*)Irving I. Geschwind, Ph.D. (*Animal Husbandry*)**210. Principles of Histochemistry. (2) I.**

Lecture—1 hour; laboratory—3 hours. Prerequisite: Zoology 107, Biochemistry 101A. Principles of enzyme histochemistry of animal tissues applicable to light and electron microscopy. Offered in odd-numbered years.

Mr. Tyler

217. Experimental Endocrinology. (4) I.

Lecture—2 hours; laboratory—6 hours. Prerequisite: Animal Science: Physiology 130. Gross, microscopic, and ultramicroscopic structure of the endocrine organs, and the applications of basic techniques used to demonstrate the physiological effects of these organs. Offered in even-numbered years.

Mr. Faulkin, Mr. McFarland

290. Seminar. (1) I, II, III.

Seminar—1 hour.

The Staff

297. Advanced Group Study in Surgical Anatomy. (2-4) I, II, III.

Laboratory—6-12 hours. Prerequisite: course 180. Selected topics in topographical, radiological, or regional anatomy as they apply to the clinical sciences.

Mr. McFarland

298. Advanced Group Study. (2-5) I, II, III.

Laboratory—6-15 hours. Prerequisite: consent of instructor.

The Staff

299. Research (2-12) I, II, III.

Laboratory—6-36 hours. Prerequisite: consent of instructor.

The Staff

Fredric W. Hill, Ph.D. (*Nutrition*)
Louis W. Holm, Ph.D. (*Physiological Sciences*)

Donald E. Jasper, D.V.M., Ph.D. (*Clinical Pathology*)

Logan M. Julian, D.V.M., Ph.D. (*Anatomy*)
Clarence F. Kelly, M.S., LL.B. (*Agricultural Engineering*)

Max Kleiber, Sc.D. (*Animal Husbandry; Emeritus*)

Frederick W. Lorenz, Ph.D. (*Animal Physiology*)

Stuart A. Peoples, M.D. (*Physiological Sciences*)

Edward A. Rhode, Jr., D.V.M. (*Clinical Sciences and Animal Physiology*)

Arthur H. Smith, Ph.D. (*Animal Physiology*)

Irving H. Wagman, Ph.D. (*Animal Physiology*)
 Wilbor O. Wilson, Ph.D. (*Poultry Husbandry*)

Associate Professors:

Ursula K. Abbott, Ph.D. (*Poultry Husbandry*)
 Ray E. Burger, Ph.D. (*Poultry Husbandry and Animal Physiology*)
 Victor M. Burns, Ph.D. (*Physiological Sciences*)
 Moses T. Clegg, Ph.D. (*Animal Husbandry and Animal Physiology*)
 Richard A. Freedland, Ph.D. (*Physiological Sciences*)
 Jiro J. Kaneko, D.V.M., Ph.D. (*Clinical Pathology*)
 Larry Z. McFarland, D.V.M., Ph.D. (*Anatomy*)
¹Frank X. Ogasawara, Ph.D., (*Poultry Husbandry and Animal Physiology*)

Douglas G. Stuart, Ph.D., (*Physiological Sciences*)
 Walter S. Tyler, D.V.M., Ph.D. (*Anatomy*)

Assistant Professors:

Ransom L. Baldwin, Jr., Ph.D. (*Animal Husbandry*)
 Ronald J. Baskin, Ph.D. (*Zoology*)
 Edmund M. Bernauer, Ph.D. (*Physical Education*)
 Harry W. Colvin, Jr., Ph.D. (*Animal Physiology*)
 Charles L. Judson, Ph.D. (*Entomology*)
 Edward E. Kreickhaus, Ph.D. (*Poultry Husbandry*)
 Robert G. Loy, Ph.D. (*Animal Husbandry*)
 Harold R. Parker, D.V.M., Ph.D. (*Physiological Sciences*)
 Norman W. Scholes, Ph.D. (*Physiological Sciences*)
 Barry W. Wilson, Ph.D. (*Poultry Husbandry and Animal Physiology*)

¹ Absent on leave, 1966-67.

ANIMAL SCIENCES

Hubert Heitman, Jr., Ph.D., *Chairman of the Committee*
 Committee Office, 130 Animal Science Building

Committee in Charge:

G. Eric Bradford, Ph.D. (*Animal Husbandry*)
 Hubert Heitman, Jr., Ph.D. (*Animal Husbandry*)
 Fredric W. Hill, Ph.D. (*Nutrition*)
 Frederick W. Lorenz, Ph.D. (*Animal Physiology*)

Magnar Ronning, Ph.D. (*Animal Husbandry and Nutrition*)
 Wilbor O. Wilson, Ph.D. (*Poultry Husbandry*)

Major Advisers.—See Schedule and Directory Listing.
Bachelor of Science Major Program and Graduate Study. See pages 00 and 00.

Participating Departments:**ANIMAL HUSBANDRY**

Hubert Heitman, Jr., Ph.D., *Chairman of the Department*
 Department Office, 130 Animal Science Building

Professors:

James M. Boda, Ph.D. (*Animal Husbandry and Animal Physiology*)
 Floyd D. Carroll, Ph.D.
 Harold H. Cole, Ph.D., LL.D. (*Emeritus*)
 Perry T. Cupps, Ph.D.
 Alex S. Fraser, Ph.D.
 Irving I. Geschwind, Ph.D.
 Harold Goss, Ph.D. (*Emeritus*)
 Paul W. Gregory, Sc.D. (*Emeritus*)

Hubert Heitman, Jr., Ph.D.
 Carroll E. Howell, M.S. (*Emeritus*)
 Max Kleiber, Sc.D. (*Emeritus*)
 Robert C. Laben, Ph.D.
 Glen P. Lofgreen, Ph.D.
 Sylvester W. Mead, M.S. (*Emeritus*)
 James H. Meyer, Ph.D.
 Wade C. Rollins, Ph.D.
 William C. Weir, Ph.D.
 James F. Wilson, M.A., LL.D. (*Emeritus*)

Associate Professors:

- G. Eric Bradford, Ph.D.
 Moses T. Clegg, Ph.D. (*Animal Husbandry and Animal Physiology*)
 William N. Garrett, Ph.D.
 Magnar Ronning, Ph.D. (*Animal Husbandry and Nutrition*)

Assistant Professors:

- Ransom L. Baldwin, Jr., Ph.D.
 Harold F. Hintz, Ph.D. (*Animal Husbandry and Nutrition*)
 Robert G. Loy, Ph.D.

ANIMAL PHYSIOLOGY

Frederick W. Lorenz, Ph.D., *Chairman of the Department*

Department Office, TB 30

Professors:

- James M. Boda, Ph.D. (*Animal Physiology and Animal Husbandry*)
 Frederick W. Lorenz, Ph.D.
 Edward A. Rhode, Jr., D.V.M. (*Animal Physiology and Clinical Sciences*)
 Arthur H. Smith, Ph.D.
 Irving H. Wagman, Ph.D.

Associate Professors:

- Ray E. Burger, Ph.D. (*Animal Physiology and Poultry Husbandry*)
 Moses T. Clegg, Ph.D. (*Animal Physiology and Animal Husbandry*)
 'Frank X. Ogasawara, Ph.D. (*Animal Physiology and Poultry Husbandry*)

Assistant Professors:

- Harry W. Colvin, Jr., Ph.D.

- Barry W. Wilson, Ph.D. (*Animal Physiology and Poultry Husbandry*)
 Dorothy E. Woolley, Ph.D.

◇ ◇ ◇

Professor:

- Emanuel Epstein, Ph.D. (*Soils and Plant Nutrition*)

Assistant Professor:

- Stanton R. Morrison, Ph.D. (*Agricultural Engineering*)

Lecturers:

- Emerson L. Besch, Ph.D.
 Walter E. Howard, Ph.D.
 Edward C. Maxie, Ph.D.
 Charles Winget, Ph.D.

¹ Absent on leave, 1966-67.

NUTRITION

Fredric W. Hill, Ph.D., *Chairman of the Department*

Department Office, 148 Home Economics Building

Professors:

- Gladys J. Everson, Ph.D.
 C. Richard Grau, Ph.D. (*Nutrition and Poultry Husbandry*)
 Fredric W. Hill, Ph.D.
 Samuel Lepkovsky, Ph.D., (*Nutrition and Poultry Husbandry; Berkeley Campus*)
 Aloys L. Tappel, Ph.D. (*Nutrition and Food Science and Technology*)

- Harold F. Hintz, Ph.D. (*Nutrition and Animal Husbandry*)
 Frances J. Zeman, Ph.D.

◇ ◇ ◇

Professor:

- Robert E. Hungate, Ph.D. (*Bacteriology*)

Associate Professors:

- Richard A. Freedland, Ph.D. (*Physiological Sciences*)
 Marvin Goldman, Ph.D. (*Physiological Sciences*)

Lecturer:

- Rocco J. Della Rosa, Ph.D. (*Physiological Sciences*)

Associate Professors:

- Lucille S. Hurley, Ph.D.
 Magnar Ronning, Ph.D. (*Nutrition and Animal Husbandry*)

Assistant Professors:

- Betty E. Haskell, Ph.D.

POULTRY HUSBANDRY

Wilbor O. Wilson, Ph.D., *Chairman of the Department*
Department Office, 109 Poultry Husbandry Building

Professors:

- Hans Abplanalp, Ph.D.
Vigfus S. Asmundson, Ph.D. (*Emeritus*)
C. Richard Grau, Ph.D. (*Poultry Husbandry and Nutrition*)
F. Howard Kratzer, Ph.D.
Samuel Lepkovsky, Ph.D., (*Poultry Husbandry and Nutrition, Berkeley Campus*)
Lewis W. Taylor, Ph.D. (*Berkeley Campus*)
Wilbor O. Wilson, Ph.D.

Associate Professors:

- Ursula H. Abbott, Ph.D.
Ray E. Burger, Ph.D. (*Poultry Husbandry and Animal Physiology*)
¹Frank X. Ogasawara, Ph.D. (*Poultry Husbandry and Animal Physiology*)
Daniel W. Peterson, Ph.D.

Assistant Professors:

- Edward E. Kreickhaus, Ph.D.
Barry W. Wilson, Ph.D. (*Poultry Husbandry and Animal Physiology*)



Lecturers:

- A. Wade Brant, Ph.D. (*Food Science and Technology*)
Leo C. Norris, Ph.D.

Animal Science

Lower Division Courses

1. Domestic Animals and Man. (3) I.

Lecture—2 hours; discussion—1 hour. Animal domestication and factors affecting characteristics and distribution of species. Their use by man for food, work, fiber, drugs, research, and recreation; projected effects of population expansion and urbanization on these uses.
Mr. Weir

2. Introductory Animal Science. (3) III.

Lecture—2 hours; laboratory—3 hours. Recommended: course 1; Biology 1. Growth, reproduction, lactation, inheritance, nutrition, and disease control in domesticated animals; the application of sciences to animal production.
Mr. Bradford

10. Poultry Production. (4) I.

Lecture—4 hours. A survey of principles and practices involved in poultry production. Designed for students not specializing in avian sciences.
Mr. Kratzer

¹ Absent on leave, 1966-67.

11. Laboratory in Poultry Production. (2) I.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 10 (may be taken concurrently) or consent of instructor. Laboratory studies in poultry biology; techniques and economics of poultry production. Mr. Kratzer

12. Survey of Poultry and Allied Industries. (3) II.

Lecture—2 hours; conference—1 hour. A survey of industries concerned with poultry products in the U. S. A. and various regions of the world: hatchery industry, feed industry, egg and meat production, poultry products, specialized enterprises. Mr. Peterson

21. Livestock and Dairy Cattle Judging. (2) III.

Laboratory—6 hours. Prerequisite: courses 1 and 2. Conformation, finish, and quality in relation to ideal type. Relationship of form to function. Change in body proportions with growth and maturity. Correlation between types in live meat animals and carcass quality.

Mr. Hintz, Mr. Cupps

Upper Division Courses

101. Avian Anatomy Laboratory. (1) I.

Laboratory—3 hours. Prerequisite: Physiology 101 and 101L, or Zoology 2. The gross and microscopic anatomy of birds; problems in the physiological adaptations of birds.

Mr. B. W. Wilson

111. Type Evaluation in Livestock and Dairy Cattle. (2) I.

Laboratory—6 hours. Prerequisite: course 21. Studies of recognized type evaluation in livestock and dairy cattle. Critical evaluation of the bases for the criteria used in establishing these standards. Intercollegiate judging teams selected from this course. Given the first six weeks of the term.

Mr. Garrett, Mr. Cupps

114A-114B. Advanced Dairy Cattle Production.

(3-3) II-III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Animal Genetics 107; Nutrition 110; Physiology 110B. The principles of milk production and sources of variation in milk yield and composition. Current knowledge in ruminant nutrition, feeds and feeding practices, breeding and genetics, milk secretion, reproductive physiology, and herd management considered in relation to production.

Mr. Laben

115. Horse Production. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Genetics 100; Nutrition 103 or 110; Physiology 110B. Feeding, breeding, and man-

agement of horses; application of the principles of basic animal sciences to problems of production of all classes of horses. Mr. Loy

116A-116B. Meat Animal Production. (3-3) II-III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Animal Genetics 107; Nutrition 103 or 110; Physiology 110B. Application of the sciences of nutrition, physiology and genetics to the development of efficient management programs for beef, sheep, and swine production. Similarities and differences among these species affecting management practices. Methods of improving carcass and meat quality.

Mr. Bradford, Mr. Garrett

118. Meat and Dairy Production. (5) II.

Lecture—5 hours. Prerequisite: course 2; Genetics 100; Nutrition 103 or 110. Improvement of meat and dairy production through selection for heritable traits; comparative reproductive and feed efficiency; environmental adaptability and distribution; management for efficient yield of meat and milk. Not open for credit to animal science majors. Mr. Carroll

121. Poultry Products Technology. (3) I.

Lecture—3 hours. Prerequisite: consent of instructor. Physical, chemical, and nutritional composition of poultry products; quality criteria and standards; physical, chemical, and microbiological factors influencing keeping quality.

Mr. Peterson, Mr. Brant

149. Environmental Management of Domestic Animals. (1) I.

Discussion—1 hour. Prerequisite: Physiology 149 (may be taken concurrently). Application of physiological principles to environmental management of domestic animals.

Mr. W. O. Wilson

151. Wildlife in Land Use. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biology 1 or a course in natural history. Wildlife and plant protection; population dynamics of vertebrates under various types of land use; applications of ecological principles to resource management-wildlife conflicts.

Mr. Howard

190. Proseminar in Animal Science. (1) I, II, III.

Seminar—1 hour. Prerequisite: senior standing in Animal Science or consent of instructor. Reports and discussions of recent advances in animal science.

The Staff (Mr. Heitman in charge)

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to animal science majors who are honor students of senior standing. 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. The Staff (Mr. Heitman in charge)

198A. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. Selected topics relating to the animal sciences. The Staff (Mr. Heitman in charge)

198B. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. Selected topics in the avian sciences. The Staff (Mr. W. O. Wilson in charge)

199A. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: consent of instructor. Problems in animal biology related to nutrition, breeding, and physiology of large domestic livestock and their products.

The Staff (Mr. Heitman in charge)

199B. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: courses basic to problem elected; consent of instructor. Problems in avian biology may be elected relating to nutrition, breeding, physiology, incubation and development, and products of domestic and experimental birds.

The Staff (Mr. W. O. Wilson in charge)

Graduate Courses

202. Experimental Incubation and Avian Teratology. (3) II.

Lecture—3 hours. Prerequisite: Chemistry 8; Zoology 100. Recommended: Zoology 107. Problems of embryonic development, causes of embryonic mortality and terata in poultry. Offered in odd-numbered years.

Mrs. Abbott, Mr. Taylor

202L. Laboratory in Avian Experimental Embryology and Teratology. (3) II.

Laboratory—9 hours. Prerequisite: course 202 (may be taken concurrently). The causes of abnormal morphogenesis in avian embryos including genetic, chemical, and physical-environmental factors; the application of transplantation, organ culture, and other experimental techniques. Offered in odd-numbered years.

Mrs. Abbott, Mr. Taylor

290. Seminar. (1) I, II, III.

Seminar—1 hour. Reports and discussions of topics of interest in the fields of animal husbandry, animal nutrition, animal physiology, or animal genetics.

The Staff (Mr. Heitman in charge)

291. Seminar. (1) I, II, III.

Seminar—1 hour. Reports and discussion of recent advances and selected topics of current interest in avian genetics, physiology, and nutrition, and poultry technology.

The Staff (Mr. W. O. Wilson in charge)

298A. Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. Lectures and discussions of advanced topics in the animal sciences. The Staff (Mr. Heitman in charge)

298B. Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. Group study of advanced topics in the avian sciences. The Staff (Mr. W. O. Wilson in charge)

299A. Research. (1-9) I, II, III.

The Staff (Mr. Heitman in charge)

299B. Research. (1-9) I, II, III.

The Staff (Mr. W. O. Wilson in charge)

Animal Biochemistry

Upper Division Course

102. Animal Biochemistry Laboratory. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: Biochemistry 101B (may be taken concurrently). Laboratory procedures employed in the study of physiological and biochemical processes. Mr. Baldwin

Graduate Courses

201. Protein Biochemistry. (3) II.

Lecture—4 hours. Prerequisite: Biochemistry 201C. Introduction to the chemical, physical, and biological properties of amino acids, peptides, and proteins. The biological aspects include protein function, biosynthetic and biodegradative pathways, and nutritional requirements for amino acids. Mr. Geschwind

230. Biochemical Aspects of Endocrinology. (3) III.

Lecture—3 hours. Prerequisite: Biochemistry 101B; Physiology 110B. The chemistry and function of animal hormones, with special reference to the isolation and structure of those of vertebrate origin. Assay, mechanism of action, biosynthesis, and metabolism of hormones. Biochemical lesions in congenital and other endocrinopathies. Offered in odd-numbered years. Mr. Geschwind

Animal Genetics

Upper Division Courses

107. Animal Breeding and Genetics. (3) I.

Lecture—3 hours. Prerequisite: Genetics 100. Qualitative and quantitative inheritance in relation to animal breeding; review of selection and breeding experiments with reference to livestock and poultry improvement. Mr. Abplanalp

107A. Animal Breeding Laboratory. (1) I.

Laboratory—3 hours. Prerequisite: course 107 (may be taken concurrently). Laboratory exercises in quantitative genetics using Drosophila. Selection, inbreeding and line crossing experiments alternate with statistical analyses using the collected data. Mr. Abplanalp

107B. Animal Breeding Laboratory. (1) I.

Laboratory—3 hours. Prerequisite: course 107 (may be taken concurrently). Experiments on qualitative and quantitative genetics using the laboratory mouse; segregation; linkage; evaluation of effects of inbreeding and line crossing; maternal influence on different kinds of traits. Mr. Bradford

107C. Discussion of Animal Breeding Experiments and Methods. (1) III.

Discussion—1 hour. Prerequisite: course 107 (may be taken concurrently). Review of literature and discussion relating to animal breeding experiments and programs. Emphasis on cattle, sheep and swine. Mr. Rollins

107D. Discussion of Poultry Breeding Experiments and Methods. (1) II.

Discussion—1 hour. Prerequisite: course 107 (may be taken concurrently). A discussion of genetic experiments and breeding plans specifically related to poultry. Mr. Abplanalp

108. Methods in Quantitative Animal Breeding. (3) II.

Lecture—3 hours. Prerequisite: course 107; a course in statistics. Principles, methods and procedures in quantitative animal breeding; heritability, intra- and inter-population selection methods, including selection index, family, pedigree and progeny selection; genetic correlation; relationship and inbreeding. Mr. Rollins

108L. Animal Breeding Laboratory. (1) II.

Laboratory—3 hours. Prerequisite: course 108 (may be taken concurrently). Laboratory in quantitative animal breeding methods. Estimation of heritabilities, genetic correlations and repeatabilities, calculation of inbreeding and relationship co-efficients, adjustment of data for environmental effects, construction of selection indexes, estimation of selection response and hybrid vigor. Mr. Rollins

109. Developmental Genetics in Animals. (3) I.

Lecture—2 hours; discussion—1 hour. Prerequisite: Genetics 100, Zoology 100. Gene and gene action in mammals and birds; the gene in relation to genetic background and developmental environment. Mrs. Abbott

Graduate Course

207. Quantitative Genetics and Animal Breeding. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 105B. Recommended: Mathematics 16A. The genetic theory of selection, population structure, and induced variation, and its implications in the design of animal breeding experiments. Mr. Abplanalp

Nutrition

Lower Division Course

10. Discoveries and Concepts in Nutrition. (3) III.

Lecture—3 hours. Nutrition as a science; its historical development; the properties of foods.

Mr. Heitman

Upper Division Courses

103. Animal Nutrition and Feeding. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8. The basic principles of animal nutrition as they are applied to livestock feeding; the composition and uses of feedstuffs in their relation to the feeding of farm animals and poultry; the balancing of rations. Not open for credit to animal science majors. Mr. Carroll

109. Nutritional Principles of Livestock

Feeding. (3) I.

Lecture—3 hours. Prerequisite: third-year standing in School of Veterinary Medicine or consent of instructor. The principles of nutrition and their application to the solution of problems in animal feeding. Nutritive requirements for maintenance and productive functions, nutritional disorders, composition and use of feedstuffs.

Mr. Lofgreen

110. Principles of Nutrition. (5) II.

Lecture—4 hours; discussion—1 hour. Prerequisite: Biochemistry 101B (may be taken concurrently); a course in physiology or zoology. The fundamental principles of the nutrition of man and other animals. The nutrients in relation to physiological processes of growth, maintenance, and reproduction. Nutritional disorders.

Mr. Hintz, Mr. Grau

112A-112B. Nutrition and Dietetics. (3-4) I-II.

Lecture—3-4 hours. Prerequisite: Chemistry 8; Physiology 1. An introduction to the principles of nutrition; study of the nutrients and their chemical and physiological roles in metabolism; nutrient requirements of man at various phases of the life cycle.

Miss Everson

113A-113B. Nutrition and Dietetics Laboratory.

(1-1) I-II.

Laboratory—3 hours. Prerequisite: course 112A-112B should be taken concurrently. An introduction to the principles of nutrition; study of the nutrients and their chemical and physiological roles in metabolism; nutrient requirements of man at various phases of the life cycle.

Miss Everson

114. Physiological Processes in Child Development. (4) I.

Lecture—4 hours. Prerequisite: course 112B; Biochemistry 101B or consent of instructor. Physical development, physiological changes,

and nutritional needs during the embryological period, infancy, childhood, and youth.

Mrs. Hurley

116. Nutrition and Diet Therapy. (5) I.

Lecture—5 hours. Prerequisite: course 112B; Biochemistry 101B. Physiological basis for the use of special diets. Problems in the planning and computation of diets for normal and pathological conditions.

Mrs. Haskell

117. Problems in Human Nutrition. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 112B; Biochemistry 101B; Chemistry 5. Evaluation of methods of assessing nutritional status in humans. Application of chemical, microbiological, chromatographic, and enzymatic techniques to current problems in human nutrition.

Mrs. Haskell

121. Animal Nutrition Laboratory. (2) III.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 110. Studies, demonstrations, and exercises in the measurement of nutritional values of feeds, nutrient requirements for physiological functions, and ration formulation. Students who have completed course 122 and/or 123 will have units of credit reduced by one unit per course.

Mr. Lofgreen

122. Ruminant Nutrition. (3) III.

Lecture—3 hours. Prerequisite: course 110; Bacteriology 2; Physiology 110B. A study of nutrient utilization as influenced by the unique aspects of digestion and fermentation in the ruminant. Students who have completed course 121 may only receive 2 units of credit.

Mr. Ronning

123. Nutrition of Non-Ruminant Animals. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 110. Application of nutrition principles to the feeding of non-ruminant species, including swine, poultry and laboratory animals. Students who have completed course 121 may only receive 2 units of credit.

Mr. Kratzer, Mr. Hintz

125. Metabolism and Food Utilization. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 110; Physiology 110B. Bioenergetics; a study of energy expenditures of animals and of factors influencing the utilization of food energy.

Mr. Ronning

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to honors students of senior standing. 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.

The Staff (Mr. Hill in charge)

198. Directed Group Study. (1-5) I, II, III. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses

201A. Advanced General Nutrition. (3) I.

Lecture—3 hours. Prerequisite: Bacteriology 2; Biochemistry 101B; Physiology 110B; a course in nutrition. Advanced studies of protein and amino acid metabolism; animal energetics and energy metabolism. Comparative aspects.

The Staff (Mr. Hill in charge)

201B. Advanced General Nutrition. (3) II.

Lecture—3 hours. Prerequisite: Bacteriology 2; Biochemistry 101B; Physiology 110B; a course in nutrition. Advanced studies of problems in nutrition with emphasis on minerals; water balance. Comparative aspects.

The Staff (Mr. Kratzer in charge)

201C. Advanced General Nutrition. (3) III.

Lecture—3 hours. Prerequisite: Bacteriology 2; Biochemistry 101B; Physiology 110B; a course in nutrition. Advanced studies of metabolic function and nutritional importance of vitamins; essential fatty acids; deficiency and degenerative diseases. Comparative aspects.

The Staff (Mrs. Hurley in charge)

250. Concepts of Animal Nutrition. (3) II.

Lecture—3 hours. Prerequisite: courses 201A, 201B, 201C. Dynamic interrelationships between food, animal, and environment, including concepts in food intake, digestion, absorption, and utilization of nutrients. Mr. Lepkovsky

290. Seminar. (1) I, II, III.

Seminar—1 hour. Discussion and critical evaluation of advanced topics in nutrition research.

The Staff (Mr. Norris in charge)

298. Group Study. (1-5) I, II, III.

Discussion—1-5 hours.

The Staff (Mr. Hill in charge)

299. Research. (1-12) I, II, III.

The Staff

Physiology

Upper Division Courses

100A-100B. General Physiology. (3-3) I-II.

Lecture—3 hours. Prerequisite: Biology 1; Chemistry 8; Physics 2C. Chemical, mathematical, and physical characteristics of the life process common to living things, with particular reference to the cell and its regulatory mechanisms.

Mr. Colvin

100L. General Physiology Laboratory. (1) II.

Laboratory—3 hours. Prerequisite: course 100B (may be taken concurrently). Laboratory

in the physical and chemical processes of cells and tissues.

Mr. Colvin

101. Functions of Organ Systems. (3) III.

Lecture—3 hours. Prerequisite: Biology 1. Physiology of organ systems; concepts of integrative and homeostatic mechanisms, especially in adaptation, growth, and reproduction.

Mr. Lorenz, Mrs. Woolley

101L. Organ Function Laboratory. (2) III.

Laboratory—6 hours. Prerequisite: course 101 (which should be taken concurrently). Dissections, primarily of domestic animals, and selected experiments to illustrate functional relationships.

Mr. Lorenz, Mrs. Woolley

102. Physiology of Growth. (3) III.

Lecture—3 hours. Prerequisite: Bacteriology 2; Botany 2; Zoology 2; or courses 101, 101L. Recommended: course 100B; Biochemistry 101B; Mathematics 13. Biological, physical, and chemical aspects of the growth of tissues.

Mr. Smith

103. Physiology of Animal Cells. (3) III.

Lecture—3 hours. Prerequisite: course 100B; Biochemistry 101B. Recommended: Bacteriology 130; Mathematics 16B; Zoology 121. Organization of metazoan systems at the cellular level; cell and tissue culture; tissue regulation; embryonic development.

Mr. B. W. Wilson

104. Relationships of Form and Function. (3) II.

Lecture—3 hours. Prerequisite: courses 101 and 101L, or Zoology 2. Relationships between form and function of biological systems from the molecular to the animal levels as exemplified by the adaptations of birds and other animals.

Mr. B. W. Wilson

107. Avian Physiology. (3) III.

Lecture—3 hours. Prerequisite: courses 101 and 101L, or Zoology 2. Physiology of the various systems of birds with emphasis on digestion, respiration, excretion, and the nervous system.

Mr. Burger

107L. Avian Physiology Laboratory. (2) III.

Laboratory—6 hours. Prerequisite: course 107 (may be taken concurrently); and consent of instructor. Selected problems in the physiology of birds.

Mr. Burger

108A-108B. Biodynamics. (2-2) I-II.

Lecture—2 hours. Prerequisite: course 110B; Mathematics 16B; Physics 2C. Rates and dynamics of physiological processes.

Mr. Morrison, Mr. Besch

110A-110B. Mammalian Physiology. (3-3) I-II.

Lecture—3 hours. Prerequisite: course 101 and 101L, or Zoology 2; Chemistry 8. The physiology of the neuromuscular, central nervous, circulatory, respiratory, digestive, endocrine, reproductive, and excretory systems of mammals.

Mr. Boda, Mr. Loy

111A-111B. Mammalian Physiology Laboratory.

(1-1) I-II.

Laboratory—3 hours. Prerequisite: course 110A-110B (may be taken concurrently).

Mr. Boda, Mr. Loy

120A. Comparative Physiology. (3) I.

Lecture—3 hours. Prerequisite: course 101 and 101L. Comparisons of physiological functions in the animal kingdom: neural and humoral integrative mechanisms.

Mr. Lorenz, Mrs. Woolley

120B. Comparative Physiology. (3) II.

Lecture—3 hours. Prerequisite: course 101 and 101L. Comparisons of physiological functions in the animal kingdom: respiration and circulation.

Mr. Smith, Mr. Rhode

120C. Comparative Physiology. (3) III.

Lecture—3 hours. Prerequisite: course 101 and 101L. Comparisons of physiological functions in the animal kingdom: digestion and excretion.

Mr. Colvin, Mr. Boda

121. Physiology of Reproduction. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110B. The physiological mechanisms related to reproduction, breeding efficiency, and fertility, with special reference to domestic animals.

Mr. Cupps

130. Physiology of the Endocrine Glands. (5) I.

Lecture—4 hours; discussion—1 hour. Prerequisite: course 110B. Control of endocrine secretion and the physiological effects of the hormones, with emphasis on endocrine problems relating to domestic animals.

Mr. Clegg

149. Environmental Physiology of Domestic Animals. (3) I.

Lecture—3 hours. Prerequisite: courses 101 and 101L, or Zoology 2. The influences of environmental factors on physiological processes related to domestic animals.

Mr. W. O. Wilson

151. Physiological Basis of Higher Nervous Function. (4) III.

Lecture—4 hours. Prerequisite: course 110A; Psychology 108. Relations between the structure and function of the brain and problems of emotion, motivation, and learned behavior.

Mr. Kreickhaus

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to animal science majors who are honor students of senior standing. 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.

The Staff (Mr. Lorenz in charge)

198. Directed Group Study. (1-5) I, II, III.

The Staff (Mr. Lorenz in charge)

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff (Mr. Lorenz in charge)

Graduate Courses**210. Advanced Systemic Physiology. (5) III.**

Lecture—2 hours; laboratory—9 hours. Prerequisite: course 110B. Advanced treatment of systemic physiology, with special emphasis on current developments; laboratory exercises illustrating modern physiological concepts and procedures.

214A-214B. Neurophysiology. (2-2) I-II.

Lecture—2 hours. Prerequisite: courses 110B, 111B. Recommended: course 100B. Electrical activity of neurons and neuroeffector junctions; physiology of the nervous system as studied by its electrical activity.

Mr. Wagman

215A-215B. Neurophysiology Laboratory. (3-3) I-II.

Laboratory—9 hours. Prerequisite: course 214A-214B, course 298 (2 units) (both courses to be taken concurrently), and consent of an advisory committee. Mr. Burger, Mr. Wagman

220. General and Comparative Physiology of Reproduction. (3) I.

Lecture—3 hours. Prerequisite: course 110B; Biochemistry 101B; Genetics 100. 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:

Mr. Clegg, Mr. Ogasawara, Mr. Cupps

225. Physiology of Lactation. (3) III.

Lecture—3 hours. Prerequisite: course 110B; Biochemistry 101B. The physiology and biochemistry of milk formation, with special reference to the metabolic pathways leading to the synthesis of milk in various species of mammals. Offered in even-numbered years.

Mr. Baldwin

242. Physiological Rhythmicity. (1) I.

Lecture—1 hour. General aspects and basic mechanisms of biological rhythms; the importance of rhythm desynchronization in areas of pharmacology and space medicine; telemetry; mathematical methods; chronometry; tidal, lunar, and annual periods; periodic desynchronization.

Mr. Winget

290. Seminar. (1) I, II, III.

Seminar—1 hour. Discussion and critical evaluation of advanced topics and current trends in research. The Staff (Mr. Lorenz in charge)

291. Seminar in General Physiology. (1) III.

Seminar—1 hour. Discussion of selected topics concerning the physical and chemical processes of cells and tissues.

Messrs. Clegg, Epstein, Maxie, Smith

298. Group Study. (1-5) I, II, III.

Lectures and/or group discussions of advanced physiological subjects.

The Staff (Mr. Lorenz in charge)

299. Research. (1-9) I, II, III.

The Staff (Mr. Lorenz in charge)

ANTHROPOLOGY

Daniel J. Crowley, Ph.D., *Chairman of the Department*

Department Office, 331 Voorhies Hall

Professor:

¹David L. Olmsted, Ph.D.

Associate Professors:

Martin A. Baumhoff, Ph.D.

Yehudi A. Cohen, Ph.D.

Daniel J. Crowley, Ph.D. (*Anthropology and Art*)

Assistant Professors:

Warren G. Kinzey, Ph.D. (*Anthropology and Zoology*)

William C. Smith, Ph.D.

Stephen A. Tyler, Ph.D.

*Assistant Professor:*

Denise O'Brien, A.B. (*Acting*)

Lecturer:

Jay W. Ruby, M.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Departmental Major Advisers.—Mr. Tyler, Miss O'Brien.

The Major Program

Lower Division Courses.—Required: Anthropology 1, 2, Geography 1; Psychology 1A, 1B, or Biology 1, and either Mathematics 13 or Sociology 46B.

Upper Division Courses.—Required: Anthropology 102, 103A, 103B, 103C; 110A, 110B, 110C, or 120; 128A, 128B, 195, and one course selected from other upper division courses in Anthropology or from Art 150, 154A, 154B, 154C; Genetics 100 or Genetics 115.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major.

Teaching Minor.—Required: 30 quarter units of anthropology.

Subject Representative: Miss O'Brien

¹ Absent on leave, 1966-67.

Lower Division Courses**1. Physical Anthropology. (4) I, II, III.**

Lecture—3 hours; discussion—1 hour. Human biology and physical anthropology; the relation of man and the animals; the origin and antiquity of man; fossil man; anthropometry, the criteria of race and racial classification; current racial theories; race problems.

Mr. Kinzey, —

2. Cultural Anthropology. (4) I, II, III.

Lecture—3 hours; discussion—1 hour. Prehistory and growth of culture; diversity of cultures considered from the aspects of language, economics, kinship, art, magic, and religion.

Mr. Cohen, Mr. Crowley, Miss O'Brien

Upper Division Courses**102. Ethnology. (4) II.**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. Major theories of culture; survey of principal culture types and their distribution; discussion of ethnological problems.

Mr. Smith

103A. Culture Growth. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Theory and method of prehistoric archaeology.

Mr. Baumhoff

103B. Culture Growth. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 103A. Comparative prehistory and archaeology: Old World.

Mr. Ruby

103C. Culture Growth. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 103A. Comparative prehistory and archaeology: New World.

Mr. Baumhoff

105A. The American Indian. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. An introductory survey of the Indians of North America: origins, languages, civilizations, and history.

Mr. Ruby

105B. The American Indian. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. An introductory survey of the Indians of South America: origins, languages, civilizations and history. Mr. Smith

110A. Elementary Linguistic Analysis. (3) I.

Lecture—2 hours. Phonetics and phonemics.

110B. Intermediate Linguistic Analysis. (3) II.

Lecture—2 hours. Prerequisite: course 110A. Morphophonemics, morphemics and tactics.

110C. Comparative Linguistics. (3) III.

Lecture—2 hours. Prerequisite: course 110B. Linguistic prehistory, historical linguistics and reconstruction; dialect geography.

119A. Culture and Personality. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. Methods and theories in the study of the relationships among culture, society, and personality. The development of culture and personality as a sub-discipline in anthropology. Mr. Cohen

***119B. Culture and Personality. (4) II.**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 119A. An examination of empirical investigations of pre-literate and contemporary societies in relation to the techniques of culture and personality studies. Mr. Cohen

120. Language and Culture. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 110B. Language and thought; classification of languages; linguistic aspects of culture; language, nation, and state. Mr. Tyler

121. Folklore. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or literary preparation acceptable to the instructor. Theory and method in the study of folktales, myths, legends, proverbs, riddles, songs, and other forms of verbal tradition. Mr. Crowley

***122. Economic Anthropology. (4) II.**

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of the instructor. Economic behavior in non-industrial societies; its social and cultural setting, and its modern changes. Miss O'Brien

***124. Comparative Religion. (4) III.**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. An anthropological analysis of the origins, elements, forms, and symbolism of religion; functional interpretation with stress on ethnographic materials. Mr. Cohen

128A. Kinship and Social Organization. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Theoretical: discussion of theories of social organization with primary emphasis on typology and classification of family and kinship systems. Mr. Tyler

128B. Kinship and Social Organization. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 128A. Methodological: demonstration of field methods and discussion of analytic models. Primary emphasis will be placed on componential and transformational analysis. Mr. Tyler

139. Peoples of Africa. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. Peoples and cultures of Africa: survey and comparative analysis of representative societies and cultures in the area. Mr. Crowley

***140. Peoples of Afroamerica. (4) II.**

Lecture—3 hours; discussion—1 hour. A study of the cultural implications of slavery and the contribution of Africans to the national cultures of the Americas. Mr. Crowley

***143. Peoples of India. (4) I.**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. Development of Indian cultural traditions; social organization and social trends. Mr. Tyler

147. Peoples of the Pacific. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. The aboriginal civilizations of Australia, Malaysia, Melanesia, Micronesia, and Polynesia in prehistoric and modern times; changes arising from European contact and colonization. Miss O'Brien

***152. Human Evolution and Fossil Man. (4) III.**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Nature and results of the evolutionary processes involved in the formation and differentiation of mankind.

***153. Living Races of Man. (4) I.**

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1. Physical characters, distribution, and relationships.

154A. Introduction to Primate Evolution. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. The origin and relationships of the monkeys and apes. Distribution of living and fossil forms with emphasis upon their adaptive radiations.

154B. Comparative Primate Anatomy. (4) II.

Lecture—3 hours; laboratory—3 hours. Pre-

⁷ * Not to be given, 1966-1967.

requisite: course 154A and Zoology 2. The functional anatomy of the locomotor, digestive, reproductive, and nervous systems of monkeys and apes. Emphasis on the anatomical evidence for their interrelationships.

154C. Primate Behavior and Ecology. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 154A. The social behavior, organization, and ecology of monkeys and apes, their relevance to the evolution of human behavior and social groups.

160A. Contemporary Civilization. (4) II.

Lecture—3 hours; discussion—1 hour. The application of anthropological concepts and methods to the study of contemporary civilization. Emphasis will be placed on the development and evolution of American culture from its beginnings to the present. Mr. Cohen

***160B. Contemporary Civilization. (4) II.**

Lecture—3 hours; discussion—1 hour. Prerequisite: course 160A. An anthropological analysis of special problems in contemporary civilization, such as family and kinship organization, community organization, and political integrations. Comparisons of American culture with other societies in contemporary civilization. Mr. Cohen

***162. Peasant Society and Culture. (4) II.**

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of the instructor. Comparative study of peasant communities, utilizing historical and ethnographic sources; analysis of urban rural relations; problems of economic development and culture change. Mr. Smith

165. Culture Change. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of the instructor. Introduction to the analysis of socio-cultural stability and change; theories of innovation, diffusion, acculturation, and cultural evolution; problems of social planning. Miss O'Brien

195. Field Course in Archaeological Method.

(3) I, III.

Laboratory—8 hours. Prerequisite: consent of the instructor. Lectures, museum preparation, and weekend excavations. Enrollment limited to twenty students. With consent of the instructor, may be repeated without duplication of credit. Mr. Ruby

***196. Archaeological Method. (3) II.**

Laboratory—6 hours. Prerequisite: course 195 and the consent of the instructor. Museum preparation, advanced field investigation, and guidance in preparation of museum material for publication. Enrollment limited to eighteen students. With consent of the instructor, may be repeated without duplication of credit. Mr. Ruby

***198. Directed Group Study. (3) I, III.**

Discussion—3 hours. Prerequisite: consent of the instructor. Directed reading and group discussion of selected anthropological problems.

Mr. Smith

199. Special Study for Advanced Undergraduates.

(1-3) I, II, III.

The Staff (Mr. Olmsted in charge)

Graduate Courses

210. Aspects of Culture Structure. (4) III.

Seminar—3 hours. Analysis of various phases of culture, such as religion, economics, law, and folklore.

Mr. Cohen

216. Problems in Archaeological Method. (4) II.

Seminar—3 hours. Techniques for analyzing archaeological data; application to various prehistoric cultures.

Mr. Baumhoff

***219. Culture and Personality. (4) III.**

Seminar—3 hours.

Mr. Cohen

220. Field Course in Linguistics. (4) III.

Seminar—2 hours; laboratory—2 hours. Prerequisite: courses 110A and 110B. Techniques of eliciting, recording, and analyzing; work with a native speaker.

Mr. Olmsted

225. Kinship and Social Structure. (4) II.

Seminar—3 hours. Compositional analysis of kinship systems and discussion of descent group and alliance theories.

Miss O'Brien

226. Evolution of Social Organization. (4) II.

Seminar—3 hours. Diachronic and synchronic analyses of social organization.

Mr. Cohen

***239. Problems in African Society and Culture. (4) II.**

Seminar—3 hours.

Seminar—3 hours. Diachronic analyses of traditional institutions in sub-Saharan Africa.

Mr. Crowley

***242. Problems in African Prehistory. (4) III.**

Seminar—3 hours.

Mr. Baumhoff

***245. Ethnology of Northern and Central Asia. (4) I.**

Seminar—3 hours. Prerequisite: a reading knowledge of German, Russian, Chinese, or Japanese. 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.

Mr. Olmsted

247. Peoples and Cultures of Oceania. (4) I.

Seminar—3 hours.

Miss O'Brien

250. Theory and Method of Anthropology. (4) III.

Seminar—3 hours.

Mr. Baumhoff

* Not to be given, 1966-1967.

253. Concepts and Problems in Physical Anthropology. (4) I.

Seminar—3 hours.

Mr. Kinzey

254. Primate Social Behavior. (4) III.

Seminar—3 hours. Analysis of primate social behavior, with particular emphasis on field studies.

265. Concepts and Problems in Applied Anthropology. (4) III.

Seminar—3 hours. Case studies of directed

culture change; problems of planning and evaluation; uses of anthropological theory and data in professional fields such as agriculture, public health, administration, and international technical assistance.

Mr. Smith

292. Seminar in Anthropological Linguistics. (4) II.

Seminar—3 hours.

299. Research. (3-8) I, II, III.

The Staff (Mr. Olmsted in charge)

ART

Richard D. Cramer, M.F.A., *Chairman of the Department*

Department Office, 103 East Hall

Professor:

Richard L. Nelson, M.A.

Associate Professors:

Richard D. Cramer, M.F.A. (*Architecture*)

Daniel J. Crowley, Ph.D. (*Art and Anthropology*)

¹Tio L. Giambruni, M.A.

Ruth J. Horsting, M.A.

Seymour Howard, Ph.D.

Ralph M. Johnson, M.A.

Roland C. Petersen, M.A.

Daniel Shapiro

Wayne Thiebaud, M.A.

Assistant Professors:

Robert C. Arneson, M.F.A.

William T. Wiley, M.F.A.

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Lecturers:

Joseph A. Baird, Jr., Ph.D.

John R. Baxter, A.B.

Roy R. DeForest, M.A.

Susan R. McKillop, M.A.

Charles M. Muskavitch, H.D., F.I.I.C.

Associate:

Jane B. Garritson, M.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Departmental Major Advisers.—Mr. Giambruni, Mr. Howard, Mr. Johnson, Mr. Nelson, Mr. Petersen, Mr. Thiebaud, Mr. Wiley.

Preparation for the Major.—Practice of Art: Art 2, 3, 4; 8 units chosen from courses 1A, 1B, 1C, and 1D. History of Art: Art 1A, 1B, 1C,

1D and one class in drawing, graphics, or painting; one class in sculpture or ceramics.

The Major.—A student may elect a major emphasizing Appreciation and Practice of Art or History of Art.

I. Appreciation and Practice of Art. Eighteen units of Group A courses under two different artists, course 148, 8 units from Group C, and 6 units chosen from Group A, B, or C.

II. History of Art. Required: two art history year sequences (e.g., Art 154A, 154B, 154C, and 178A, 178B, 178C); Art 148; Art 189; and 4 units from Group C. Students planning to do advanced work in History of Art are urged to develop their knowledge of foreign languages (especially German) as early as possible.

Transfer Students.—Transfer students who have fulfilled unit requirements elsewhere are (a) required to take an examination in order to qualify for Group A courses, and (b) requested to present examples of their work done in other institutions before being admitted to classes and before credit can be given toward the major for work done elsewhere.

Students who qualify will be advised to take course 195 in order to acquaint themselves with the methods expected for this department's advanced courses. The department will recommend for graduation only students with at least a grade C average in the major.

Graduate Study.—The Department of Art offers a program of study and research leading to the M.A. degree in art practice. Detailed information regarding graduate study may be obtained from the *Announcement of the Graduate Division*, or by writing to the Graduate Adviser, Department of Art.

Teaching Major.—Requirements are the same as for the undergraduate major for degree (A.B.).

Teaching Minor.—30 quarter units in the field of art; at least 18 quarter units of this total to be in upper division courses (except as recommended by the Department of Art).

Subject Representative: Mr. Petersen

¹ Absent on leave, 1966-67.

Lower Division Courses**1A. History of Art: Prehistoric through Early Christian. (4) I.**

Lecture—4 hours. Art from 1500 B.C. to 500 A.D.: the cave at Lascaux, Jericho, Ur, Thebes, Knossos, Troy, Mycenae, Corinth, Athens, Pergamum, Cerveteri, Rome and Ravenna; Imhotep, Phidias, Polyclitus, Praxiteles, Scopas, Lysippus, Agesander, and Apollodorus.

Mr. Howard

1B. History of Art: Byzantine through Renaissance. (4) II.

Lecture—4 hours. European art from the seventh through the sixteenth centuries: Sutton-Hoo, Constantinople, Aachen, Hildesheim, Chartres, Salisbury, Florence, Siena, Rome, Venice; Giotto, the van Eycks, Brunelleschi, Donatello, Piero della Francesca, Botticelli, Leonardo, Michelangelo, Titian, Dürer, and El Greco.

Mrs. McKillop

1C. History of Art: Baroque through Modern. (4) I, III.

Lecture—4 hours. European art after 1600: Caravaggio, Bernini, Rubens, Rembrandt, Velazquez, Vermeer, Wren, Watteau, Mansart, Gainsborough, Reynolds, Canova, Goya, Blake, Constable, Delacroix, Ingres, Manet, Whistler, Richardson, Rodin, Cezanne, Matisse, Picasso, Brancusi, Corbusier, and Klee.

Mr. Cramer

1D. Art History: Oriental Art (4) III.

Lecture—4 hours. The art of India, China, and Japan.

Mr. Crowley

2. Elementary Form and Color. (4) I, II, III.

Laboratory—12 hours. Form in composition using black and white media. Introduction to color in composition.

Mr. Thiebaud,

Mr. Johnson, Mr. Petersen,
Mr. Wiley, Mr. DeForest**3. Intermediate Form and Color. (4) I, II, III.**

Laboratory—12 hours. Prerequisite: course 2. Color and form in composition.

Mr. DeForest, Mrs. Garritson

4. Introductory Figure Painting. (4) I, II, III.

Laboratory—12 hours. Prerequisite: course 2. Form in composition, with the human figure as subject.

Mr. Petersen, Mr. Thiebaud

10. Introduction to Art. (3) I, II, III.

Lecture—3 hours. The understanding and appreciation of painting, sculpture, architecture, and industrial art. Illustrated lectures. Recommended for nonmajors.

Mr. Nelson

12A. Ceramics. (4) I, II.

Laboratory—12 hours. Beginning ceramics; an introduction to ceramic forms and processes.

Mr. Arneson

12B. Ceramics. (4) II, III.

Laboratory—12 hours. Prerequisite: course 12A. Beginning ceramics; introduction to ceramic color and glaze research. Mr. Arneson

14A. Sculpture. (4) I, II, III.

Laboratory—12 hours. Beginning sculpture; introduction to basic elements of three dimensional construction and relief in clay and plaster.

Mrs. Horsting

14B. Sculpture. (4) I, II.

Laboratory—12 hours. Prerequisite: course 14A. Beginning sculpture; introduction to space design, with the human figure as a motif. Construction in clay, plaster, wood, and stone.

Mrs. Horsting

16. Descriptive Drawing and Rendering. (3) I, II.

Lecture—1 hour; laboratory—6 hours. Methods of objective drawing and of space description; rendering in various media.

Mr. Baxter

Upper Division Courses**GROUP A: APPRECIATION AND PRACTICE****102. Advanced Drawing and Painting. (3) I, II, III.**

Laboratory—9 hours. Prerequisite: courses 2, 3, 4. Composition with the human figure as a basic motif and representational composition based on out-of-door subjects. Painting in various media including oil, tempera, gouache, and wax. May be repeated for credit.

Mr. Johnson, Mr. Petersen, Mr. Wiley,
Mr. Thiebaud, Mr. DeForest**104. Advanced Form and Figure Composition. (3) I, II, III.**

Laboratory—9 hours. Prerequisite: course 4. Problems of light, color, and space that involve the human figure and its environment.

121A. Architectural Design. (3) I.

Lecture—1 hour; laboratory—6 hours. Prerequisite: two courses in art practice or design; or consent of instructor. Studio projects in architectural design.

Mr. Cramer

121B. Architectural Design. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 121A. Studio projects in architectural design.

Mr. Cramer

122. Collage and Assemblage. (3) II, III.

Laboratory—9 hours. Prerequisite: courses 2 and 14A. Basic elements of form, texture, and color in two and three dimensions; studio exercises.

Mr. Baxter

128A. Graphic Arts. (3) I, II, III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: two courses in art practice. Beginning

experimental methods in relief and intaglio printmaking, etching, engraving, aquatint, woodcut, and related media. Mr. Shapiro

128B. Graphic Arts. (3) I.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 128A. Intermediate experimental methods in relief and intaglio printmaking, etching, engraving, aquatint, woodcut, and related media. Mr. Shapiro

128C. Graphic Arts. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 128B. Advanced experimental methods in relief and intaglio printmaking, etching, engraving, aquatint, woodcut, and related media. Mr. Shapiro

141. Sculpture: Methods and Materials. (3) I, II.

Laboratory—9 hours. Prerequisite: course 14B; or consent of instructor. Advanced three-dimensional design featuring the use of stone, wood, metal, and plaster. Mr. Giambruni

142. The Human Figure in Sculpture. (3) I.

Laboratory—9 hours. Prerequisite: courses 4, 14B, 14I; or consent of instructor. Design exercises in three-dimensions and relief, featuring the human figure as subject matter.

Mrs. Horsting

143. Casting Techniques and Theory of Cast Sculpture. (3) II, III.

Laboratory—9 hours. Prerequisite: course 14B; or consent of instructor. Advanced sculpture projects in varied casting techniques and media. Emphasis on bronze and "lost-wax" techniques. Mrs. Horsting

†144A. Advanced Sculpture. (3) I, II, III.

Laboratory—9 hours. Prerequisite: course 14B. Advanced problems dealing with relationship of volumes in the round and in relief, specifically considering problems as related to the demands of materials used. Discussions of the aesthetics involved in sculpture.

*144B. Advanced Sculpture. (3) III.

Laboratory—9 hours. Prerequisite: course 144A. Advanced aesthetic sculpture problems.

*145. Advanced Relief Structure. (3) II.

Laboratory—9 hours. Prerequisite: course 14A. Drawing for sculpture; creating sculpture reliefs using plaster, wood, ceramics, wax, and aluminum.

\$146. Ceramic Sculpture. (3) I, II, III.

Laboratory—9 hours. Prerequisite: course 12B; or consent of instructor. Use of clay as material for sculpture in round and relief. May be repeated for credit. Mr. Arneson

GROUP B: THEORY AND CRITICISM

148. Art Theory and Criticism. (4) II, III.

Lecture—3 hours. Prerequisite: course 2 or 14A, and one art lecture course. Study of forms and symbols in historic and contemporary works of art Mr. Thiebaud

GROUP C: HISTORY OF ART

150. The Art of Primitive Peoples. (4) II.

Lecture—3 hours. The arts of prehistoric peoples, and of Africa, Oceania, Australia, and the Indians of the Americas. Mr. Crowley

154A. Greek Art: The Helladic through Archaic Periods. (4) I.

Lecture—3 hours. The art of Classical Greece to the Persian invasions. The Geometric, Orientalizing, and Archaic styles: the Doric temple, black- and red-figure vase painting, the *Kore* and *Kouros*. Corinth, Selinus, Paestum, Polymedes, Clitias, Execias, Epictetus, Euthymides, Kritios, and Clamis. Mr. Howard

154B. Greek Art: The Gold and Silver Ages. (4) II.

Lecture—3 hours. Greek art from the time of Pericles to that of Alexander: Olympia, the Athenian Acropolis, Bassae, Epidaurus, Halicarnassus; Myron, Phidias, Polycletus, the Achilles Painter, Praxiteles, and Scopas. Mr. Howard

154C. Greek Art: The Hellenistic Age. (4) III.

Lecture—3 hours. Art in the Greek world from 322 B.C. until the time of Imperial Rome: Pergamum, Alexandria, Priene, and Delos; Lysippus, Polyeuctus, Boethus, Agesander, Philoxenus, and other artists. Mr. Howard

155. Roman Art. (4) III.

Lecture—3 hours. The art of Republican and Imperial Rome, its buildings, portraiture, historic reliefs, and murals: Pompeii, Nîmes, Praeneste, Ostia, Baalbeck, Palmyra, Petra, Spoleto, Trier; Forum Romanum, Ara Pacis, Pont du Gard, Colosseum, Pantheon, Baths of Caracalla, and the Arch of Constantine. Mr. Howard

*160. History of Minor Art. (4) I.

Lecture—3 hours. Great periods, masters, and masterworks of minor art, such as Tutankhamen's throne, harp of Ur, Tanagra figurines, Portland vase, Bayeux tapestry, Suger's chalice, Majolica; Pisanello, Cellini, Chippendale, Adam, Wedgwood, Morris, Tiffany, Eames, and others. Mrs. McKillop

*162. History of Graphic Art. (4) III.

Not to be given, 1966-67.
Lecture—3 hours. Printmaking from the Renaissance to modern times; such printmakers

Not to be given, 1966-67.

Not to be given, fall quarter 1966.

Not to be given, winter quarter, 1967.

Not to be given, spring quarter 1967.

as the Master of the Nuremberg Chronicle, Dürer, Van Dyck, Rembrandt, Goya, Daumier, Whistler, Picasso, and Hayter. Mrs. McKillop

168. The History of Urban Form. (4) II.

Lecture—3 hours. An historical investigation of the evolution of great cities; physical forms of town planning in the past as a guide to modern urban developments. Consideration of Rome, Constantinople, Venice, Paris, London, and New York. The relation of European and American planning concepts. Field trips.

Mr. Baird

176A. Art of the Middle Ages: Early Christian to Romanesque. (4) I.

Lecture—3 hours. The art of Christian Europe from the founding of Constantinople to the tenth century; the early Christian, Byzantine, Carolingian, and Ottonian periods; the Basilica of St. Peter's, St. Mark's in Venice, Hagia Sophia, St. Gall, Sutton-Hoo, and the Lindisfarne Gospels.

***176B. Art of the Middle Ages: Romanesque through Gothic. (4) II.**

Lecture—3 hours. The arts in Christian Europe from the eleventh to the fifteenth centuries: St. Sernin, Gislebertus, Poitiers, Caen, St. Ambrose, St. Denis, Chartres, Rheims, Salisbury, Cologne, Santa Croce, Strasbourg, Naumburg, Claus Sluter, and Villard de Honnecourt.

Mr. Howard

177A. Northern Renaissance Art. (4) I.

Lecture—3 hours. Art of the Lowlands in the fifteenth and sixteenth centuries. The van Eycks, Master of Flemalle, Roger van der Weyden, Bouts, Geertgen, Bosch, and Bruegel.

Mrs. McKillop

***177B. Northern Renaissance Art. (4) II.**

Lecture—3 hours. Art between the Rhine and the Danube in the fifteenth and sixteenth centuries: Multscher, Riemenschneider, Witz, Schongauer, Dürer, Grünewald, Cranach, Alt-dorfer, and Holbein.

Mrs. McKillop

178A. Italian Renaissance Art. (4) I.

Lecture—3 hours. Art of the Trecento: Niccolò and Giovanni Pisano, Cimabue, Giotto, Duccio, the Lorenzetti, Simone Martini. Emphasis on Assisi, Florence, and Siena.

Mrs. McKillop

178B. Italian Renaissance Art. (4) II.

Lecture—3 hours. Art of the fifteenth century: Ghiberti, Brunelleschi, Masaccio, Donatello, Fra Angelico, Piero della Francesca, Botticelli, Mantegna, and Bellini. Emphasis on Florence, Northern Italy, and Venice.

Mrs. McKillop

178C. Italian Renaissance Art. (4) III.

Lecture—3 hours. Art of the sixteenth century: Leonardo, Michelangelo, Raphael, Bramante, Giorgione, Titian, Correggio, Pontormo, and Tintoretto. Emphasis on Rome, Florence, and Venice.

Mrs. McKillop

179A. Baroque Art. (4) II.

Lecture—3 hours. Architecture, sculpture, and art of the garden, from formative stages of the Baroque in the sixteenth century to creation of the Rococo. Emphasis on western Europe; prototypes and developments. Bernini, Mansart, and other major artistic personalities.

Mr. Baird

179B. Baroque Art. (4) III.

Lecture—3 hours. Painting from 1590 to 1720, Italian, Spanish, Flemish, French, and English masters will receive particular attention as well as Caravaggio, Velasquez, Rubens, Van Dyck, Claude, and Poussin. Some attention to painting and drawing for the theater and other spectacles.

Mr. Baird

180. Readings in Art Historical Methods. (4) II.

Lecture—3 hours. Works by major art chroniclers, historians, and theorists of the historic and recent past: Plutarch, Pliny, Lucian, Suger, Alberti, Vasari, Bellori, Winckelmann, Ruskin, Wölfflin, Berenson, Riegl, and Panofsky.

183A. Modern Painting: Neo-Classicism to Realism. (4) I.

Lecture—3 hours. European painting from the French Revolution through mid-nineteenth-century academicism. Goya, David, Ingres, Gericault, Delacroix, Daumier, Corot, Millet, Rousseau, Courbet, early Manet, Reynolds, Blake, Lawrence, Constable, Turner, Overbeck, Feuerbach.

183B. Modern Painting: Impressionism through Early Expressionism: (4) II.

Lecture—3 hours. European painting from 1865 to 1910: later Manet, Degas, Monet, Renoir, Cezanne, Seurat, Van Gogh, Lautrec, Gauguin, Bernard, Vuillard, Bonnard, Redon, Moreau, Matisse, Derain, Rouault, Rossetti, Sickert, Munch, Corinth, Kokoschka, Kirchner, Nolde, Soutine, and Modigliani.

183C. Modern Painting: Cubism to the Present. (4) III.

Lecture—3 hours. International painting styles from 1910 to the present: Picasso, Braque, Boccioni, Severini, Delaunay, Leger, Malevitch, Mondrian, Kandinsky, Klee, Beckmann, Grosz, Duchamp, Chirico, Chagall, Schwitters, Ernest, Arp, Miro, Masson, Gorky, de Kooning, Johns, Orozco, Bacon, Sutherland, Burri, Soulages, Appel, and Dubuffet.

* Not to be given, 1966-67.

184. Architecture in the Twentieth Century. (4) III.

Lecture—3 hours. The forms and sub-styles of modern architecture, with emphasis on the development of organicism in the works of Frank Lloyd Wright and of the international style in the work of Le Corbusier and Van der Rohe.

Mr. Cramer

188A. The Art of Latin America. (4) I.

Lecture—3 hours. Emphasis on architecture, sculpture, and paintings of Mexico from colonial times to the present; the American Southwest, colonial art in Peru, and eighteenth century to modern architecture in Brazil. European backgrounds and creative originality in the New World.

Mr. Baird

***188B. The Art of the United States. (4) II.**

Lecture—3 hours. A survey of three centuries of American building arts, with emphasis on colonial, Georgian, nineteenth and twentieth century architecture. Particular attention to California (especially northern California). Field trips.

Mr. Baird

***188C. The Art of the United States. (4) III.**

Lecture—3 hours. Emphasis on painting and sculpture. The great eras from Colonial to contemporary; notable masters and schools. Special attention to pictorial art since 1850; some attention to the leading figures in California of the later nineteenth and early twentieth centuries. Field trips.

Mr. Baird

189. Museum Methods and Connoisseurship. (4) III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: basic art history courses; or consent of instructors. The history of collecting; problems of media and connoisseurship, especially in painting, drawing, and graphic arts. Study of iconography, techniques of preservation and restoration, museum registration and storage. Preparation of an exhibition at Davis, with printed catalogue. Field trips.

Mr. Baird

190. The Role of the Artist in Culture. (4) I.

Lecture—3 hours. Prerequisite: non-majors

^a Not to be given, 1966–1967.

AVIAN MEDICINE

H. E. Adler, D.V.M., Ph.D., *Chairman of the Department*

Department Office, 2079 Haring Hall

Professors:

Henry E. Adler, D.V.M., Ph.D.

Raymond A. Bankowski, D.V.M., Ph.D.

Associate Professor:

Livio G. Raggi, D.V.M., Ph.D.



admitted only with consent of instructor. Comparative analysis of recruitment, training, function, roles, and evaluations of artists in various cultures. Written and oral reports. Mr. Baxter

Special Study Courses

195. Special Study in Appreciation and Practice of Art. (4) I, II, III.

Laboratory—12 hours. Prerequisite: 12 units of appreciation and practice work or consent of instructor. May not be repeated for credit.

The Staff (Mr. Nelson in charge)

198. Directed Group Study. (1–5) I, II, III.

The Staff (Mr. Nelson in charge)

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

The Staff (Mr. Nelson in charge)

Graduate Courses

201. Advanced Practice in Selected Painting and Drawing Techniques. (4) II, III.

Lecture—3 hours. Original work produced for group discussion and criticism. May be repeated for credit.

The Staff (Mr. Nelson in charge)

290. Seminar. (4) I, III.

Seminar—3 hours. The practice of painting and drawing; original works produced for group discussion and criticism; topics of a contemporary and historical nature. May be repeated for credit. The Staff (Mr. Nelson in charge)

299. Individual Study. (1–6) I, II, III.

The Staff (Mr. Nelson in charge)

Professional Course

300. Practice and Principles of Art Education.

(3) II, III.

Lecture—2 hours; laboratory—4 hours. Prerequisite: senior or graduate standing; or consent of instructor. Art education and practice of techniques used in elementary and secondary schools.

Mrs. Carriton

Lecturer:

Richard Yamamoto, Ph.D.

Upper Division Course

112. Poultry Diseases. (3) II.

Lecture—3 hours. Prerequisite: Biology 1;

junior standing or consent of the instructor. Principles in the control of poultry diseases.

Mr. Adler

Graduate Courses

208. Poultry Diseases. (3) II.

Lecture—3 hours. Prerequisite: third-year standing in the School of Veterinary Medicine, or consent of instructor. The etiology, diagnosis, and control of the diseases of poultry.

The Staff (Mr. Adler in charge)

209. Avian Medicine Laboratory. (2) I.

Lecture—1 hour; laboratory—2 hours. Prerequisite: fourth-year standing in the School of Veterinary Medicine. Diagnosis of avian diseases by necropsy and laboratory procedures. Selected diseases of major importance to the poultry industry will be reproduced for class use including those of bacterial, viral, and chemical origin.

The Staff

299. Research. (1-9) I, II, III.

Discussion—1-6 hours.

The Staff

BACTERIOLOGY

Allen G. Marr, Ph.D., *Chairman of the Department*

Department Office, 156 Hutchison Hall

Professors:

Robert E. Hungate, Ph.D.

John L. Ingraham, Ph.D.

Allen G. Marr, Ph.D.

Herman J. Phaff, Ph.D. (*Bacteriology and Food Science and Technology*)

Mortimer P. Starr, Ph.D.

Associate Professor:

Donald M. Reynolds, Ph.D.

Assistant Professors:

Clifton E. Dowell, Ph.D.

Monica Riley, Ph.D.



Associate Professor:

Martin W. Miller, Ph.D. (*Food Science and Technology*)

Lecturer:

Nancy L. Baigent, Ph.D.

Associate:

Emily S. McDermott, M.A.T.

Letters and Science List.—All undergraduate courses in bacteriology are included in the Letters and Science List of Courses (see page 98).

Major Advisers.—Mr. Ingraham, Mr. Hungate, Mr. Reynolds.

The Major Program. The undergraduate major programs are designed to provide a proper balance of studies in the biology of bacteria and other microorganisms together with appropriate courses in mathematics and physical science. The Bachelor of Science program offers greater emphasis in mathematics and physical science. Both the Bachelor of Arts program and the Bachelor of Science program are suitable for students who plan to do graduate work in a biological science or who wish a professional career in bacteriology.

Either major is appropriate for students contemplating a career in Medical Technology. Such students are advised to take Veterinary Microbiology 127 and a year laboratory course in physics in addition to the courses required for a major in bacteriology.

Bachelor of Arts Major Program

Lower Division Courses.—Bacteriology 2; Biology 1; Biology 2, Botany 2, or Zoology 2; Chemistry 1A-1B-1C, 8; Mathematics 16A-16B and either 13, 16C, or 36A-36B; Physics 2A-2B-2C.

Upper Division Courses.—Bacteriology 110, 130, 140; Biochemistry and Biophysics 101A-101B-101L; Chemistry 5; Genetics 100; and one course from the following group: Bacteriology 150; Botany 118, 119A-119B; Zoology 110; and two additional units in bacteriology which may include Veterinary Science 127.

Bachelor of Science Major Program

Lower Division Courses.—Bacteriology 2; Biology 1; Chemistry 1A-1B-1C, 5; Mathematics 1A-1B-1C, 13; Physics 4A-4B-4C-4D. Recommended: elementary courses in French and German.

Upper Division Courses.—Bacteriology 110, 130, 131, 140, 160, 170; Biochemistry and Biophysics 101A-101B-101L; Chemistry 110A-110B-110C, 112A-112D-112E; Genetics 100; and one course from the following groups: Bacteriology 150; Botany 118, 119A-119B; Zoology 110.

Honors and Honors Program (see page 96).—The honors program consists of course 194H.

Graduate Study (see page 111).—The Graduate Group in Microbiology offers programs of study and research leading to the M.A. and Ph.D. degrees in general microbiology, including bacteriology. The offerings of the Department of Bacteriology are augmented by courses and faculty of the Departments of Biochemistry and Biophysics, Botany, Food Science and Technology, and Viticulture and Enology,

and the School of Veterinary Medicine. For detailed information regarding graduate study in microbiology, address the Graduate Adviser in Microbiology, Department of Bacteriology.

Teaching Major.—Requirements for the Teaching major are the same as those for the departmental major.

Teaching Minor.—30 units selected from the B.A. or B.S. Bacteriology major programs, as approved by the Department Subject Representative.

Subject Representative: Mr. Reynolds

Lower Division Course

2. Introduction to Microbiology. (5) I, II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biology 1; Chemistry 1A. A general introduction to the biology of bacteria and of other micro-organisms.

Mr. Ingraham, Mr. Marr, Mr. Reynolds

Upper Division Courses

110. Structure and Function of Bacteria. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 2. Analysis of the structure and ultrastructure of bacteria in relationship to physiological function; osmotic behavior of bacterial cells.

Mr. Marr

130. Bacterial Physiology. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 2; Mathematics 16A. Growth of bacteria; biochemical and genetic regulation of metabolism; effects of the physical and chemical environment.

Mr. Ingraham

131. Bacterial Metabolism. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2; Biochemistry 101B. A survey of the biochemical activities of bacteria and of the methods of analysis of these activities.

Mr. Hungate

140. Bacterial Diversity and Ecology. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2; Chemistry 8. Principles of bacterial diversity and bacterial ecology. Survey of the major systematic groups of bacteria, with intensive study of selected micro-organisms and habitats.

Mr. Starr

150. Protistology. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 2 and Botany 2; or Zoology 2. A survey of the physiology of protista, including selected topics dealing with protozoa, algae, and fungi.

Mr. Phaff, Mr. Hungate

160. Virology. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130; Biochemistry 101B. Structure of viruses; physiology and biochemistry of viral infections; genetics of viruses; lysogeny. Emphasis on bacteriophage.

Mr. Dowell

170. Bacterial Genetics. (5) III.

Lecture—4 hours; laboratory—3 hours. Prerequisite: course 2; Genetics 100; Biochemistry 101B. Mutation and genetic recombination in bacteria and bacteriophages. Mechanisms of replication, recombination, and gene expression.

Mrs. Riley

199. Special Study for Advanced Undergraduates. (1–5) I, II, III.

Prerequisite: consent of instructor. Investigation of special problems.

The Staff

Graduate Courses

230. Bacterial Physiology. (4) III.

Lecture—4 hours. Prerequisite: course 130; Biochemistry 101B. Recommended: course 170. Economics of bacterial growth; biochemical and genetic regulation of metabolism.

Mr. Ingraham, Mr. Marr

240. Bacterial Taxonomy. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 140. Recommended: a course in computer programming. Principles of classification; evolution and phylogeny of bacteria; determinative and taxonomic techniques. Laboratory includes numerical taxonomy.

Mr. Starr

*250. Yeasts and Related Organisms. (5) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: a general course in microbiology, botany, biochemistry, and consent of instructor. Recommended: a course in cryptogamic botany. Morphology, development, classification, and distribution of yeasts; relation to other fungi; growth requirements; physiological activities, including certain industrial aspects.

Mr. Phaff, Mr. Miller

290. Seminar in General Microbiology. (1) I, II, III.

Seminar—1 hour.

The Staff

291. Seminar in Bacterial Physiology. (1) I, II, III.

Seminar—1 hour.

The Staff

292. Seminar in Bacterial Genetics. (1) I, II, III.

Seminar—1 hour.

The Staff

299. Research. (1–6) I, II, III.

The Staff

Biology

Lower Division Courses

1. Principles of Biology. (6) I, II, III.

Lecture—4 hours; laboratory—6 hours. Prerequisite: Chemistry 1A; or a passing score in a qualifying examination in chemistry. An interdisciplinary course designed for majors in the biological sciences. Emphasis on the unity of basic biological principles as related to cell

* Not to be given, 1966–67.

structure and function, reproduction, genetics, growth and differentiation, evolution, ecology, and taxonomy.

Mr. Hungate, Mr. Wolfe, Mr. Ketellapper

***4. Biological Diversity. (5) II, III.**

Lecture—3 hours; laboratory—6 hours. Pre-

requisite: course 1. A survey of representative micro-organisms, plants and animals, stressing diversity, classifications, structure, and function.

The Staff

* Not to be given, 1966–1967.

BIOCHEMISTRY AND BIOPHYSICS

Paul K. Stumpf, Ph.D., *Chairman of the Department*

Department Office, 554 Hutchison Hall

Professors:

Eric E. Conn, Ph.D.
Lloyd L. Ingraham, Ph.D.
Paul K. Stumpf, Ph.D.

Associate Professors:

Sterling Chaykin, Ph.D.
Roy H. Doi, Ph.D.
Jack Preiss, Ph.D.

Assistant Professors:

Richard S. Criddle, Ph.D.
Jerry L. Hedrick, Ph.D.
Irwin H. Segel, Ph.D.



Associate Professors:

Mendel Mazelis, Ph.D. (*Food Science and Technology*)
Irving I. Geschwind, Ph.D. (*Animal Husbandry*)

Lecturer:

Tsune Kosuge, Ph.D. (*Plant Pathology*)

For graduate study the Department of Biochemistry and Biophysics cooperates with the Group in Comparative Biochemistry for work leading to the M.S. degree and Ph.D. degree in comparative biochemistry. The department cooperates with the Group in Biophysics for work leading to the Ph.D. degree in biophysics.

Upper Division Courses

101A. General Biochemistry. (3) I, II.

Lecture—3 hours. Prerequisite: Chemistry 1B and 8 or 112B. Recommended: introductory course in bacteriology, botany, or zoology. Introduction to the chemistry and metabolism of biologically important compounds; dynamic aspects of biochemistry with examples from animals, plants, and macro-organisms.

Mr. Conn, Mr. Segel

¹ Absent on leave, 1966–67.

101B. General Biochemistry. (3) II, III.

A continuation of 101A. Mr. Conn, Mr. Segel
Lecture—3 hours. Prerequisite: course 101A.

101L. General Biochemistry Laboratory. (3) I, III.

Lecture—1 hour; laboratory—6 hours. Pre-requisite: course 101B (may be taken concurrently); Chemistry 5. Introduction to laboratory methods and procedures employed in studying biochemical processes. Designed for students who require limited experience in the use of biochemical techniques as laboratory tools.

Mr. Hedrick, Mr. Kreil

201A–201B–201C. Advanced General Biochemistry. (3–3–3) I–II–III.

Lecture—3 hours. Prerequisite: course 101B or consent of instructor; Chemistry 109B or 110C, 112C. Physical and chemical properties of amino acids, proteins, lipids, carbohydrates and nucleic acids; methods of isolating proteins; enzymes, including kinetics, cofactors, and type reactions; and the study of organized cell structures. The Staff (Mr. Criddle in charge)

202A–202B. Advanced Biochemistry Laboratory. (6–6) II–III.

Lecture—1 hour; laboratory—15 hours. Prerequisite: course 201A; Chemistry 5. Laboratory methods and procedures used in biochemical research. Critical evaluation of experimental design and data is stressed.

The Staff (Mr. Criddle in charge)

203. Carbohydrates. (3) I.

Lecture—3 hours. Prerequisite: course 201C or consent of instructor. The chemistry, metabolism, and biological functions of the various classes of carbohydrates and their polymers. Biosynthesis of simple and complex sugars and polysaccharides.

Mr. Preiss

204. Nucleic Acids. (3) III.

Lecture—3 hours. Prerequisite: course 201C or consent of instructor. The physical and biological properties of nucleic acids; biosynthetic pathways; metabolism and structure of bases, nucleotides and their occurrence and distribution. The relation of structure and function of

RNA and DNA to heredity, coding, and protein synthesis. Mr. Doi

205. Biochemical Mechanisms. (3) II.

Lecture—3 hours. Prerequisite: course 101B or consent of instructor; Chemistry 110C, 131. Bond structures of biochemical interest. Application of modern organic and inorganic chemical principles to a study of the mechanisms of biochemical reactions. Mr. Ingraham

206. Physical Biochemistry of Macromolecules. (3) I.

Lecture—3 hours. Prerequisite: course 201C or consent of instructor; Chemistry 110C. Application of modern physical concepts and experimental methods to the problems of large molecules of biological interest. Mr. Criddle

207. Lipids. (3) I.

Lecture—3 hours. Prerequisite: course 201C or consent of instructor. A discussion of the chemistry, metabolism and experimental methodology unique to fatty acids, triglycerides, phospholipids, plasmalogens, sphingolipids, carotenoids, steroids. Mr. Stumpf

***208. Biochemical Control Mechanisms. (3) II.**

Lecture—3 hours. Prerequisite: course 201C or consent of instructor. The mechanisms by which metabolism is regulated in living cells. The role of variations in the intracellular levels of intermediates, activators, and inhibitors; enzyme induction and repression; and multiple forms of enzymes. Mr. Doi

* Not to be given, 1966-1967.

BIOLOGICAL SCIENCES

_____, Chairman of the Committee

Committee Office, _____

Committee in Charge:

Professor:

Mortimer P. Starr, Ph.D. (*Bacteriology*)

Associate Professors:

Hendrik J. Ketellapper, Ph.D. (*Botany*)

Robert L. Rudd, Ph.D. (*Zoology*)

Assistant Professor:

Stephen L. Wolfe, Ph.D. (*Zoology*)

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Major Advisers.—(see *Schedule and Directory*).

Plan I

Bachelor of Arts Major Program

Lower Division Courses.—Required: Biology

222. Plant Biochemistry. (3) II.

Lecture—3 hours. Prerequisite: course 101B. The chemistry of important plant constituents and processes such as photosynthesis and respiration; carbohydrate, fat, and nitrogen metabolism. Mr. Conn, Mr. Stumpf

240. Selected Topics in Biochemistry. (2) I.

Lecture—2 hours. Prerequisite: course 201C or consent of instructor. The Staff (Mr. Geshwind in charge)

250. Biochemical Literature. (1) I, II, III.

Seminar—1 hour. Prerequisite: course 201C or consent of instructor. Critical reading and evaluation of the current biochemical literature. Selected papers will be presented and discussed in detail. Mr. Kreil

270. Advanced Research Conference. (1) I, II, III.

Seminar—1 hour. Prerequisite: course 201C or consent of instructor. Presentation and critical discussions of the research activities of various members of the local biochemical community; primarily designed for graduate students. Mr. Ingraham

291. Current Progress in Biochemistry. (1) I, II, III.

Seminar—1 hour. Prerequisite: course 201C or consent of instructor. Seminars presented by guest lecturers on the subject of their own research activities. Mr. Segel

299. Research. (1-9) I, II, III.

The Staff

1; Botany 2; Zoology 2; Bacteriology 2; Chemistry 1A-1B, 8. Recommended: other introductory courses in natural sciences (see list page 97).

Upper Division Courses.—A total of 36 units in biological sciences, including at least one course in each of the following six categories: invertebrate zoology, vertebrate zoology, plant taxonomy, plant morphology, genetics and evolution, and physiology.

Bachelor of Science Major Program

Lower Division Courses.—Required: Biology 1; Botany 2; Zoology 2; Bacteriology 2; Chemistry 1A-1B, 8; Physics 2A-2B-2C; Mathematics 13. Recommended: other introductory courses in natural sciences (see list page 97).

Upper Division Courses.—A total of 45 units in biological sciences, including at least one course in each of the following four categories: animal morphology and taxonomy, plant morphology and taxonomy, genetics and evolution, and physiology.

Not fewer than three courses botany and three in zoology are required. To complete the 45-unit requirement, students may elect additional upper division courses in the above-mentioned groups or in other fields of biology, such as microanatomy, biochemistry, ecology, paleontology, microtechnique, microbiology, bacteriology, parasitology, and physical anthropology.

Plan II

Bachelor of Arts Major Program

Lower Division Courses.—Required: Biology 1; Botany 2; Zoology 2; Bacteriology 2; Chemistry 1A-1B-1C, 5 or 1A-7A-7B; Physics 2A-2B-2C or 4A-4B-4C; Mathematics 13; 16A-16B-16C or 1A-1B-1C.

Upper Division Courses.—Required: Chemistry 112A-112B-112C or 112A-112D-112E; Biochemistry 101A-101B; Genetics 100; 15 units selected from the department offerings in botany, zoology, bacteriology, biochemistry and biophysics, genetics, and others upon approval of the adviser.

Bachelor of Science Major Program

Lower Division Courses.—Required: same as for Bachelor of Arts under Plan II.

Upper Division Courses.—Required: A total of 45 units. Required and elective courses same as for Bachelor of Arts under Plan II and, in addition, Chemistry 110A-110B-110C; Biochemistry 101L. Recommended: an upper division course in physics.

Minor in Biological Sciences

A minimum of 30 units of biology, including the undergraduate core: Biology 1, Botany 2, Zoology 2 and Bacteriology 2.

The Honors Program.—Students on the honor list may enroll in an Honors Program of courses

leading to honors with the bachelor's degree (see page 96).

A special study course (194H) involving either independent research or reading on an appropriate topic, followed by preparation of an honors thesis (course 195H) based primarily on the work done in the prerequisite course, must be completed.

Teaching Major.—A degree in Biological Sciences satisfies the requirement for a teaching major in the life sciences for both elementary and secondary teaching credentials, except that for the elementary credential Entomology 10 must be included.

Teaching Minor.—A minimum of 45 units of biology, including the undergraduate core: Biology 1, Botany 2, Zoology 2, and Bacteriology 2.

Subject Representative: _____

Upper Division Courses

189. Integration of Biological Concepts. (2) III.

Lecture—2 hours. Prerequisite: twenty upper division units in biology. A detailed examination in depth of the coherence of biology through a study of several unifying themes, for example, evolution.

194H. Special Study for Honors Students. (3-6) I, II, III.

Perequisite: enrollment limited to honors students. Independent research and/or reading on selected topics.

The Staff (_____ in charge)

195H. Honors Thesis. (2) I, II, III.

Perequisite: course 194H. Preparation of comprehensive thesis incorporating studies undertaken in course 194H.

The Staff (Mr. Currier in charge)

BOTANY

¹Ernest M. Gifford, Jr., Ph.D., *Chairman of the Department*

C. Ralph Stocking, Ph.D., *Acting Chairman of the Department*

Department Office, 143 Robbins Hall

Professors:

Alden S. Crafts, Ph.D. (*Emeritus*)
 Herbert B. Currier, Ph.D.
 Ernest M. Gifford, Jr., Ph.D.
 C. Ralph Stocking, Ph.D.
 John M. Tucker, Ph.D.
 Grady L. Webster, Ph.D.
¹T. Elliot Weier, Ph.D.

Associate Professors:

Floyd M. Ashton, Ph.D.
 Paul A. Castelfranco, Ph.D.
 Elizabeth G. Cutter, Ph.D., D.Sc.
 Hendrik J. Ketellapper, Ph.D.

Jack Major, Ph.D.
 Kenneth Wells, Ph.D.

Assistant Professors:

Bruce A. Bonner, Ph.D.
 Donald W. Kyhos, Ph.D.
 Norma J. Lang, Ph.D.
 Thomas E. Ragland, Ph.D.

<><>

Lecturers:

¹David E. Bayer, Ph.D.
 Oliver A. Leonard, Ph.D.

¹ Absent on leave, 1966-67.

Letters and Science List.—All undergraduate courses except Botany 8, 107, 155, and 180 are included in the Letters and Science List of Courses (see page 98).

Departmental Major Adviser.—Mr. Wells

The Major Programs

The Bachelor of Science major program should be elected by those students who plan advanced study in botany, who wish to obtain general secondary teaching credentials, or who wish training for a position requiring a detailed knowledge of plants. Students who wish a less intensive program in botany, but one that acquaints the students with plant life and its importance, should elect the Bachelor of Arts major program.

Bachelor of Science Major Program

Lower Division Courses.—Required: Biology 1; Botany 2; Zoology 2; Chemistry 1A, 1B, 8; Physics 2A, 2B, 2C; plus 8 additional units in related natural science subjects. German or French is the required language. Recommended: Bacteriology 2; Chemistry 1C; and Mathematics 13, 16A, 16B, 16C.

Upper Division Courses.—Required: Botany 105, 108, 111, 116, 118 or 119A and 119B; Genetics 100; 6 (3 if Botany 119A and 119B are selected) additional units in botany; plus 8 units in related natural science courses. Recommended: Biochemistry 101A and 101B.

Bachelor of Arts Major Program

Lower Division Courses.—Required: Biology 1; Botany 2; Zoology 2; Chemistry 1A, 1B. Recommended: Chemistry 8.

Upper Division Courses.—Required: 36 units in botany and allied areas; 12 upper division units from the humanities or the social sciences, in addition to the college breadth requirements.

Honors and Honors Program (see page 33).—Students on the honors list may elect to substitute a maximum 5 units of 194H for 5 upper division units of the regular major; however, recommendations for high honors and highest honors at graduation are not dependent on the completion of 194H.

Teaching Major.—The requirements for the teaching major are the same as for the departmental major for degree (A.B. or B.S.).

Teaching Minor.—Botany 2; and a minimum of 23 units in botany or closely related subjects. Students must consult with subject representative.

Subject Representative: Mr. Wells

Graduate Study.—Graduate programs leading to M.A., M.S., and Ph.D. degrees are offered in cytology, plant physiology, anatomy, morphology, taxonomy, ecology, mycology, and allied areas. The resources of the department are augmented by appropriate courses in related departments.

Biology

Lower Division Courses

1. Principles of Biology. (6) I, II, III.

Lecture—4 hours; laboratory—6 hours. Prerequisite: Chemistry 1A; or a passing score in a qualifying examination in chemistry. An interdisciplinary course designed for majors in the biological sciences. Emphasis on the unity of basic biological principles as related to cell structure and function, reproduction, genetics, growth and differentiation, evolution, ecology, and taxonomy. Mr. Ketellapper

*4. Biological Diversity. (5) II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 1. A survey of representative macro-organisms, plants, and animals stressing diversity, classification, structure, and function. The Staff

10. General Biology. (4) I, III.

Lecture—3 hours; discussion—1 hour. Not open for credit to those who have had course 1. Consideration of the main features and principles of biology, with emphasis on biological processes and special reference to evolution, heredity, and the bearing of biology on human life. Designed for those not specializing in biology. Mr. Ketellapper

Botany

Lower Division Courses

2. General Botany. (5) II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biology 1. Structure, physiology, and taxonomy of plants, with special emphasis on seed plants. The Staff

8. Poisonous Plants. (1) III.

Laboratory—3 hours. Identification of poisonous plants, their distribution, toxic principles, nature of injury and animals affected, and plant control measures. Mr. Kyhos

Upper Division Courses

105. Plant Anatomy. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2 or Biology 4. Structure and growth of meristems; development and structure of cells, tissues, and tissue systems; comparative anatomy of stem, root, and leaf. Miss Cutter

107. Weed Control. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 2; Chemistry 8. Introduction to the physiological and chemical principles underlying control of weeds; principles of preventive, cultural, and biological weed control; identification of common weeds. Mr. Ashton

* Not to be given, 1966-1967.

108. Systematic Botany of Flowering Plants. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2. Laboratory and field studies of the characters and relationships of the principal families and orders of flowering plants. Principles of taxonomy. Practice in identification of species by means of keys. Mr. Tucker

111. Introduction to Plant Physiology. (5) I.

Lecture—5 hours. Prerequisite: course 2; Chemistry 8 (may be taken concurrently). The fundamental activities of plants such as absorption, transpiration, synthesis of foods, respiration, growth, and reproduction.

Mr. Stocking

***115. Mosses and Liverworts. (3) II.**

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 2 or Biology 4. Morphology, taxonomy, and ecology of mosses and liverworts. Field trips.

Miss Land

116. Organization and Phylogeny of Vascular Plants. (5) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2 or Biology 4. Structure, reproduction, and phylogeny of the major groups of living and extinct vascular plants; special emphasis given to seed plants.

117. Plant Ecology. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 111. Study of individual plants, species, and vegetation in relation to environment and of modification of the environment by vegetation.

Mr. Major

118. Phycology. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2. Morphology, physiology, genetics, evolution, distribution, cultivation, and economic importance of freshwater and marine algae; field trips.

Miss Lang

119A. Mycology. (4) I.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 2 or Biology 4. Introduction of structure, relationships, ontogeny, and genetics to selected species of Ascomycetes, Myxomycetes, Plasmodiophoromycetes, Chytridiomycetes, Phycomycetes, and Ascomycetes.

Mr. Wells

119B. Mycology. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 119A. Introduction to structure, relationships, ontogeny, and genetics of selected species of Basidiomycetes and Fungi Imperfici, ultrastructure of fungi; genetics of mating systems; mycorrhizae.

Mr. Wells

120A. Plant Physiology. (3) I.

Lecture—3 hours. Prerequisite: course 111; Biochemistry 101A (may be taken concur-

rently). Cellular physiology, plant water relations, and translocation. Mr. Currier

120B. Plant Physiology. (3) II.

Lecture—3 hours. Prerequisite: course 111; Biochemistry 101A. Recommended: course 120A; Biochemistry 101B. Mineral nutrition; plant metabolism, including photosynthesis and respiration.

Mr. Ragland

120C. Plant Physiology. (3) III.

Lecture—3 hours. Prerequisite: course 111; Biochemistry 101A. Recommended: courses 120A and 120B; Biochemistry 101B. Internal and environmental regulation of plant growth and development.

Mr. Bonner

121A. Plant Physiology Laboratory. (2) I.

Laboratory—6 hours. Prerequisite: course 120A (may be taken concurrently). Laboratory procedures in plant physiology. Experiments selected to follow subject-matter sequence of course 120A.

Mr. Currier

121B. Plant Physiology Laboratory. (2) II.

Laboratory—6 hours. Prerequisite: course 120B (may be taken concurrently). Laboratory procedures in plant physiology. Experiments selected to follow subject-matter sequence of course 120B.

Mr. Ragland

121C. Plant Physiology Laboratory. (2) III.

Laboratory—6 hours. Prerequisite: course 120C (may be taken concurrently). Laboratory procedure in plant physiology. Experiments selected to follow subject-matter sequence of course 120C.

Mr. Bonner

130A. General Cytology. (4) I.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 2 or Zoology 2; Genetics 100 or Biochemistry 101A. An analysis of the structure and ultrastructure of cells; the relationship between structure and function at cellular and subcellular levels. Consideration of cell particulates, membranes, endoplasmic reticulum, mitochondria, plastids, the golgi zone and their relationship to the metabolic nucleus.

***130B. General Cytology. (4) II.**

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 130A. An analysis of the structure and function of cells during mitosis, meiosis, gametogenesis and fertilization at cellular and subcellular levels.

155. Plant Microtechnique. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 116 or course 105. Introduction to practical laboratory methods in preparing plant materials for microscopic examination; special emphasis on paraffin and chromosome

* Not to be given, 1966-67.

smear techniques; introduction to techniques of tissue culture and photomicrography. The Staff

180. Biological Evaluation of Herbicides. (3) I.

Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 107 and 111 (may be taken concurrently). Principles dealing with the physical, chemical, and physiological aspects of herbicides. Laboratory, greenhouse and field studies illustrating these principles in herbicide evaluation; emphasis upon biological assays and upon the interpretation of biological data. Mr. Ashton

194H. Special Study for Honors Students. (1-5)

I, II, III.

Prerequisite: open only to majors of senior standing on honors list. 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. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses

210. Cell Physiology-Protoplasmatics. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: consent of instructor. Selected plant physiological topics treated on the cellular level: water relations, plasmolytic phenomena, cytoplasmic movements, transport mechanisms, vital staining, responses of cells to high and low temperatures, wound reactions, effects of poisons. Microscopic techniques are stressed. Mr. Currier

***211. Plant Cell Metabolism. (4) II.**

Lecture—2 hours; laboratory—6 hours. Prerequisite: consent of instructor. Plant cell physiology, dealing particularly with the roles of plastids, mitochondria, microsomes, and nuclei in cellular metabolism. Isolation and study of these particulates, using centrifugation, gasometric, chromatographic, and spectroscopic methods. Detailed consideration of photosynthesis and respiration. Mr. Stocking

***212. Physiology of Herbicidal Action. (3) II.**

Lecture—3 hours. Prerequisite: courses 107, 120A, 120B, 120C. A study of the fundamental processes involved in the physiological action of herbicides. Detailed consideration of the fate of herbicides in plants and soils. Mr. Ashton

***214. Mechanisms of Toxic Action. (4) II.**

Lecture—4 hours. Prerequisite: Biochemistry 101A, 101B and consent of instructor. Physiological and biochemical mechanisms underlying toxicity and detoxification reactions. Mr. Castelfranco

215. Light and Plant Growth. (3) I.

Lecture—3 hours. Prerequisite: courses 120A, 120B, 120C; Physics 2B. Mechanisms

and phenomena involved in the control of plant growth by light. Photoperiodism, photomorphogenesis, phototropism, and certain aspects of photosynthesis. Mr. Bonner

***216. Advanced Morphology of Vascular Plants. (3) I.**

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 116. Evolution of form, structure, and reproduction of fossil and extant types through Cycadophytes.

218. Experimental Phycology. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 118. Special problems in development, physiology, and genetics using algae as experimental organisms. Topics to be investigated will be selected according to the interests of individual students. Miss Lang

220. Plant Morphogenesis. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 105 or 116. Recommended: course 155. A survey of recent advances in the study of growth and the development of form, with special reference to higher plants, and some emphasis on experimental approaches. Miss Cutter

221. Selected Topics in Plant Physiology. (2) I, II,

III.

Lecture—2 hours. Evaluation of the most recent research in plant physiology. Coverage of the entire field in a three-year period. Lectures and discussions by specialists in the areas of their research interests. May be repeated for credit. The Staff

***231. Advanced Microtechnique. (4) III.**

Lecture—2 hours; laboratory—6 hours. Prerequisite: one of the following: course 105, 116, 130A; Zoology 107. Recommended: course 155 or Zoology 104. Autoradiography, thin sectioning, freeze drying, micrurgy, Feulgen staining, cytospectrophotometry, and similar techniques. Laboratory work involving techniques of special interest to the student. Mr. Weier

***255. Principles of Plant Taxonomy. (5) I.**

Lecture—2 hours; discussion—1 hour; laboratory—6 hours. Prerequisite: course 108; Genetics 103. Evaluation of different approaches to biological classifications; theory of evolutionary classification; examples of how various disciplines—anatomy, embryology, biochemistry, paleontology, ecology—contribute to the elucidation of problems of taxonomic relationships, mainly of genera and higher categories. Mr. Tucker

256A. Experimental Plant Taxonomy. (2) II.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 108. Recommended: course

* Not to be given, 1966-1967.

117; Genetics 103. The application of experimental techniques to the elucidation of taxonomic problems and evolutionary relationships in higher plants. Mr. Kyhos

256B. Experimental Plant Taxonomy. (2) III.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 256A. A continuation of course 256A. The study of variation in natural populations in relation to taxonomy; the application of population sample analysis, cytogenetics, transplant studies, etc., to the solution of taxonomic problems and the clarification of relationships. Mr. Kyhos

257. Plant Autecology. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: courses 108, 111, 117; Mathematics 105A. Study of the ecological requirements of native plants of California as demonstrated by experiments under controlled conditions. Comparison of responses of related species, and analysis of responses in pure stands under changing competitive conditions. Field measurements; life histories. Mr. Major

***258. Plant Synecology. (3) II.**

Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 108, 117; Soil Science 120A.

* Not to be given, 1966–1967.

CHEMISTRY

Raymond M. Keefer, Ph.D., *Chairman of the Department*
Department Office, 108 Chemistry Building

Professors:

Thomas L. Allen, Ph.D.
Lawrence J. Andrews, Ph.D.
Robert K. Brinton, Ph.D.
Raymond M. Keefer, Ph.D.
Richard E. Kepner, Ph.D.
Edgar P. Painter, Ph.D.
Harold G. Reiber, Ph.D.
Leo H. Sommer, Ph.D.
¹David H. Volman, Ph.D.

John W. Root, Ph.D.
William P. Schaefer, Ph.D.
James H. Swinehart, Ph.D.
William E. Thiessen, Ph.D.
James S. Vincent, Ph.D.

Letters and Science List.—All undergraduate courses in chemistry are included in the Letters and Science List of Courses (see page 98).

Major Subject Advisers.—Mr. Bottini, Mr. Harrington, Mr. Kepner, Mr. Maciel, Mr. Rock, Mr. Swinehart.

The Major Programs

Students who are interested in chemistry as a profession should elect the program leading to the Bachelor of Science degree, which meets the standards recommended by the American Chemical Society for professional training in chemistry. Students desiring a less intensive program in chemistry or wishing to emphasize biochemistry should elect the program leading to the Bachelor of Arts degree. High school students should note that the preparation for either degree is simplified if their high school programs include chemistry and four years of mathematics.

Candidates for the bachelor's degree in chemistry will receive upper division credit for those

Associate Professors:

Albert T. Bottini, Ph.D.
Gary E. Maciel, Ph.D.
Charles P. Nash, Ph.D.
George S. Zweifel, Sc.D.

Assistant Professors:

Edwin C. Friedrich, Ph.D.
George A. Gerhold, Ph.D.
Rodney E. Harrington, Ph.D.
Hakon Hope, Cand. Real.
W. Kenneth Musker, Ph.D.
Peter A. Rock, Ph.D.

¹Absent on leave, 1966–67.

Theories and techniques involved in the study of structure, composition, boundaries, ecology, and classification of vegetation, with particular emphasis on California plant communities. Mr. Major

291. Seminar in Plant Morphology. (1) I, II, III.

Seminar—1 hour. The Staff

292. Seminar in Plant Physiology. (1) I, II, III.

Seminar—1 hour. The Staff

293. Seminar in Weed Science. (1) II.

Seminar—1 hours. The Staff

294. Seminar in Cytology and Cytobiocchemistry. (1) III.

Seminar—1 hour. Survey of current research developments in the fields of cytology and biochemistry with special reference to plants. Discussion of the fine structure of cells in relation to biochemical function. Mr. Castelfranco

299. Research. (1–9) I, II, III.

The Staff

lower division chemistry courses accepted in lieu of upper division courses required for the major.

Bachelor of Science Major Program

Lower Division Courses.—Required: Chemistry 1A, 1B, 1C, 5 or 1A, 7A, 7B; Physics 4A, 4B, 4C, 4D, 4E; Mathematics 1A, 1B, 1C, 2A, 2B; and a reading knowledge of German.

Upper Division Courses.—Required: Chemistry 105A, 105B, 110A, 110B, 110C, 111, 112A, 112B, 112C, and 8 units of any additional courses in chemistry (one of which must include laboratory work) except Chemistry 109A or 109B.

Bachelor of Arts Major Program.

Lower Division Courses.—Required: Chemistry 1A, 1B, 1C, 5 or 1A, 7A, 7B; Physics 2A, 2B, 2C, 3A, 3B, 3C; Mathematics 16A, 16B, 16C.

Upper Division Courses.—Required: 36 units in chemistry, biochemistry, or physics, including Chemistry 110A, 110B, 110C, 112A, 112B, and 112C or 112E.

Honors and Honors Program (see page 95).—The honors program comprises 6 units of course 194H.

Graduate Study.—The Department of Chemistry offers programs of study and research leading to the M.S. and Ph.D. degrees in chemistry. Detailed information regarding graduate study may be obtained by writing to the Graduate Adviser, Department of Chemistry.

Teaching Major.—The teaching major is satisfied by either the A.B. or B.S. major in chemistry.

Teaching Minor.—Chemistry 1A, 1B, 1C, 5, 8, 9, 109A, 109B. With the approval of the representative some substitution may be permitted.

Subject Representative: Mr. Nash

Lower Division Courses

1A. General Chemistry. (5) I, II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: high school chemistry; or high school physics and three years of high school mathematics (with an average grade of B or higher); or second-quarter standing. **The Staff**

(I. Mr. Keefer, Mr. Allen, and Mr. Vincent in charge; II. Mr. Maciel in charge; III. Mr. Harrington in charge)

1B. General Chemistry. (5) I, II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 1A. **The Staff**

(I. Mr. Swinehart in charge; II. Mr. Harrington and Mr. Schaefer in charge; III. Mr. Brinton in charge)

†1C General Chemistry. (5) I, II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 1B. **The Staff**
(I. _____, in charge; II. Mr. Rock in charge; III. Mr. Musker and Mr. Vincent in charge)

5. Quantitative Analysis. (4) I, III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 1C with grade of C or higher. Not open to students who have credit for Chemistry 7B. An introduction to the principles and methods of quantitative chemical analysis, with emphasis on the application of equilibrium theory to analytical problems.

I. Mr. Hope, III. Mr. Gerhold

7A. General Chemistry. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 1A, Mathematics 1A or 16A (may be taken concurrently). Enrollment to be limited. Admission based on performance in course 1A. The fundamental principles of chemistry with emphasis in the laboratory on quantitative work. Courses 1A–7A–7B are equivalent to the sequence Chemistry 1A–1B–1C–5 as a prerequisite for further courses in chemistry.

Mr. Nash

7B. General Chemistry. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 7A. Continuation of course 7A. **Mr. Hope**

8. Organic Chemistry, Brief Course. (5) I, III.

Lecture—4 hours; laboratory—3 hours. Prerequisite: course 1B or 1C with a grade of C or higher. An introductory study of the compounds of carbon.

I. Mr. Reiber, III. Mr. Sommer

9. Methods of Organic Chemistry. (3) II, III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 1C with a grade of C or higher and course 8. An experimental study of the physical properties and chemical reactions of the common classes of organic compounds.

II. Mr. Friedrich, III. Mr. Thiessen

Upper Division Courses

105A–105B. Advanced Quantitative Analysis. (3–3) II, III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 109B or 110C (may be taken concurrently). Instrumental methods of analysis, emphasizing chromatographic, electrochemical, and spectrophotometric techniques.

II. Mr. Swinehart, III. Mr. Schaefer

109A. Physical Chemistry, Brief Course. (2) I.

Lecture—2 hours. Prerequisite: course 5 or 7B; Mathematics 16C; one year of college physics. Graduate students of high standing

† Not to be given, fall quarter 1966.

may, under exceptional circumstances, be admitted without the prerequisite in chemistry. Special topics in physical chemistry. Mr. Gerhold

109B. Physical Chemistry, Brief Course. (3) II.

Lecture—3 hours. Prerequisite: course 109A or 110A. Continuation of course 109A.

Mr. Hope

110A. Physical Chemistry. (3) I, III.

Lecture—3 hours. Prerequisite: course 5 or 7B; Mathematics 2B or 16C; one year of college physics. The general principles of physical chemistry and elementary thermodynamics.

I. Mr. Brinton; III. Mr. Rock

110B. Physical Chemistry. (3) I, II.

Lecture—3 hours. Prerequisite: course 110A. Continuation of course 110A.

I. Mr. Harrington, II. Mr. Gerhold

110C. Physical Chemistry. (3) II, III.

Lecture—3 hours. Prerequisite: course 110B. Continuation of course 110B.

II. Mr. Vincent, III. Mr. Allen

111. Physical Chemistry. (4) I, III.

Lecture—1 hour; laboratory—9 hours. Prerequisite: course 109B or 110C (may be taken concurrently). Physicochemical measurements and laboratory experiments illustrating some of the important principles of physical chemistry.

I. Mr. Nash, III. —

112A. Organic Chemistry. (5) II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 11C with a grade of C or higher. A course with emphasis on modern theoretical concepts designed primarily for majors in chemistry. II. Mr. Reiber; III. Mr. Bottini

112B. Organic Chemistry. (5) I, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 112A or 8 and 9. Continuation of course 112A.

I. Mr. Zweifel; III. Mr. Friedrich

112C. Organic Chemistry. (5) I, II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 112B. Continuation of course 112B.

I. —; II. Mr. Kepner

112D. Organic Chemistry. (3) I, III.

Lecture—3 hours. Prerequisite: course 112A or 8 and 9; and consent of instructor. Equivalent to the lecture part of 112B. Intended primarily for students in fields other than chemistry.

I. Mr. Zweifel; III. Mr. Friedrich

†112E. Organic Chemistry. (3) I, II.

Lecture—3 hours. Prerequisite: course 112B or 112D; and consent of instructor. Equivalent

to the lecture part of 112C. Intended primarily for students in fields other than chemistry.

I. —; II. Mr. Kepner

121. Introduction to Molecular Structure and Spectra. (4) III.

Lecture—4 hours. Prerequisite: course 110C. Modern theoretical and experimental methods used to study problems of molecular structure and binding; emphasis on spectroscopic techniques.

Mr. Maciel

124. Advanced Inorganic Chemistry. (4) I.

Lecture—4 hours. Prerequisite: course 109B or 110C; 112C or 112E. Modern interpretations of bonding, structure, and reactivity of inorganic compounds; emphasis on the chemistry of the first- and second-row elements and transition metals.

Mr. Musker

124L. Advanced Inorganic Chemistry. (2) I.

Laboratory—6 hours. Prerequisite: course 124 (may be taken concurrently). Synthesis and characterization of inorganic compounds.

Mr. Musker

126A. Nuclear Chemistry. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 110C (may be taken concurrently). General features of nuclear structure, nuclear radiations, and laws of radioactive decay. Laboratory experiments to illustrate the application of nuclear chemical techniques to nuclear and chemical problems.

Mr. Root

126B. Nuclear Chemistry. (3) III.

Lecture—3 hours. Prerequisite: course 126A. Detailed discussion of selected examples of nuclear properties, nuclear models, radioactive decay processes, nuclear reactions, and fission.

Mr. Root

130. Qualitative Organic Analysis. (4) III.

Lecture—1 hour; laboratory—9 hours. Prerequisite: course 5 or 7B; 112C or 112E. The application of physical and chemical techniques to the qualitative identification of organic compounds.

Mr. Kepner

131. Advanced Organic Chemistry. (4) II.

Lecture—4 hours. Prerequisite: course 109B or 110B; 112C or 112E. Application of current knowledge of reaction mechanisms and molecular structure to problems of organic synthesis.

Mr. Sommer

150A. Chemistry of Natural Products. (3) I.

Lecture—3 hours. Prerequisite: courses 109B and 112C or 112E, or consent of the instructor. Chemistry of carbohydrates and lipids; structure proof, stereochemistry, conformation, substitutions, and rearrangements of model systems.

Mr. Painter

150B. Chemistry of Natural Products. (3) II.

Lecture—3 hours. Prerequisite: courses 109B

† Not to be offered fall quarter 1966.

and 112C or 112E, or consent of the instructor. Structure, reactions, and physical properties of proteins, amino acids, nucleic acids, and related nitrogen compounds. Mr. Painter

194H. Undergraduate Research. (2-5) I, II, III.

Prerequisite: course 110C (may be taken concurrently) and honors status. Original research and a written report of the investigation. Unit value to be determined by instructor supervising the research. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: consent of the instructor based upon adequate preparation in chemistry, mathematics, and physics. The Staff

Graduate Courses

204. Chemical Kinetics. (3) III.

Lecture—3 hours. Prerequisite: course 214. Basic theories describing rate processes, with special emphasis on the interpretation of activation parameters. An intensive study of the relationship between rate law and mechanism. Mr. Keefer

205. Quantum Chemistry I. (3) II.

Lecture—3 hours. Introduction to quantum chemistry, with emphasis on molecular electronic structure. Mr. Allen

206. Quantum Chemistry II. (3) I.

Lecture—3 hours. Prerequisite: course 205. Selected topics in the application of quantum theory to systems of chemical interest. Offered in odd-numbered years.

214. Chemical Thermodynamics. (4) I.

Lecture—4 hours. Development of thermodynamic relations; applications to chemical systems. Mr. Rock

215. Advanced Physical Chemistry—Statistical Methods. (3) III.

Lecture—3 hours. Prerequisite: course 214. Probability and statistical methods; introduction to partition functions and statistical thermodynamics; heat capacities; chemical equilibrium; statistical theory of reaction rates; liquids and solutions; matter in fields. Mr. Nash

***216. Statistical Thermodynamics. (3) I.**

Lecture—3 hours. Prerequisite: course 215. Development of the laws of molecular assemblies; ensemble theory; fluctuations; imperfect gases; quantum effects; cooperative phenomena. Offered in even-numbered years.

220. Organic Chemistry. (3) II.

Lecture—3 hours. Selected topics of current interest concerning the structure and synthesis of naturally-occurring organic compounds. Offered in odd-numbered years. Mr. Thiessen

221. Organic Chemistry. (3) III.

Lecture—3 hours. Selected topics of current interest concerning the synthesis and reactions of heterocyclic compounds. Offered in even-numbered years.

222. Organic Chemistry. (3) II.

Lecture—3 hours. Selected topics of current interest concerning the synthesis and reactions of small-ring compounds. Offered in even-numbered years. Mr. Bottini

223. Organometallic Compounds. (3) III.

Lecture—3 hours. Selected topics concerning the preparation and utilization of organometallic compounds in organic synthesis, including the application of metal hydrides as reducing agents. Offered in odd-numbered years. Mr. Zweifel

224. Inorganic Chemistry. (3) III.

Lecture—3 hours. Prerequisite: course 124. A development of the modern theories related to the structural, optical, and magnetic properties of inorganic compounds and complexes. Offered in odd-numbered years. Mr. Swinehart

225. Inorganic Chemistry. (3) III.

Lecture—3 hours. Prerequisite: course 124. Application of kinetic and thermodynamic principles to the interpretation of inorganic systems. Offered in even-numbered years. Mr. Musker

233A-233B. Physical Organic Chemistry. (2-2) I-II.

Lecture—2 hours. Modern concepts of substitution, elimination, and addition reactions, rearrangements, and stereochemistry.

I. Mr. Andrews; II. Mr. Bottini

290. Seminar. (1) I, II, III.

Seminar—1 hour. Prerequisite: consent of the instructor Mr. Bottini and Mr. Maciel

***298. Group Study. (1) I.**

Lecture—1 hour.

299. Research. (2-9) I, II, III.

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 semester in which the work is to be undertaken. The Staff

* Not to be given, 1966-67.

CLASSICS

Department Office, 622 Sproul Hall

Assistant Professors:

¹Richard E. Grimm, Ph.D.
Wesley E. Thompson, Ph.D.



Assistant Professor:

H. Phelps Gates, Jr., M.A. (*Acting*)

Lecturer:

Charles F. Saylor, M.A.

Classics

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 98.

Upper Division Courses

139A. Greek Literature in Translation. (4) I.

Lecture—3 hours. Prerequisite: English 1A. The Homeric epic and fifth-century drama. Reading of the *Iliad*, *Odyssey*, and selected plays of Aeschylus, Sophocles, Euripides, and Aristophanes. Lectures on the early Greek epic and classical Athenian drama. Mr. Gates

139B. Greek Literature in Translation. (4) II.

Lecture—3 hours. Prerequisite: English 1A. Readings in Pindar, Herodotus, Thucydides, Plato, Menander, and the Hellenistic writers. Lectures on literary trends from the fifth century to the end of the Hellenistic period. Offered in even-numbered years. Mr. Thompson

*140. Latin Literature in Translation. (4) II.

Lecture—3 hours. Prerequisite: English 1A. Readings in Plautus, Terence, Lucretius, Roman lyric poets, Vergil, Livy, Seneca, Petronius, Tacitus, and Juvenal. Lectures on Roman literary history from Ennius to the late Empire. Offered in odd-numbered years.

Greek

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 98.

Lower Division Courses

1. Elementary Greek. (5) I.

Lecture—4 hours. Mr. Gates

2. Elementary Greek. (5) II.

Lecture—4 hours. Prerequisite: course 1. A continuation of course 1. Mr. Gates

3. Elementary Greek. (5) III.

Lecture—4 hours. Prerequisite: course 2. A continuation of course 2. Mr. Thompson

^o Not to be given, 1966–1967.

¹ Absent on leave, 1966–67.

Upper Division Courses

101. Plato. (4) I.

Lecture—3 hours. Prerequisite: course 3.

102. Euripides. (4) II.

Lecture—3 hours. Prerequisite: course 101. Mr. Thompson

103. Homer. (4) III.

Lecture—3 hours. Prerequisite: course 102. Mr. Gates

*111. Sophocles. (4) I.

Lecture—3 hours. Prerequisite: course 103. Offered in odd-numbered years. Mr. Grimm

*112. Aristophanes. (4) II.

Lecture—3 hours. Prerequisite: course 103. Offered in even-numbered years. Mr. Grimm

*113. Thucydides. (4) III.

Lecture—3 hours. Prerequisite: course 103. Offered in even-numbered years. Mr. Thompson

114. Lyric Poetry. (4) I.

Lecture—3 hours. Prerequisite: course 103.

*115. Aeschylus. (4) II.

Lecture—3 hours. Prerequisite: course 103. Offered in odd-numbered years. Mr. Thompson

116. Herodotus. (4) III.

Lecture—3 hours. Prerequisite: course 103. Offered in odd-numbered years. Mr. Thompson

*120A–120B. Greek Composition. (2–2) II–III.

Lecture—2 hours. Prerequisite: course 103. Mr. Gates

194H. Special Study for Honors Students. (5)

I, II, III.

Prerequisite: open only to honors students
The Staff

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

The Staff

Latin

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 98.

Departmental Major Adviser.—Mr. Thompson.

The Major Program

Lower Division Courses.—Required: Latin 1, 2, 3, 4, and 5, or their equivalents.

Upper Division Courses.—Required: at least 36 units of upper division courses, including 121A–121B–121C.

Honors and Honors Program (see page 95).—The honors program comprises two quarters of study under course 194H, which will include a research paper and a comprehensive examination.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major.

Teaching Minor.—Requirements for the teaching minor in Latin: Latin 1, 2, 3, 4, 5, or their equivalents; at least 18 units of upper division work, including Latin 121A–121B–121C. Recommended: History 111C.

Subject Representative: Mr. Thompson

Lower Division Courses**1. Elementary Latin. (4) I.**

Lecture—4 hours. The Staff

2. Elementary Latin. (4) II.

Lecture—4 hours. Prerequisite: course 1. A continuation of course 1. The Staff

3. Elementary Latin. (4) III.

Lecture—4 hours. Prerequisite: course 2. A continuation of course 2. The Staff

4. Intermediate Latin. (3) I.

Lecture—3 hours. Prerequisite: course 3 or equivalent. The Staff

5. Intermediate Latin. (3) I., II.

Lecture—3 hours. Prerequisite: course 4 or equivalent. Continuation of course 4. The Staff

Upper Division Courses***101. Livy. (4) I.**

Lecture—3 hours. Prerequisite: course 5. Offered in odd-numbered years. Mr. Thompson

***102. Roman Comedy. (4) II.**

Lecture—3 hours. Prerequisite: course 5. Offered in even-numbered years. Mr. Gates

***103. Vergil: Aeneid. (4) III.**

Lecture—3 hours. Prerequisite: course 5. Offered in even-numbered years. Mr. Gates

104. Sallust. (4) I.

Lecture—3 hours. Prerequisite: course 5. Offered in even-numbered years. Mr. Thompson

105. Catullus. (4) II.

Lecture—3 hours. Prerequisite: course 5. Offered in odd-numbered years. Mr. Thompson

* Not to be given, 1966–1967.

106. Horace: Odes and Epodes. (4) III.

Lecture—3 hours. Prerequisite: course 5. Offered in odd-numbered years.

111. Tacitus. (4) I.

Lecture—3 hours. Prerequisite: course 5. Offered in even-numbered years.

112. Petronius. (4) II.

Lecture—3 hours. Prerequisite: course 5. Offered in odd-numbered years.

113. Juvenal. (4) III.

Lecture—3 hours. Prerequisite: course 5. Offered in odd-numbered years.

***114. Cicero: Philosophical Works. (4) I.**

Lecture—3 hours. Prerequisite: course 5. Offered in odd-numbered years. Mr. Grimm

***115. Lucretius. (4) II.**

Lecture—3 hours. Prerequisite: course 5. Offered in even-numbered years. Mr. Gates

***116. Vergil: Eclogues and Georgics. (4) III.**

Lecture—3 hours. Prerequisite: course 5. Offered in even-numbered years. Mr. Grimm

***121A. Latin Composition I. (2) I.**

Lecture—2 hours. Prerequisite: course 5. Survey of classical Latin syntax; extensive practice in prose composition. Offered in odd-numbered years. Mr. Grimm

121B. Latin Composition II. (2) II.

Lecture—2 hours. Prerequisite: course 5. Continuation of course 121A. Offered in even-numbered years. Mr. Grimm

121C. Latin Composition III. (2) III.

Lecture—2 hours. Prerequisite: course 5. Survey of classical Latin syntax; extensive practice in prose composition. Offered in odd-numbered years. Mr. Grimm

194H. Special Study for Honors Students. (5)

I, II, III.

Prerequisite: open only to honors students. Guided research leading to an honors paper. The Staff

199. Special Study for Advanced Undergraduates.

(2–5) I, II, III.

The Staff

Sanskrit**Upper Division Courses****191. Elementary Sanskrit. (4) I.**

Discussion—3 hours. Introduction to the study of the Sanskrit language; analysis of its structure and history. To be offered in even-numbered years. Mr. Gates

192. Elementary Sanskrit. (4) II.

Discussion—3 hours. Prerequisite: course 191. Continuation of course 191. To be offered in odd-numbered years. Mr. Gates

193. Elementary Sanskrit. (4) III.

Discussion—3 hours. Prerequisite: course 192. Continuation of course 192. To be offered in odd-numbered years. Mr. Gates

CLINICAL PATHOLOGY

*Oscar W. Schalm, D.V.M., Ph.D., *Chairman of the Department*
Jiro J. Kaneko, D.V.M., Ph.D., *Acting Chairman of the Department*

Department Office, 1163 Haring Hall

Professors:

Donald E. Jasper, D.V.M., Ph.D.

*Oscar W. Schalm, D.V.M., Ph.D.

Associate Professor:

Jiro J. Kaneko, D.V.M., Ph.D.

Upper Division Course

199. Special Study for Undergraduates. (1-4)

I, II, III.

The Staff

Graduate Courses

201. Clinical Hematology. (3) I.

Lecture—1 hour; laboratory—6 hours. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of the instructor. Hematological techniques and interpretation as applied to the study of disease in animals. Mr. Schalm, Mr. Kaneko

202. Clinical Biochemistry. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: third-year standing in School of Veterinary Medicine or consent of the instructor. Biochemical methods in the diagnosis of disease. Special emphasis on electrolyte balance, liver function, kidney function, urinalysis, osteologi-

¹ Absent on leave, 1966-67

cal diseases, thyroid function, and disorders of carbohydrate, protein, and lipid metabolism.

Mr. Kaneko, Mr. Jasper

203. Biochemistry of Metabolic Diseases. (3) II.

Lecture—3 hours. Prerequisite: biochemistry and physiology or consent of the instructor. The biochemistry of inborn and acquired errors of metabolism in animals and man. Offered in even-numbered years. Mr. Kaneko

***204. Morphological Hematology. (3) III.**

Lecture—2 hours; laboratory—3 hours. Prerequisite: consent of the instructor. Morphological and interpretive clinical hematology for graduate students. Mr. Schalm

250A-250B-250C. Clinical Pathology Laboratory.

(1) I, II, III.

Prerequisite: fourth-year standing in School of Veterinary Medicine. Application of laboratory methods to the diagnosis of animal disease. The Staff

290. Seminar in Clinical Pathology. (1) I, II, III.

Seminar—1 hour.

The Staff

298. Directed Group Study. (1-3) I, II, III. The Staff

299. Research in Clinical Pathology. (1-9) I, II, III.

The Staff

* Not to be given, 1967.

CLINICAL SCIENCES

R. M. Cello, D.V.M., *Chairman of the Department*

Department Office, 1315 Haring Hall

Professors:

Robert M. Cello, D.V.M.

John F. Christensen, D.V.M., Ph.D.

John W. Kendrick, D.V.M., M.S.

Blaine McGowan, Jr., D.V.M.

William R. Pritchard, D.V.M., Ph.D., J.D.

Edward A. Rhode, Jr., D.V.M. (*Clinical Sciences and Animal Physiology*)

John D. Wheat, D.V.M.

Jack A. Howarth, D.V.M., Ph.D.

John P. Hughes, D.V.M.

Robert L. Leighton, D.V.M.

Gordon H. Theilen, D.V.M.

Assistant Professors:

Charles A. Hjerpe, D.V.M.

Terrell A. Holliday, D.V.M., Ph.D.

Bud C. Tennant, D.V.M.



Lecturers:

David E. Brown, M.D. (*Surgery*)

Alfred G. Edward, D.V.M. (*Laboratory—Animal Medicine*)

Charles E. Grayson, M.D. (*Radiology*)

Alida P. Wind, D.V.M.

Lower Division Course

10. Introduction to Biomedical Terminology. (2) III.

Lecture—1 hour; discussion—1 hour. An introduction to the basic terminology of animal biology and medicine, with practice in term analysis.

Mr. Christensen

Upper Division Courses

103. Introductory Medicine. (4) I, III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Pathology 122B and Physiological Sciences 140B. Lectures on the principles of clinical diagnosis of animal diseases, with special emphasis on history taking and identification and interpretation of symptoms. The laboratory will provide practice in physical examination of normal and abnormal animals.

Mr. Rhode, Mr. Cello

199. Special Study for Advanced Undergraduates. (1–5) I, II, III.

The Staff (Mr. Rhode in charge)

Graduate Courses

204A. Medicine (3) I.

Lecture—3 hours. Prerequisite: course 103. A study of the medical diseases of domestic animals. The Staff (Mr. Tennant in charge)

204B. Medicine. (4) II.

Lecture—4 hours. Prerequisite: course 204A. A study of the medical diseases of domestic animals. The Staff (Mr. Howarth in charge)

204C. Medicine. (3) III.

Lecture—3 hours. Prerequisite: course 204B. A study of the medical diseases of domestic animals. The Staff (Mr. Hughes in charge)

***204D. Medicine. (5) I.**

Lecture—5 hours. Prerequisite: course 204C. A study of the medical diseases of domestic animals. The Staff (Mr. Cello in charge)

***204E. Medicine. (3) II.**

Lecture—3 hours. Prerequisite: course 204D. A study of the medical diseases of domestic animals. The Staff (Mr. Rhode in charge)

***204F. Medicine. (3) III.**

Lecture—3 hours. Prerequisite: course 204E. A study of the medical diseases of domestic animals. The Staff (Mr. Hjerpe in charge)

207. Large Animal Medicine. (5) III.

Lecture—5 hours. Prerequisite: course 206. The diagnosis and control of diseases of the

skin, internal parasitism, mastitis, diseases of the nervous and locomotor system, diseases of the eye, metabolic and nutritional diseases, and poisonings of horses, cattle, swine, sheep, and goats. Mr. Tennant, Mr. Cello, Mr. Fowler

210A. Medical Rounds. (1) I.

Discussion—2 hours. Prerequisite: course 103. Discussion of selected cases from the clinic. The Staff (Mr. Holliday in charge)

210B. Medical Rounds. (1) II.

Discussion—2 hours. Prerequisite: course 204A. Discussion of selected cases from the clinic. The Staff (Mr. Fowler in charge)

***210C. Medical Rounds. (1) III.**

Discussion—2 hours. Prerequisite: course 204B. Discussion of selected cases from the clinic. The Staff (Mr. Cello in charge)

220. Introductory Surgery. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Pathology 122C, Physiological Sciences 140B. Principles of surgery and surgical technique. Mr. Leighton, Miss Wind

221. Large Animal Surgery. (5) II.

Lecture—5 hours. Prerequisite: course 220. Surgical diseases of large animals. Mr. Wheat

222. Small Animal Surgery. (5) I, III.

Lecture—5 hours. Prerequisite: course 220. Surgical diseases of small animals. Miss Wind, Mr. Leighton

230. Reproduction, Genital Diseases and Obstetrics. (6) I.

Lecture—5 hours; laboratory—3 hours. Prerequisite: Pathology 122C, Physiological Sciences 140B. A course in the diagnosis, treatment, and control of diseases affecting the reproductive organs; the normal and disturbed physiology of reproduction; and obstetrics. Mr. Kendrick

245. Ecological Factors of Animal Disease. (4) I.

Lecture—4 hours. Prerequisite: senior standing in the School of Veterinary Medicine or consent of the instructor. Relationship of animal environment to control and prevention of disease. Application of nutrition, genetics, husbandry, and management to disease control. Mr. McGowan

249. Clinics. (Summer) (2–8).

Diagnosis and treatment of animal diseases. Students are responsible for case records, care of patients, physical examinations, and participation in surgery. Laboratory exercises in restraint, diagnostic and therapeutic procedures and surgical techniques. Completion of 8 units satisfies requirements of 250C.

The Staff (Mr. Cello in charge)

* Not to be given, 1966–67.

250A. Clinics. (8) I.

Laboratory—24 hours. Prerequisite: courses 204C, 220, 230, 260.

The Staff (Mr. Cello in charge)

250B. Clinics. (8) II.

Laboratory—24 hours. Prerequisite: courses 204C, 220, 230, 260.

The Staff (Mr. Cello in charge)

250C. Clinics. (7) III.

Laboratory—21 hours. Prerequisite: courses 204C, 220, 230, 260.

The Staff (Mr. Cello in charge)

260. Radiology. (2) II.

Lecture—1 hour; laboratory—3 hours. Prerequisite: courses 103, 220. The physics and practical operation of x-ray and fluoroscopic

equipment; the development and interpretation of radiographs, radiation therapy, and radiotherapy.

Mr. Hage

270. Jurisprudence and Law for the Veterinarian.

(1) II.

Lecture—1 hour. Prerequisite: senior standing in the School of Veterinary Medicine or consent of the instructor. The student is introduced to the principles of veterinary medical jurisprudence and the legal concepts pertinent to profession activities.

Mr. Pritchard

290. Seminar in Veterinary Medicine. (1) I, II, III.

The Staff (Mr. Tennant in charge)

299. Research. (1-9) I, II, III.

The Staff (Mr. Cello in charge)

COMPARATIVE BIOCHEMISTRY

(A Graduate Group)

¹Sterling Chaykin, Ph.D., *Chairman of the Group*
Group Office, 576 Hutchison Hall

Members of the Group:

Professors:

Arthur L. Black, Ph.D. (*Physiological Sciences*)

Clinton O. Chichester, Ph.D. (*Food Science and Technology*)

Eric E. Conn, Ph.D. (*Biochemistry and Biophysics*)

C. C. Delwiche, Ph.D. (*Soils and Plant Nutrition*)

Robert E. Feeney, Ph.D. (*Food Science and Technology*)

Irving I. Geschwind, Ph.D. (*Animal Husbandry*)

Robert E. Hungate, Ph.D. (*Bacteriology*)

Lloyd L. Ingraham, Ph.D. (*Biochemistry and Biophysics*)

Max Kleiber, Sc.D. (*Animal Husbandry; Emeritus*)

F. Howard Kratzer, Ph.D. (*Poultry Husbandry*)

Allen G. Marr, Ph.D. (*Bacteriology*)

Edgar P. Painter, Ph.D. (*Chemistry*)

Herman J. Phaff, Ph.D. (*Food Science and Technology and Bacteriology*)

Harlan K. Pratt, Ph.D. (*Vegetable Crops*)

Harold G. Reiber, Ph.D. (*Chemistry*)

Mortimer P. Starr, Ph.D. (*Bacteriology*)

George F. Stewart, Ph.D. (*Food Science and Technology*)

C. Ralph Stocking, Ph.D. (*Botany*)

Paul K. Stumpf, Ph.D. (*Biochemistry and Biophysics*)

Aloys L. Tappel, Ph.D. (*Food Science and Technology and Nutrition*)

Frederick P. Zscheile, Jr., Ph.D. (*Agronomy*)

Associate Professors:

Richard A. Bernhard, Ph.D. (*Food Science and Technology*)

Paul A. Castelfranco, Ph.D. (*Botany*)

¹Sterling Chaykin, Ph.D. (*Biochemistry and Biophysics*)

Roy H. Doi, Ph.D. (*Biochemistry*)

Richard A. Freedland, Ph.D. (*Physiological Sciences*)

Ray C. Huffaker, Ph.D. (*Agronomy*)

Tsune Kosuge, Ph.D. (*Plant Pathology*)

Mendel Mazelis, Ph.D. (*Food Science and Technology*)

Daniel W. Peterson, Ph.D. (*Poultry Husbandry*)

Jack Preiss, Ph.D. (*Biochemistry and Biophysics*)

John R. Whitaker, Ph.D. (*Food Science and Technology*)

Assistant Professors:

Ransom L. Baldwin, Jr., Ph.D. (*Animal Husbandry*)

Richard S. Criddle, Ph.D. (*Biochemistry and Biophysics*)

¹ Absent on leave, 1966-67.

Betty E. Haskell, Ph.D. (*Nutrition*)
 Jerry L. Hedrick, Ph.D. (*Biochemistry and Biophysics*)
 Monica Riley, Ph.D. (*Bacteriology*)
 Irwin H. Segel, Ph.D. (*Biochemistry and Biophysics*)

Lecturers:

Wendell W. Kilgore, Ph.D. (*Food Science and Technology*)

DRAMATIC ART

Theodore J. Shank, Ph.D., *Chairman of the Department*

Department Office, 220 Dramatic Art

Associate Professors:

Everard d'Harnoncourt, Ph.D.
 Theodore J. Shank, Ph.D.
 Daniel E. Snyder
 Alan A. Stambusky, Ph.D.

Assistant Professors:

Gene A. Chesley, M.A.
 Douglas McDermott, Ph.D.
 Alfred A. Rossi, Ph.D.
 Robert K. Sarlos, Ph.D.

**Lecturer:**

William Barbe, B.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Major Advisers—Mr. Stambusky, Mr. McDermott

Lower Division Courses.—Twenty-four quarter units in Dramatic Art consisting of the following: 10A, 10B, 10C (Principles of Acting); 20 (Introduction to Dramatic Art); 24 (Visual Aspects of Dramatic Art); and 27 (Creative Principles of Dramatic Art).

Upper Division Courses.—Thirty-eight quarter units in Dramatic Art including the following: 124A, 124B, and 124C or 124D (Principles of Theatrical Design); 127A, 127B (Principles of Directing); 158A, 158B, 158C (World Drama); 159 (Contemporary Drama); and 160A, 160B (Principles of Playwriting).

In exceptional cases, with the adviser's consent, the student may petition to substitute up to 8 units from other Dramatic Art courses for any of the above courses.

To qualify for graduation, each major student will be required to pass a comprehensive examination in Dramatic Art, administered during the third quarter of the student's senior year. In some instances, with the adviser's consent, the student may petition to substitute a thesis for

Roger J. Romani, Ph.D. (*Pomology*)

Graduate Courses**290. Seminar. (1) I, II, III.**

Seminar—1 hour. The Staff
 Prerequisite: consent of instructor.

299. Research (1-9) I, II, III.

The Staff

part or all of the comprehensive examination. The thesis may be based upon a research project or upon a creative project in acting, design, directing, or playwriting.

In addition each major student is required to participate in departmental dramatic productions.

Master of Arts Degree**Graduate Adviser.—Mr. d'Harnoncourt**

Candidates who meet the requirements of the Graduate Division and the Department of Dramatic Art will be admitted to graduate studies. After admission, students will be required to complete a background examination in Dramatic Art.

Candidates for the degree must complete the following requirements:

1. At least one graduate course in each of the following groups:

Group A: Dramatic Art 230, 232, 234, 235, 240, 242, 244.

Group B: Dramatic Art 228, 250, 259, 265.

Group C: Dramatic Art 210, 224A, 224B, 227, 260.

Group D: Dramatic Art 280, 299.

2. Graduate students who lack experience in some phase of dramatic production will be given assignments to make up their deficiencies. Beyond this, student participation, while highly encouraged, is voluntary.

3. A reading knowledge of French or German (or another language approved by the Department). Demonstration of the student's ability to apply his knowledge of that language in a graduate course will satisfy the foreign language requirement.

4. The requirements of one of the following plans must be fulfilled:

Plan I

Candidates must complete a minimum of 30 units of upper division and graduate courses in Dramatic Art and allied fields, take an oral examination lasting not less than two hours, and

submit a thesis that has been approved by the faculty committee in charge. The thesis may be of either type described below:

The Creative Thesis records an artistic accomplishment involving research and public performance in one of the following areas: Acting, Design, Directing, or Playwriting.

The Research Thesis presents the results of a historical or critical investigation of an important aspect of Dramatic Art.

Plan II

Candidates must complete a minimum of 36 units in Dramatic Art and allied fields, of which at least 18 are in graduate courses, and take a written comprehensive examination not less than nine hours in length.

The University Theatre

Each year the Department of Dramatic Art presents a series of stage productions of outstanding dramas from various periods and countries. These productions are part of the academic program of the Department and serve an important purpose in the study of dramatic art. Participation is open to all students.

Teaching Major.—The requirements for the teaching major are the same as for the undergraduate major.

Teaching Minor.—At least 30 quarter units, including Dramatic Art 10A, 20, and 24; and at least 14 quarter units of upper division courses, including 127A–127B and two courses from the sequence 158A, 158B, 158C, 159. Participation in departmental dramatic productions is recommended.

Subject Representative: Mr. Stambusky.

Lower Division Courses

10A. Principles of Acting. (4) I, II.

Lecture—2 hours; laboratory—4 hours. The physical and psychological resources for acting; fundamentals of creative mime, improvisation, stage speech and movement. Reading and analysis of selective plays to illustrate principles involved. Field trips included.

Mr. Stambusky, Mr. Rossi

10B. Principles of Acting. (4) II.

Lecture—2 hours; laboratory—4 hours. Prerequisite: course 10A. Methods of characterization in the realistic style. Reading and analysis of contemporary plays; theory and practice of acting with emphasis on realistic and naturalistic character analysis and interpretation. Field trips included.

Mr. Stambusky

10C. Principles of Acting. (4) III.

Lecture—2 hours; laboratory—4 hours. Prerequisite: course 10A. Methods of characterization in non-realistic styles. Reading and analysis of plays of different types and forms selected

from various periods; theory and practice of acting with emphasis on period styles. Field trips included.

Mr. Rossi

15. The Art of the Cinema. (4) I, III.

Lecture—3 hours; laboratory—2 hours. The cinema as an art form; its relation to other arts; its evolution with emphasis on the significant modern contributions.

Mr. d'Harnoncourt

20. Introduction to Dramatic Art. (4) I, III.

Lecture—4 hours. Understanding and appreciation of plays in their cultural contexts. The plays will be selected from the major periods of dramatic art.

Mr. McDermott, Mr. Stambusky

24. Visual Aspects of Dramatic Art. (4) III.

Lecture—3 hours; laboratory—2 hours. Understanding and appreciation of the visual aspects of dramatic art: theatre architecture, scenery, lighting, costume, and makeup.

Mr. Snyder

27. Creative Principles of Dramatic Art. (4) II.

Lecture—4 hours. Understanding and appreciation of both the distinctive and collaborative contributions of playwright, actor, director, and designer to the total work of dramatic art.

Mr. McDermott

30. Theatre Laboratory. (1–5) I, II, III.

Prerequisite: consent of instructor. Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit up to a total of 8 units.

The Staff

Upper Division Courses

110. Advanced Acting. (4) I.

Lecture—2 hours; laboratory—4 hours. Prerequisite: courses 10B and 10C, and consent of instructor. Advanced theory and practice of acting with emphasis on special problems. Detailed study of the Stanislavski system of acting and other acting theories. Field trips included.

Mr. Rossi

115. Advanced Study of Major Film Makers. (4) II.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 15. Analysis of the contribution of some outstanding film creators. Study of diverse aesthetic theories of the cinema and their application to selected films.

Mr. d'Harnoncourt

124A. Principles of Theatrical Design. (3) I.

Lecture—2 hours; laboratory—2 hours. Prerequisite: course 24; or consent of instructor. Scene design: drafting methods, working drawings, rendering techniques, scale models, methods and materials of scenery construction.

Mr. Chesley

124B. Principles of Theatrical Design. (4) II.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 124A. Analysis of plays in terms of scene design, elements of design, execution of designs for modern and period plays.

Mr. Snyder

124C. Principles of Theatrical Design. (3) III.

Lecture—2 hours; laboratory—2 hours. Prerequisite: course 24; or consent of instructor. Theories of lighting the stage, equipment and control systems, execution of lighting plots.

Mr. Chesley

124D. Principles of Theatrical Design. (3) III.

Lecture—2 hours; laboratory—2 hours. Prerequisite: course 24; or consent of instructor. 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.

Mr. Barbe

***125. History of Scene Design and Staging Methods. (4) II.**

Lecture—4 hours. Study of scenic developments from the Renaissance to the present.

Mr. Sarlos

127A. Principles of Directing. (4) I.

Lecture—2 hours; laboratory—4 hours. Prerequisite: courses 10A, 10B, and 10C. The director's creative approach to the play and to its staging.

Mr. Rossi

127B. Principles of Directing. (2) II.

Lecture—1 hour; laboratory—2 hours. Prerequisite: course 127A. The director's creative approach to the actor.

Mr. Stambusky

150. American Drama. (4) III.

Lecture—4 hours. Selected plays and the history of the theatre from Colonial times to the present.

Mr. McDermott

158A. World Drama. (4) I.

Lecture—4 hours. Selected plays and the history of the theatre from ancient Greece to the Renaissance.

Mr. Sarlos

158B. World Drama. (4) II.

Lecture—4 hours. Selected plays and the history of the theatre from the Renaissance to Romanticism.

Mr. Sarlos

158C. World Drama. (4) III.

Lecture—4 hours. Selected plays and the history of the theatre from Romanticism to the end of the nineteenth century.

Mr. Sarlos

159. Contemporary Drama. (4) I.

Lecture—4 hours. Twentieth-century European, British, and American plays.

Mr. McDermott

* Not to be given, 1966–1967.

160A–160B. Principles of Playwriting. (4–2) I–II.

Lecture—Seminar—4–2 hours. Prerequisite: two courses in Dramatic Art or related courses in other departments. Analysis of dramatic structure; preparation of scenarios; the composition of plays.

Mr. Shank

165. Dramatic Theory and Criticism. (4) III.

Lecture—Seminar—4 hours. Changing concepts of drama from Aristotle to the present.

Mr. McDermott

180. Theatre Laboratory. (1–5) I, II, III.

Prerequisite: upper division standing and consent of instructor. Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit up to a total of 8 units.

The Staff

198. Directed Group Study. (1–4) I, II, III.

Lecture—1–4 hours. Prerequisite: consent of instructor.

The Staff

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

Prerequisite: consent of instructor. The Staff

Graduate Courses**210. Special Problems in Advanced Acting. (4) II.**

Seminar—2 hours; laboratory—2 hours. Study of specialized advanced-acting problems arising from differences in the type and style of dramatic production as they relate to the history, theory, and practice of acting through the ages.

Mr. Stambusky

224A. Advanced Principles and Theories of Theatrical Design. (4) I.

Seminar—3 hours. Selected problems in the visual and auditory aspects of theatrical production.

Mr. Snyder

224B. Advanced Principles and Theories of Theatrical Design. (4) II.

Seminar—3 hours. Selected problems in the design of stage scenery and costumes; practice in design.

Mr. Chesley

227. Advanced Directing. (4) III.

Seminar—2 hours; laboratory—2 hours. Advanced directing techniques; specialized procedures in styles of drama. Projects in directing scenes from dramas of different types and periods.

Mr. Stambusky

***228. Seminar in Directing. (4) II.**

Seminar—3 hours. Prerequisite: course 227; or consent of instructor. Development of directorial conceptions for hypothetical contemporary productions of classical and modern plays.

Mr. Rossi

***230. Greek and Roman Theatre. (4) I.**

Seminar—3 hours. The classical theatre, with emphasis on the relationship of the dramas of the period to the physical circumstances under which they were produced Mr. Sarlos

the dominance of the middle-class in the audience, and the introduction of changeable scenery. Offered in odd-numbered years.

Mr. McDermott

232. Medieval Theatre. (4) III.

Seminar—3 hours. The theatre and drama of the Middle Ages; the significant liturgical and secular influences upon the evolution of dramatic art from the fall of the Roman Empire to the Renaissance. Offered in even-numbered years.

Mr. Stambusky

234. Theatre of the Italian Renaissance. (4) II.

Seminar—3 hours. The Italian theatre after the rediscovery of classical antiquity, with emphasis on courtly spectacles and the emergence of a theatrical tradition characterized by proscenium arch, unified perspective setting, and changeable scenery. Offered in odd-numbered years.

Mr. Sarlos
Mr. Stambusky

***235. Elizabethan-Jacobean Theatre. (4) II.**

Seminar—3 hours. The theatre under the Tudors and Stuarts, with emphasis on the dominant dramatic and theatrical traditions and the relationship between the plays and the physical circumstances under which they were performed.

Mr. Sarlos

***244. The European Theatre of the Eighteenth and Nineteenth Centuries. (4) III.**

Seminar—3 hours. The development of such dramatic genres as domestic tragedy and melodrama, and the corresponding rise of scenic illusion, with the culmination of these trends in romanticism and realism.

Mr. McDermott

250. Realism in the Contemporary Theatre. (4) I.

Seminar—3 hours. The realistic drama in its theatrical context.

Mr. Sarlos

259. Contemporary Nonrealistic Trends in the Theatre. (4) III.

Seminar—3 hours. Nonrealistic drama in the twentieth century and related movements in the theatre.

Mr. d'Harnoncourt

260. Advanced Playwriting. (4) III.

Seminar—3 hours. Dramatic structure, character, and dialogue. Advanced projects in playwriting.

Mr. Shank

***265. Theory of Dramatic Art. (4) I.**

Seminar—3 hours. Theory and aesthetic principles of dramatic art as a fine art.

Mr. McDermott

280. Theatre Laboratory. (1-12) I, II, III.

Advanced practice in acting, design, directing, playwriting, and technical theatre.

The Staff

298. Group Study. (1-4) I, II, III.

Seminar—1-3 hours. Prerequisite: consent of instructor.

The Staff

299. Individual Study. (1-12) I, II, III.

The Staff

* Not to be given, 1966-67.

240. French Seventeenth-Century Theatre. (4) I.

Seminar—3 hours. The theatre under Louis XIII and Louis XIV. The manifestation of the classical ideal. Special study of the dramatic productions of plays by Corneille, Racine, and Molière. Offered in even-numbered years.

Mr. d'Harnoncourt

242. English Restoration and Eighteenth Century**Theatre. (4) I.**

Seminar—3 hours. The history of the British theatre in its attempt to accommodate such changes as the rise of sentiment in the drama,

ECONOMICS

Frank C. Child, Ph.D., *Chairman of the Department*

Department Office, 378 Voorhies Hall

Professors:

Frank C. Child, Ph.D.
Bruce Glassburner, Ph.D.
Thomas Mayer, Ph.D.

Associate Professors:

Ralph C. James, Ph.D.
Tsung-yuen Shen, Ph.D.
Henry Y. Wan, Jr., Ph.D.

Assistant Professors:

Andrzej Brzeski, Ph.D.
W. Eric Gustafson, Ph.D.
Hiromitsu Kaneda, Ph.D.
Martin P. Oettinger, Ph.D.
Norman Schneider, Ph.D.
Elias H. Tuma, Ph.D.

◇ ◇ ◇

Assistant Professor:

Charles Schotta, Jr., M.A. (*Acting*)

Letters and Science List.—All undergraduate courses in economics are included in the Letters and Science List of Courses (see page 98).

Departmental Major Advisers.—Mr. Brzeski, Mr. Kaneda, Mr. Shen, Mr. James, Mr. Schneider, Mr. Schotta, Mr. Tuma, Mr. Gustafson, Mr. Wan, Mr. Oettinger.

Graduate Adviser.—Mr. Glassburner.

Economics

The Major Program

Lower Division Courses.—Required: Economics 1A, 1B, and 9 additional units in social sciences; Economics 12; at least a C average in these courses. Students planning to major in economics should complete these courses by the end of the sophomore year.

Upper Division Courses.—Required: A total of 36 units of economics including (1) Economics 100A, 100B, 101A; (2) either Economics 110A or 110B; and (3) one of the following sequences of courses: 110A, 110B; 116, 117; 121A, 121B; 130A, 130B; 135A, 135B, 135C; 150A, 150B; 160, 161.

It is recommended that Economics 100A, 100B, and 101A be taken during the junior year; 101A and 101B may be taken concurrently with or prior to 100A or 100B. Except under extraordinary circumstances, not more than three economics courses may be taken in any one quarter.

Graduate Study.—Students who meet the admission requirements of the Graduate Division and the Department of Economics may pursue studies leading to the M.A. and Ph.D. degrees. Fields of emphasis for graduate study include: Economic Theory, Monetary Economics, Economic Development, Economic History, International Economics, Labor Economics, Industrial Organization, Economic Systems, History of Economic Thought, Public Finance, Mathematical Economics, and Quantitative Methods (Econometrics).

For information about admission to graduate study, degree requirements, and financial aid, students should consult the *Announcement of the Graduate Division* and contact the Department's Graduate Adviser.

Teaching Major and Minor.—Economics is acceptable for the secondary credential.

Teaching Major.—Same as for the undergraduate major for the A.B. degree.

Teaching Minor.—Thirty units in economics including Economics 1A, 1B, and 12. The student should consult with the subject representative.

Subject Representative: Mr. Brzeski.

Lower Division Courses

1A. Principles of Economics. (5) I, II, III.

Lecture—3 hours; discussion—2 hours. Prerequisite: courses 1A and 1B may be taken in either order. Analysis of the allocation of re-

sources and the distribution of income through a price system; competition and monopoly; the role of public policy; comparative economic systems.

The Staff

1B. Principles of Economics. (5) I, II, III.

Lecture—3 hours; discussion—2 hours. Prerequisite: courses 1A and 1B 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.

The Staff

11A. Elementary Accounting. (4) I.

Lecture—3 hours; laboratory—2 hours. The history and basic concepts of accounting; the ledger, journals, income statement, and the balance sheet; inventory valuation; depreciation; introduction to cost accounting; analysis of financial statements; social accounting.

Mr. Oettinger

11B. Elementary Accounting. (3) II.

Lecture—2 hours; laboratory—2 hours. Prerequisite: course 11A. Continuation of course 11A.

Mr. Oettinger

12. Introduction to Quantitative Methods in Economics. (5) I, III.

Lecture—4 hours; laboratory—2 hours. Prerequisite: two years of high school algebra. Not open to students having credit for Mathematics 13 or Psychology 3. Methods of analyzing quantitative economic data including descriptive statistics; sampling and statistical inference, index numbers, correlation, and time series. Emphasis on the logic of procedures, interpretation, and application.

Mr. Brzeski, Mr. Gustafson

Upper Division Courses

100A. Micro Theory: Welfare and Competition. (3) I, II.

Lecture—3 hours. Prerequisite: courses 1A and 1B; or consent of instructor. Price and distribution theory; the firm and the industry under conditions of perfect competition; welfare economics.

Mr. Schneider, Mr. Wan, Mr. Child

100B. Micro Theory: Imperfect Competition. (3) II, III.

Lecture—3 hours. Prerequisite: course 100A. Price and distribution theory; the firm and the industry under conditions of monopoly, imperfect competition, and bi-lateral monopoly; economic welfare considerations.

Mr. Schneider, Mr. Wan, Mr. Child

101A. Macro Theory: Statics. (3) I, III.

Lecture—3 hours. Prerequisite: courses 1A and 1B; or consent of instructor. Theory of income, employment, and prices under static conditions.

Mr. Child, Mr. Schotta, Mr. Kaneda

101B. Macro Theory: Dynamics. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 12 and 101A. Theory of income, employment, and prices under dynamic conditions; analysis of economic fluctuations and growth. Mr. Kaneda, Mr. Schotta, Mr. Child

102. Advanced Economic Theory. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A and one course in calculus. Mathematical analysis in economic theory; determinants of the aggregate level of output and employment and the allocation of resources. Includes advanced value and distribution theory and a brief examination of modern monetary theory.

Mr. Shen, Mr. Wan

105. History of Economic Thought. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. Historical survey of economic doctrine: the Classical School and its antecedents, Neoclassical thought, criticism of classical thought, emergence of modern economic thought.

Mr. Shen

110. Economic History. (4) II.

Lecture—4 hours. Prerequisite: courses 1A and 1B or consent of the instructor. Survey and analysis of economic change in the eastern hemisphere, beginning with the middle ages; emphasis on Europe; implications for contemporary economic development.

Mr. Tuma

111. Economic History. (4) III.

Lecture—4 hours. Prerequisite: courses 1A and 1B or consent of the instructor. Survey and analysis of economic change in the western hemisphere, beginning with the colonial period; emphasis on the United States; implications for contemporary economic conditions.

Mr. Tuma

115. Economic Development. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. Theories of economic development and underdevelopment, economic policy for growth and development.

Mr. Shen

116. Economic Systems. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. Critical examination of major economic systems, their goals and institutions; capitalism, fascism, and varieties of socialism; problems of economic planning in USSR, India, China, and other industrializing economies.

Mr. Brzeski

117. The Soviet Economy. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. Survey of Soviet economic development: economic organization, methods of planning, and performance.

Mr. Brzeski

121A. Industrial Organization. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. An appraisal of the role of competition and monopoly in the American economy; market structure, conduct, and economic performance of a variety of industries.

Mr. James, Mr. Schneider

121B. Industrial Organization. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 121A. Public policy in a private enterprise economy; anti-trust and other policies toward industry; economies of regulated industries.

Mr. James, Mr. Schneider

130A-130B. Economics of the Public Sector. (4-4)**II-III.**

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. Impact of the public sector on income, employment, prices, allocation of resources, and distribution of income; related topics such as the budgetary process, public debt, revenue and expenditure problems, fiscal institutions.

Mr. Schotta

134. Corporation Finance. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A and 1B; or consent of instructor. The corporation as a form of business organization; promotion, organization, operation, expansion, consolidation, failure, and reorganization; the capital market, financial instruments, and institutions; security markets.

Mr. James

135A. Money, Income, and Monetary Policy. (3) I.

Lecture—3 hours. Prerequisite: courses 1A and 1B; or consent of instructor. Monetary institutions, the banking system, money creation, the Federal Reserve System, the tools of monetary policy.

Mr. Mayer

135B. Money, Income, and Monetary Policy. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 101A and 135A. Monetary theory; the impact of changes in the quantity of money and of liquid assets on money income.

Mr. Mayer

135C. Money, Income, and Monetary Policy. (3) III.

Lecture—3 hours. Prerequisite: course 135B. Evaluation of monetary policy, its impact on the economy and past performance, the problem of inflation.

Mr. Mayer

150A. Labor Economics. (5) II.

Lecture—4 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. Historical analysis of worker organization and of trade union philosophy and practice; theoretical exploration of basic influences affecting real wages and employment; examination

tion of relevant statistical records; wage structure and wage level problems; union-management relations and the national economy.

Mr. Oettinger

150B. Labor Economics. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. Labor law and legislation and their economic impact; collective bargaining and economic conflict; economic impact of laws regulating minimum wages, hour of work, and other labor standards; government intervention in collective bargaining and dispute settlement.

Mr. Oettinger

160. International Trade. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. International trade theory: impact of trade on the domestic and the world economies; public policy toward external trade. Mr. Kaneda

161. International Finance. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B; or consent of instructor. International money and capital markets and their impact on the domestic and world economies; international financial institutions and policies.

Mr. Kaneda

190. Senior Seminar. (5) III.

Seminar—4 hours. Prerequisite: senior standing, open only to economics majors. Selected topics in economic analysis and public policy.

The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses

200A. Economic Theory. (3) I.

Lecture—3 hours. Price and value theory; behavior of firms and households under competitive conditions; price determination, resource allocation, and income distribution; fundamentals of welfare economics.

Mr. Child

200B. Economic Theory. (3) II.

Lecture—3 hours. Prerequisite: course 200A. A continuation of course 200A with reference to non-competitive conditions.

Mr. Child

200C. Economic Theory. (3) II.

Lecture—3 hours. Macrostatic theory of income, employment, and prices.

Mr. Shen

200D. Economic Theory. (3) III.

Lecture—3 hours. Prerequisite: course 200C. Macrodynamic theory of income, employment, and prices.

Mr. Wan

201. History of Economic Thought. (4) III.

Lecture—3 hours; discussion—1 hour. Development of economic thought from classical Greece to modern times.

Mr. Shen

203A. Advanced Economic Theory. (4) III.

Seminar—4 hours. Prerequisite: course 200B. Advanced topics in the theory of the firm; distribution theory; welfare economics.

Mr. Wan

203B. Advanced Economic Theory. (4) I.

Prerequisite: courses 200B and 200C. General equilibrium theory; capital theory; growth theory.

Mr. Wan

207. Special Topics in Mathematical Economics.

(4) II.

Seminar—3 hours. Prerequisite: courses 203A and 203B or consent of instructor. Advanced topics in mathematical economics. Contents may vary from one year to another.

Mr. Wan

210A. Economic History. (4) I.

Seminar—3 hours. Method and theory of economic history. Critical analysis of the methodology of economic history and theories of economic change as illustrated by major economic phenomena drawn from the history of different countries.

Mr. Tuma

210B. Economic History. (3) II.

Lecture-discussion—3 hours. Prerequisite: course 210A. Problems in economic history of the eastern hemisphere from the beginning of the Middle Ages up to the end of the eighteenth century; emphasis on Europe.

Mr. Tuma

210C. Economic History. (3) III.

Lecture-discussion—3 hours. Prerequisite: course 210A. Problems in economic history of the eastern hemisphere since the eighteenth century; emphasis on England, France, and Germany.

Mr. Tuma

210D. Economic History. (3) III.

Lecture-discussion—3 hours. Prerequisite: course 210A. Problems in economic history of the western hemisphere since the eighteenth century; emphasis on United States.

Mr. Tuma

215A-215B. Economic Development. (4-4) I-II.

Lecture—3 hours; discussion—1 hour. Theories of economic development, policies for growth, problems from selected areas.

Mr. Glassburner

216. Economic Systems. (4) I.

Lecture—4 hours. Comparative study of economic systems, with reference to their organization and institutions, their values and goals, and their economic performance.

Mr. Brzeski

217. Economics of Planning. (4) III.

Lecture—4 hours. Theories and principles of economic planning under various economic systems.

Mr. Brzeski

218. Development Programming. (4) III.

Seminar—3 hours. Prerequisites: courses 215B and 217; Mathematics 15 and 16B.

Analytical formulation of growth and development goals including the optimal growth models; problems and practices in implementing such development policies.

Mr. Shen

221A. Industrial Organization. (4) II.

Lecture—2 hours; seminar—2 hours. Analysis of market structure, business behavior, and economic performance under conditions of limited government interference.

Mr. James, Mr. Schneider

221B. Industrial Organization. (4) III.

Lecture—2 hours; seminar—2 hours. Pre-requisite: course 221A. Social standards and public policies toward the business sector of the economy

Mr. James, Mr. Schneider

230. Public Finance. (4) II.

Lecture—2 hours; seminar—2 hours. Role of the public sector; tax and expenditure theories; related topics.

Mr. Schotta

231. Problems of the Public Sector. (4) III.

Lecture—2 hours; seminar—2 hours. Pre-requisite: course 230. Public sector institutions, problems, and policies.

Mr. Schotta

235A-235B-235C. Monetary Economics. (3-3-3)

I-II-III.

Lecture—3 hours. Monetary theory, policy, and problems.

Mr. Mayer

240A. Econometrics: Principles. (4) II.

Lecture-discussion—4 hours. Prerequisites: Mathematics 15 and 131B. General linear

model, auto-correlation, multicolinearity, heteroscedasticity. Simultaneous equation problems.

240B. Econometrics: Advanced Topics. (3) III.

Lecture-discussion—3 hours. Prerequisite: course 240A. Special problems in the theory and the applications of econometrics.

250A. Labor Economics. (4) I.

Lecture—3 hours; discussion—1 hour. Pre-requisite: courses 150A and 150B. Philosophy and theory of the labor movement; union structure and organization under changing labor market conditions; labor market issues.

Mr. Oettinger

250B. Labor Economics. (4) II.

Lecture—3 hours; discussion—1 hour. Pre-requisite: courses 150A and 150B. Theory of the labor market; analysis of wage-employment, wage-investment, and wage-price relationships.

Mr. Oettinger

260A. International Economics. (4) I.

Lecture—3 hours; discussion—1 hour. Economic structure and factors that underlie international trade; policies for regulating external trade.

Mr. Kaneda

260B. International Economics. (4) II.

Lecture—3 hours; discussion—1 hour. Significance of international transactions for the national income; international monetary mechanisms.

Mr. Kaneda

299. Individual Study. (1-6) I, II, III.

The Staff

EDUCATION

Hugh C. Black, Ph.D., *Chairman of the Department*

Department Office, 228 Voorhies Hall

Associate Professors:

Hugh C. Black, Ph.D.

Julius M. Sassenrath, Ph.D.

Assistant Professors:

V. Kenneth Shrable, Ph.D.

Leroy F. Troutner, Ph.D.

George D. Yonge, Ph.D.



Visiting Professor:

Martin Levit, Ph.D.

Lecturers in and Supervisors of Teacher Education:

Dorothy S. Blackmore, Ed.D. (*Associate Head of Teacher Education*)

Larry D. Estes, M.A.

Robert E. Hapworth, M.A.

Burt Liebert, M.F.A.

Walter T. Mara, M.S.

Douglas L. Minnis, Ed.D. (*Head of Teacher Education*)

Shirley J. Skinner, M.A.

Letters and Science List.—Education 110.

Credentials Counselors:

Elementary.—Mrs. Skinner, Mrs. Blackmore, Mr. Hapworth.

Secondary.—Mr. Estes, Mr. Mara, Mr. Liebert.

Junior College.—Mr. Mara.

Curricula for Teacher Education.—See page 114). For a statement of complete requirements and appointments with credential counselors, apply to the departmental office. Applicants for the intern program should consult the department early in the fall quarter of the senior year.

Required courses in the "Professional Preparation" part of the requirements:

For Secondary Teaching: courses 320A (for student teachers, as early as junior year; for

interns, spring quarter of senior year), 110, 120, 320C, and 320E.

For Elementary Teaching: courses 330A, 110, 120, 300, 302, 303, 330C, and 330E.

Upper Division Courses

110. Introduction to Educational Psychology. (4)

I, II, III.

Lecture—4 hours. Prerequisite: Psychology 1A. The learning process; physical, mental, and social development; individual differences and their measurement; mental hygiene; the role of the teacher in guidance and counseling.

Mr. Sassenrath, Mr. Yonge, Mr. Shrable

***114. Quantitative Methods in Educational**

Research. (4) II.

Lecture—2 hours; discussion—2 hours. Prerequisite: two years of high school algebra. Problems and methods in data analysis. Design of research projects. Emphasis will be on procedures suited to digital computers. Mr. Mara

119. Tests and Measurements. (4) II.

Lecture—4 hours. Prerequisite: course 110 (may be taken concurrently). A critical survey of teacher-made and standardized tests; principles and functions of measurement in education, current practices in school marks; supervised work in test administration, scoring, and interpretation. Mr. Yonge

120. Educational Sociology. (4) I, II, III.

Lecture—4 hours. Prerequisite: course 110 (may be taken concurrently). The school as a social institution; historical development of purposes and programs of education; the role of the teacher. Mr. Black, Mr. Troutner

163. Guidance and Counseling. (4) III.

Lecture—4 hours. Prerequisite: course 110 (may be taken concurrently). 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. Mr. Shrable

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor.

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Graduate Courses

290. Seminar. (3) I, II, III.

Seminar—3 hours.

Professional Courses

300. Language Arts in the Elementary School. (3)

I, II, III.

Lecture—3 hours. Prerequisite: consent of instructor. Principles, procedures, and curricular

materials for developing oral and written language skills. Mrs. Blackmore, Mrs. Skinner

302. Elementary School Curriculum—Social Studies.

(2) I, II.

Lecture—2 hours. Current conceptions of the elementary school curriculum, with emphasis on the contributions from the social sciences and on effective teaching methods. Mr. Minnis

303. Elementary School Curriculum—Science. (2)

II, III.

Lecture—2 hours. Current conceptions of the elementary school curriculum with emphasis on the role of science and on effective teaching methods. Mr. Hopworth

320A. Introduction to Teaching in Secondary Schools. (2) I, II, III.

Lecture—1 hour; discussion—1 hour. Lectures, conferences, and field work in secondary teaching. Observations and participation in some form of public school work.

Mr. Mara, Mr. Estes

#320C. Supervised Teaching in Secondary Schools.

(4-12) I, II, III.

Prerequisite: course 320A; course 320E must be taken concurrently. Directed teaching for candidates for the secondary credential. May be repeated for credit up to a total of 12 units.

The Staff

#320E. Methods of Teaching in Secondary Schools.

(2) I, II, III.

Lecture—2 hours. Prerequisite: course 320A; course 320C must be taken concurrently. Methods of teaching in the secondary school; selection, organization, and evaluation of teaching materials including the use of audio-visual aids and the services of counseling and guidance programs. May be repeated for credit up to a total of 4 units.

The Staff

330A. Introduction to Teaching in Elementary Schools. (2) I, II, III.

Lecture—1 hour; discussion—1 hour. Lectures, conferences, and field work; observation of and participation in classroom activities in the public elementary schools.

Mrs. Blackmore, Mr. Minnis

* Not to be given, 1966-1967.

Open only to interns and student teachers. These 300 series courses are scheduled as extra-session courses, to begin with the opening of the public schools and to end with the closing of the second semester in the public schools. Thus teaching assignments in the fall quarter, 1966, will begin on or about September 6. For the spring quarter, they will end on or about June 9. Students should make arrangements accordingly.

#330C. Supervised Teaching in Elementary Schools.

(4-12) I, II, III.

Prerequisite: course 330E must be taken concurrently. Directed teaching for candidates for the elementary credential. The Staff

#330E. Methods of Teaching in Elementary Schools.

(2) I, II, III.

Lecture—2 hours. Prerequisite: course 330C must be taken concurrently. Selection, organization, and evaluation of teaching materials including audio-visual aids. The Staff

#340. Supervised Teaching in Junior Colleges. (5)

I, II, III.

Discussion—1 hour. Prerequisite: consent of instructor. Directed teaching for candidates for the standard teaching credential with specialization in junior college teaching. The Staff

341. Teaching in the Junior College. (5) I, III.

Lecture—5 hours. Prerequisite: graduate standing and consent of instructor. The junior college: organization and functions, role in higher education, characteristics of students, trends and issues in curricula, instructional procedures and materials. Mr. Mara

EDUCATION ABROAD PROGRAM

Attention: A participant who wishes to make normal progress toward graduation should counsel *in advance* with his departmental adviser and the dean of his school or college in order to ascertain how participation will affect his academic program and his plans for graduation. While all courses listed below are University of California credit courses, each department retains the right to determine the extent to which it will accept the units so earned in fulfillment of the requirements for its own majors. Application forms for each program are available at International Student Services, Dean of Students Office.

The Bordeaux Study Center

The upper division courses listed below are the 1966-67 University of California selections from the regular offerings of the University of Bordeaux. The California students may audit widely throughout the University.

ART**BC 163B. History of French Art and Architecture. (12) Yr.**

A survey of French art since the Romanesque, with emphasis on medieval architecture, on painting since 1500, and on all the arts since 1900. Professor Pariset

ZOOLOGY**BC 109. Vertebrate Physiology. (12) Yr.**

Prerequisite: consent of instructor. The physiology of vertebrates, including nerve, muscle, blood, endocrine glands, and the processes of metabolism. Professor Lafon

CHEMISTRY**BC 140. Physical Chemistry. (12) Yr.**

Prerequisite: consent of instructor. Elementary thermodynamics; chemical equilibria; gas laws; molecular-kinetic theory; electrochemistry.

Professors Pacault and Joussot-Dubien

ECONOMICS**BC 101. History of Economic Thought. (12) Yr.**

The development of economic thought from the Greeks to Marshall and Keynes.

Professor Robine

BC 107. Comparative Economic Systems. (12) Yr.

A comparative analysis of economic systems and structures: the principal types of economic organization, the evolution of some specific economies at different stages of development, the political economy according to these systems and structures.

Professor Garrigou-Lagrange

BC 112. The Economic History of Europe. (12) Yr.

Survey of the development of the economic institutions of Europe; an analysis of economic problems and policies in their historical setting.

Professors Schnapper and Minvielle

FRENCH**BC 101A-101B. Conversation and Composition. (6-6) I.**

Prerequisite: French 4 or equivalent. Original composition; translation and discussion of selected passages from French literature. Use of films and language laboratory equipment.

Professor Perrin

BC 102A-102B. Advanced Conversation and Composition. (6-6) I.

Prerequisite: French 101A-101B, or equivalent. Original composition; translation and discussion of works of selected French authors on advanced level. Use of films and language laboratory equipment where appropriate.

Professor Perrin

(Note: French 101A-101B and 102A-102B are taken at the Institute at Pau during September and October.)

* Open only to interns and student teachers. These 300 series courses begin and end with the public schools. Teaching assignments in the fall quarter, 1966, will begin on or about September 6.

BC 112. French Literature: The Nineteenth Century. (12) Yr.

Prerequisite: French 101A-101B, or equivalent. Lectures will treat the works of nineteenth century French literary figures, such as Leconte de Lisle, Zola, and Rimbaud. Professor Flottes

BC 120. French Literature: The Seventeenth and Eighteenth Centuries. (12) Yr.

Prerequisite: French 101A-101B, or equivalent. The works of seventeenth and eighteenth century French literary figures, such as Molière, Le Sage, and LaClos. Professor Mesnard

BC 127. Comparative Literature. (12) Yr.

Prerequisite: French 101A-101B, or equivalent. An introduction to comparative literature: realism in the European novel, humor and irony in the eighteenth and nineteenth centuries, and dramatic theories at the end of the eighteenth century. Professor Escarpit

BC 132. Contemporary French Literature. (12) Yr.

Prerequisite: French 101A-101B, or equivalent. A general introduction to such representative twentieth century French authors as Valery, Proust, Gide, Mauriac, Camus, and others.

Professor Dulck

GEOGRAPHY

BC 141. Economic and Political Geography. (12) Yr.

Relationships between geography and the study of economic and political problems. Specific topics emphasized will vary each year in accordance with French university custom.

Professor Enjalbert

HISTORY

BC 102. History of Europe in the Seventeenth and Eighteenth Centuries. (12) Yr.

The history of Europe between the medieval period and the French Revolution, emphasizing political, social, religious, and economic aspects of life. Specific topics considered will vary each year in accordance with French university custom.

Professor Braure

BC 113. History of Europe in the Nineteenth and Twentieth Centuries. (12) Yr.

History of Europe since the French Revolution, emphasizing political, social, religious, and economic aspects of life. Specific topics covered will vary each year in accordance with French university custom.

Professor Dupeaux

BC 121. Medieval Europe. (12) Yr.

The history of Europe between the fourth and the fifteenth centuries with an emphasis on political, social, religious, and economic aspects of life. Specific topics covered each year will vary in accordance with French university custom.

Professor Guillemain

MATHEMATICS

BC 104. Introduction to Mathematical Analysis. (6) I.

Prerequisite: Advanced calculus, or consent of instructor. Point sets on the line and in Euclidean spaces, metric spaces, spaces of functions, differentiation, Riemann integration, interchange of order of limit operations, methods of successive approximations, existence theorems.

Professor Colmez

BC 113. Linear Algebra. (6) II.

Prerequisite: consent of instructor. Vector spaces and linear transformations, matrices, rank, determinants, duality, bilinear and quadratic forms, unitary spaces, similarity and unitary similarity, canonical forms.

Professor Colmez

POLITICAL SCIENCE

BC 121. International Relations. (12) Yr.

Contemporary international relations and international institutions. The problems and periods emphasized will vary each year in accordance with French university custom.

Professor Merle

BC 125. Contemporary World Political and Economic Problems. (12) Yr.

A group of lectures on the current world scene by outstanding scholars. Topics covered will vary each year in accordance with French university custom.

Professor Merle

BC 142. Government and Politics in France. (12) Yr.

Introduction to the social, economic, and political structure of France and to the systems of thought applicable to political studies from both a literary and legalistic point of view.

Professor Merle

SOCIOLOGY

BC 163. Social Movements. (12) Yr.

Social change and social movements: the development of collective enterprises in politics, religion, and art. The specific topics emphasized each year will vary in accordance with French university custom.

Professor Ellul

The Colombia Study Center

The University of California Study Center in Bogota, Colombia opened in fall, 1965. Each participant elects a program of courses from among the regular offerings of the University of the Andes. For the most part, these courses are in fields related to Latin American studies. A list of available courses will be published later in the year.

The Goettingen Study Center

The following courses of George August University, Goettingen have been approved for credit by the University of California.

Attention: It is not the custom of George August University to schedule the same courses each year. Consequently, only a fraction of these courses may be given again in 1966-67. Other courses, as they may be offered, will be selected for University of California credit.

The California students may audit widely throughout George August University.

ASTRONOMY

GC 101. Introduction to Astronomy. (3) I.

Prerequisite: consent of instructor. Introduction to the principal fields of modern astrophysical research.

Professor Voight

BIOLOGY

GC 101A-101B. Physiological Chemistry. (7½-8) Yr.

Prerequisite: consent of instructor. General introduction to metabolism of proteins, carbohydrates, liquids, vitamins, salts, and hormones, with special emphasis on digestion, blood, and excretion from a medical and pathological standpoint.

Professor Deuticke

GC 102. Chemistry and the Biological Significance of the Steroids. (3) II.

Stereochemistry of steroid ring systems and general stereochemistry; the classification and separation of steroids; the descriptive chemistry of steroids; bile acids, adrenal cortical hormones, sex hormones, and alkaloids.

Professor Thiele

GC 103. Mutation, Regulation, and Technical Microbiology. (4½) II.

Prerequisite: consent of instructor. Consideration of the structure and synthesis of DNA, protein synthesis, mutation and mutants in bacteria, selection of mutants, metabolic regulation, race stability and conservation, and technical microbiology.

Professor Hans-Guenter Schlegel

GC 105. General Microbiology. (9) I.

Prerequisite: consent of instructor. An introduction to the systematics, physiology, and genetics of the bacteria and fungi and the importance of their activities to man.

Professor Schlegel

GC 105(L). Microbiology Laboratory. (3) I.

Prerequisite: consent of instructor. Methods of microscopic examination, culture, isolation, and identification of bacteria.

Professor Schlegel

GC 106(L). Microbiology Laboratory. (2) II.

Prerequisite: Biology GC 105, GC 105(L). The course gives an overview of the enrichment (or concentration), isolation and growth

of soil and water bacteria. The students prepare a culture and ascertain the conditions one or another of the bacteria develops. Simultaneously attention is paid to the ecology and biology of the form under investigation.

Professor Schlegel

GC 106(S). Microbiology Seminar. (3) II.

Prerequisite: Biology GC 105. The seminar operates through questions and short research projects which then serve as the basis of discussion. It is intended to give added depth to the problems touched on in the lectures.

Professor Schlegel

GC 109. Special Biochemistry of Microorganism II. (2) II.

Prerequisite: consent of instructor. The lecture serves primarily to introduce Microbiology majors into the special field of physiological metabolism and the biochemistry of microorganisms. It is preparation for the research problems dealt with in the Microbiological Institute.

Professor Schlegel

GC 110. Biology of Selected Bacteria Groups. (4½) II.

Prerequisite: consent of instructor. These lectures are designed primarily for Microbiology majors and are intended to deepen their knowledge of special bacterial groups which cannot be treated in the general lectures.

Professor Schlegel

GC 130. Genetics. (6) II.

Prerequisite: consent of instructor. Gametogenesis, meiosis, chromosome morphology and anatomy, phenotypes and genotypes, variation and mutation. Genetic determination of sexes. Molecular genetics, role of DNA, RNA.

Professor Heberer

GC 133. Principles of Human Genetics. (4½) I, (3) II.

Basic principles of human genetics. Fundamentals of molecular genetics, mutations, distortion, twin and family research.

Professor Becker

GC 136. Statistics for Biologists, Psychologists and Medical Students. (6) I, (4½) II.

Prerequisite: consent of instructor. Introduction to theory of probability, including distribution, expectation, variance, law of large numbers; statistical methods of proving hypotheses and evaluations.

Professor Jacobs

BOTANY

GC 101. Introductory Botany. (7½) II.

History and scope of botanical science; cell tissue and organ structure; nuclear phenomena and inheritance; physiology, including osmotic phenomena, metabolism, photosynthesis, carbon

and nitrogen cycles, water relations; relationships of the major groups of plants; speciation.

Professor Pirson

GC 102. Introduction to Plant Taxonomy. (3) II.

Prerequisite: Botany GC 101 taken concurrently. Introduction to the more important plant families; laboratory study and field trips.

Professor Beug

ZOOLOGY

GC 101. Comparative Embryology. (4½) II.

Prerequisite: consent of instructor. Introduction to invertebrate and vertebrate embryology.

Professor Bueckmann

GC 143. Comparative Physiology of the Nervous System. (6) II.

Prerequisite: consent of instructor. Introduction to the general physiology of the sense organs. Comparative consideration of the structure and function of chemical, mechanical and optical receptors in animals and men, and of orientation reactions.

Professor Birukow

CHEMISTRY

GC 109. Introduction to Physical Chemistry. (4) II.

Prerequisite: Chemistry 1A-1B and Chemistry 5. An introduction to the major fields of Physical Chemistry.

Professor Jost

GC 112A-112B. Organic Chemistry. (9-7½) Yr.

Prerequisite: consent of instructor. The classes of organic compounds such as hydrocarbons, alcohols, and amines are discussed; also vitamins, sugar, alkaloids, and steroids.

Professor Brockmann

GC 112A(L)-112B(L). Organic Chemistry Laboratory. (9-7½) Yr.

Prerequisite: consent of instructor. The application of theoretical knowledge.

Professor Brockmann

GC 112A(S)-112B(S). Seminar in Organic Chemistry. (1½-1½) Yr.

Prerequisite: Chemistry GC 112A-112B taken concurrently. Bibliographical reports in organic chemistry.

Professor Brockmann

GC 125. Physical Methods in Organic Chemistry. (4½) II.

Prerequisite: consent of instructor. Fundamentals of IR spectroscopy. (Vibration and rotation of molecules, light absorption, force constants, characteristic group frequencies.) Examples of classification of IR spectra.

Professor Leuttko

GC 140A-140B. Introduction to Physical Chemistry.

(4½-4½) Yr.

Prerequisite: consent of instructor. Chemical thermodynamics; equilibria and reaction kinetics.

Professor Jost

GC 140A(L)-140B(L). Physical Chemistry Laboratory.

(4½-3) Yr.

Prerequisite: Chemistry GC 140A-140B taken concurrently. Experiments in chemical equilibrium, molecular structure, chemical thermodynamics, and reaction kinetics.

Professor Jost

GC 140A(S). Seminar in Physical Chemistry. (1½) I.

Prerequisite: Chemistry GC 140A taken concurrently. Exercises, examples, and calculations in Physical Chemistry.

Professor Jost

GC 140B(S). Seminar in Physical Chemistry. (1½) II.

Prerequisite: Chemistry GC 140B taken concurrently. Exercises, examples, and calculations in Physical Chemistry.

Professor Jost

GC 171. Free Radicals in Organic Chemistry. (4½) I, (3) II.

Prerequisite: consent of instructor. Surveys the formation, and the most important physical and chemical properties, of organic free radicals. Included are methods of graphical representation of free radicals, electron spin resonance spectroscopy, and mechanisms of radical reactions.

Professor Leuttko

GC 183A-183B. Reaction Mechanisms. (3-3) Yr.

Prerequisite: consent of instructor. Theories of reaction mechanisms in Organic Chemistry (equilibrium, rate process, collision, solvent effects, steric effects).

Professor Leuttko

ECONOMICS

GC 100A-100B. Economic Theory. (7½-6) Yr.

100A. Economic Theory: value, price formation, distribution of income.

100B. Factors that determine output, national income, and employment.

Professor Suranyi-Unger

GC 101. History of Economic Doctrine. (4½) II.

Prerequisite: Economics 1A-1B. Economic ideas from ancient times to the present.

Professor Egner

GC 102. Economics Seminar. (3) II.

Prerequisite: consent of instructor. Seminar in advanced economic theory.

Professor Rittig

GC 104-105. Economic Policy and Economic Theory. (12-9) Yr.

Prerequisite: Economics 1A-1B, or equivalent. Economic theory and the application of theory to policy in various aspects of economic

life, developed through lectures, seminars, and tutorial discussions.
Professor Rittig

GC 107. Comparative Economic Systems. (7½) I.

Prerequisite: Economics 1A-1B, or equivalent. Study of economic systems of liberalism, conservatism, and socialism and their economic policies.
Professor Egner

GC 114. Seminar in Economics. (3) II.

Prerequisite: Economics 1A-1B. Theories of economic development. Problems of accelerated development in poor countries and of maintaining development in rich countries.
Professor Egner

ENGLISH

GC 131. Narrative Art in Modern English: Henry

James, Virginia Woolf. (4½) II.

Introduction to the problems of narrative art, chiefly in the work of Henry James and Virginia Woolf, but with reference also to their contemporaries. Special attention to style, motivation, construction, and the relationship between these elements and the subject matter.
Professor Sehrt, Dr. Hoffmann

FRENCH

GC 3. Intermediate French. (6) I.

Prerequisite: French 2 or equivalent.
Mr. Kuhrau

GERMAN

GC 100A. German Literature in the Baroque Period.

(7½) I.

Literature of the seventeenth century; a general survey with a study of selected examples in depth.
Professor Schoene

GC 100B. Lyric of the Baroque Period. (7½) I.

An introduction to the Baroque lyric, based on a representative selection of poems; a study in depth of its language, its poetical and rhetorical characteristics.
Professor Killy, Dr. Schillemeit

GC 103. Thomas Mann's "The Magic Mountain." (6)

II.

An intensive study of *The Magic Mountain* as an example of the genre "Novel" and of the literary methods and philosophy of Thomas Mann.
Professor Killy, Dr. Muschg

GC 104B. Buechner's Dramas. (6) II.

Seminar problems in Georg Buechner's dramas with particular reference to the literary movements of his time.
Professor Schoene, Herr Stenzel

GC 105. Lessing. (6) I.

An emphasis on the dramatic works of Lessing. Specific contents will vary from year to

year in accordance with German university custom.
Professor Woelfel

GC 106A-106B. German Grammar and Composition.

(6-6) I.

Prerequisite: German 4, or equivalent. Original composition; translation and discussion of selected passages from German literature; conversation. Highly intensive six weeks preparatory course for students in the Goettingen Center.
Professor Killy and Staff

GC 107A. The Young Herder. (7½) I.

Seminar on selected prose texts, giving an insight into the literary life of the *Sturm und Drang* generation.
Professor Hassenstein

GC 108A. Schiller's Dramas. (4½) II.

A study of Schiller's dramas and the development of Schiller as a dramatist.
Professor Woelfel

GC 108B. Seminar on Schiller's Prose. (7½) I.

An analysis of Schiller's stories, his philosophical works, and his criticism.
Professor Schoene, Herr Stenzel

GC 109A. Young Goethe. (4½) II.

Introduction to Goethe and to Goethe philology, with emphasis on the period prior to the Italian journey.
Professor Killy

GC 109C. Goethe's Letters. (4½) II.

Seminar dealing with the analysis of form and content of a selection of Goethe's letters.
Frau Dr. May

GC 109D. Dramas of the Young Goethe. (7½) I.

A survey of the dramas of the early Goethe and an introduction to the methods of stylistic analysis.
Professor Killy, Dr. Schillemeit

GC 109E. Seminar on Goethe's Ballads. (6) II.

Prerequisite: open only to German majors with previous experience in literature. Problems of poetics (epic, lyric, dramatic) based on examples from Goethe's ballads; the development of Goethe's language and stylistic forms; intensive study of selected ballads from the standpoint of idea content, background, and literary references.
Frau Dr. May

GC 109F. Seminar on Goethe's Lyric Poetry. (7½) I.

A study of Goethe's lyrics; traces Goethe's development as a lyric poet; includes detailed analyses of selected poems.
Professor Schoene, Dr. Stenzel

GC 110A. The German Ballad. (6) II.

Seminar on the types and development of the German ballad. Poetic interpretation of the ballad form through the study of selected texts.
Professor Schoene, Herr Stenzel

GC 110B. Heine's Lyrics. (6) II.

Seminar on the lyrical work of H. Heine with an introduction to the analysis of lyrical poetry in general. Professor Schoene, Herr Schluer

GC 111. Seminar on the Tragedies of the German Classic Period. (6) II.

Study of the characteristics of German Classic Tragedy with special attention to style, genre, period. Includes intensive study of Goethe's "Naturliche Tochter" and Schiller's "Braut von Messina." Dr. Hassenstein

GC 112. Seminar on German Nineteenth and Twentieth Century Drama. (7½) I. (6) II.

Selected texts from dramas of the nineteenth and twentieth centuries with emphasis on linguistic analysis and determining characteristic dramatic style of author concerned.

Professor Killy, Dr. Boeschenstein

GC 122. Twentieth Century Drama and Lyrics. (6) II.

The study of selected texts in the field of modern German poetry and drama.

Professor Schoene

GC 125A. Seminar on Selected Lyrical Texts. (7½) I (6) II.

Emphasis on technical terminology, particularly in metrics, and methods of text analysis. Specific topics to be covered will vary from year to year according to German university custom but will be selected from the whole range of German lyrical production.

Professor Schoene, Herr Schluer

GC 125B. Problems of Lyric Poetry. (6) I.

Using selected examples of lyric poetry, basic problems and techniques of this poetic form will be discussed. A study in depth of the poetic process.

Professor Killy

GC 126. Seminar on Selected Prose Texts. (7½) I (6) II.

A selection of prose texts such as Wieland, Goethe, Stifter, and Kafka is to provide the basis for the study and practice in the fundamental concepts of stylistic analysis and the art of narration.

Professor Killy, Dr. Schillemeit

GC 128. Literature of the German Romantic Period. (6) I.

Lecture course on the Literature of the German Romantic period. Specific topics covered will vary from year to year in accordance with German university system.

Professor Killy

GC 130A-130B. Advanced German Grammar and Composition. (6-6) I.

Prerequisite: German 106A-106B or equivalent. Highly intensive six weeks preparatory

course for students in the Goettingen Study Center.
Professor Killy and Staff

GC 131A-131B. Exercises in German Style. (4½-3) Yr.

Analysis of composition in terms of style with a special emphasis on needs of foreign students of German philology.

Frau Dr. May

GC 140. German Poetry in the Period of the Enlightenment. (4½) II.

German literature of the Period of the Enlightenment, including the history of ideas, the theory of art, and the creative writing of the period, especially Klopstock, Lessing, and Wieland.

Professor Schoene

GC 140A. German Prose in the Period of the Enlightenment. (3) I.

Starting with Gottsched, then concentrating on Lessing and Wieland, this seminar discusses both the fictional prose and the theoretical writings of the Period of the Enlightenment, the latter in the context of German contributions to literary theory.

Professor Schoene

GC 141. Seminar on Kleist's Novellas. (6) II.

A study of narrative art and processes, especially the literary characteristics of Kleist.

Professor Schoene, Herr Stenzel

GC 145. Seminar on the Stories of Keller. (6) II.

A study of narrative art and processes based on selected stories of Keller, including literary characteristics of Keller.

Professor Schoene, Herr Stenzel

GC 149A. Seminar on Wedekind. (7½) I.

Outline of a theory of comedy and an intensive study of Wedekind's plays and prose works.

Professor Killy, Dr. Muschg

GC 150A. Seminar on the Novels of Wieland. (7½) I.

Methods of interpreting narrative prose and basic techniques in study of German philology. Emphasis on a single novel with a brief survey of literary history.

Professor Schoene, Herr Stenzel

GC 150B. Seminar on Thomas Mann's "Buddenbrooks." (7½) I.

An introduction to the main motifs of early works of Mann with regard to content and style; introduces student to methods of prose interpretation and philological techniques.

Professor Schoene, Herr Stenzel

GC 160. Seminar on Brecht's Theoretical Drama. (6) II.

Study of the techniques and artistic characteristics of Brecht's doctrinal works.

Professor Killy, Dr. Muschg

HISTORY**GC 102. Europe in the Fifteenth and Sixteenth Centuries. (7½) II.**

Prerequisite: History 4B or equivalent. General European history in the fifteenth and sixteenth centuries, with special emphasis on the religious struggles, the reformation movements, and the development and alignment of the various political powers. Professor Nüernberger

GC 103C. Economic and Social History of the West. (1750-1832) (6) I.

Prerequisite: History 4A-4B, or equivalent. Includes the Industrial Revolution, development of modern commerce and finance, beginnings of colonial policies of the nineteenth century, liberation of the European peasants, internal and external migration, constitutional problems, English parliamentary reform, and the rise of the Middle Class Professor Treue

GC 103D. Economic and Social History of Western Europe. (4½) II.

Prerequisite: History 4A-4B, or equivalent. Covers the period from 1830 to 1914. Professor Treue

GC 113A-113B. History of Europe in the Nineteenth and Twentieth Centuries. (9-6) Yr.

History of Europe since 1800. Specific topics to be covered will vary each year in accordance with German university custom.

Professor Nüernberger

GC 113C-113D. Seminar in Modern European History. (7½-5) Yr.

Seminar on various aspects of European history of the nineteenth and twentieth centuries. The specific topics covered vary each year in accordance with German university custom.

The Staff

GC 113E. History of the Second World War. (6) I.

Prerequisite: History 4A-4B, or consent of instructor. The rise of the National Socialist Party; political and economic factors leading to war; the course of the War and its outcome.

Professor Schramm

GC 121-122. Medieval Europe. (7½-5) Yr.

Prerequisite: History 4A-4B, or equivalent. History of medieval Europe (300 A.D.-1350 A.D.). Specific topics to be covered will vary each year in accordance with German university custom.

Professor Heimpel

GC 125. The Genesis of the German Empire. (6) II.

Development of the Carolingian Empire under Charlemagne; its subsequent breakdown into three major sections during the late ninth and early tenth centuries; special emphasis on the development of the East Franconian and German Empires.

Professor Wenskus

GC 126. Revolutionary Movements in the Nineteenth Century. (6) II.

Prerequisite: History 4B or equivalent. The conflict between progressive and conservative forces in the nineteenth century; bourgeois liberals, socialists, and anarchists vs. kings and nobles; "evolution" vs. "revolution."

Professor Wittram

GC 143. European Nationalism. (6) II.

Prerequisite: consent of instructor. The development of nationalism in Europe from 1848 to 1917.

Professor Wittram

GC 145A-145B. History of Early Mercantilism. (7½-6) Yr.

Prerequisite: consent of the instructor. Lectures, seminar, and independent study in the economic history of Europe in the seventeenth and eighteenth centuries.

Professor Treue

GC 150C. The Russian Revolution of 1917. (7½) I.

Prerequisite: History 4A-4B, or consent of instructor. The history of the Russian Revolution, including its social, economic, and political background and its results.

Professor Wittram

MATHEMATICS**GC 105. Measure and Integration. (7½) II.**

Prerequisite: consent of instructor. Families of sets, Borel fields, measures, measurable functions, integration theory, spaces L^p , Lattices (Banach, etc.)

Professor Jacobs

GC 108. Matrix Theory. (4½) I.

Prerequisite: consent of instructor. Operations on matrices. Elementary theory of vector spaces. Hermite normal form. Permutations, determinants. Symmetric and hermitian matrices and forms. Characteristic roots and vectors. Numerical methods.

Dr. Pommerenke

GC 111. Analytical Geometry and Linear Algebra.

(7½) II.

Prerequisite: Math 8 or equivalent. Sets, equivalence relations, integral domains, fields, rings, linear transformation, vector spaces, matrices, rank, determinants, duality, bilinear and quadratic forms, similarity and canonical forms.

Professor Lyra

GC 115A-115B. Algebraic Number Theory. (9-7½)

Yr.

Prerequisite: consent of the instructor. Elementary theory of numbers; integral quadratic forms (Zahlenkoerper).

Professor Maak

GC 122. Introduction to Theory of Complex Variables. (9) I, (7½) II.

Prerequisite: consent of instructor. Analytic functions, integration in the complex plane,

analytic continuation, conformal mapping, introduction to applications in the engineering field.
Professor Grauert

GC 126. Introduction to Topology. (3) I.

Prerequisite: consent of the instructor. Properties of Topological Spaces. Professor Jacobs

MUSIC

GC 114. Chamber and Orchestra Music of the Baroque. (4½) II.

This is a survey lecture on the music of the Baroque (instrumental). The various aspects: form, melody, counterpoint, etc. are discussed. The problems of style and criticism of modern performance are treated. The history is traced from about 1600 to 1756. Professor Boetticher

GC 137. A Cappella Choir. (1½), I, (1½) II.

Prerequisite: consent of instructor.
Professor Fuchs

GC 142. Symphony Orchestra. (1½) I, (1½) II.

Prerequisite: consent of instructor.
Professor Fuchs

GC 174. Beethoven's "Missa Solemnis." (3) II.

A seminar with research papers required of each class member, both written and orally. Each member studies a different aspect of the work, counterpoint, harmony, form, etc. The work is discussed with regard to its style and in relation to other choral works. It is seen in relation to other works and the other masses by Beethoven.
Dr. Stephan

GC 175. Selected Problems in Bach Philology. (6) I.

Prerequisite: consent of instructor. Philological study of selected works of J. S. Bach, comparing original manuscripts with copies.

Professor Dürr

GC 176A-176B. The German Lied from Schubert to Brahms. (4½-3) Yr.

Prerequisite: consent of instructor. A study in depth of the German Lied from Schubert to Brahms, including Hugo Wolf.

Professor Boetticher

GC 179. Seminar on Criticism of Style in the Music of Impressionism. (3) II.

This is a seminar covering the period from the early 1880's to the end of the first quarter of the twentieth century. Each student is required to do an oral report up to 45 minutes on some aspect of composition of the Impressionistic School of composition. The period is discussed in relation to the historical past as well as its influence on the modern period.

Professor Boetticher

GC 186. The Life and Work of Alban Berg. (3) II.

This is a survey lecture on the life and work of Berg and his place in and influence on modern music. Various pieces are analyzed and compared with his entire product and those of other composers of his time, e.g. Schoenberg, Webern. His development as a composer is studied.

Dr. Stephan

PHILOSOPHY

GC 101. Introduction to Philosophy. (4½) I.

Philosophers' conceptions from classical times to the present day, with brief analyses of the more important philosophical concepts, figures, and theories.
Professor Klein

GC 126. Introduction to Metamathematics. (7½) II.

Prerequisite: consent of instructor. Basic principles of metamathematics as introduced by Tarski; axiomatic metatheories; classical conceptions of freedom, contradiction, totality, and determination; elementary arithmetics; theories of algebraic structures; totality conceptions for the predicate calculus by Gödel, Löwenheim, Skolem; characteristic clause by Church.

Professor Scheibe

GC 133. Problems in the Philosophy of Language.

(4½) II.

Modern linguistics, with an emphasis on the theories and methods of the "Oxford Linguists," especially L. Wittgenstein.
Professor Delius

GC 187. Logic, Language and Reality. (4½) I.

Prerequisite: consent of the instructor. Study of the development, meaning, and interrelationship of logic, language, and reality.

Professor Patzig

PHYSICS

GC 105A. Analytic Mechanics. (6) II.

Prerequisite: consent of instructor. Coordinate transformations, the mechanics of particles, central force motion, collisions, and harmonic motion. Fundamental principles of Newtonian mechanics. Introduction to Lagrange's and Hamilton's equations.
Professor Hajdu

GC 108. Classical Wave Motion. (3) II.

Mechanics of wave motion, including discussion of free and forced vibrations. Primarily light as it relates to the Applied Sciences.

Professor Meyer

GC 109. Transistors and Diodes. (1½) II.

Prerequisite: consent of instructor. General theory of transistors and diodes.
Dr. Kuttruff

GC 111. Technique of Electronic Measurement. (4½) II.

Prerequisite: consent of instructor. Laboratory techniques in electronics.
Professor Meyer

GC 113A(L)-113B(L). Advanced Physics Laboratory.
(3-3) Yr.

Prerequisite: consent of the instructor. Includes such experiments as electron diffraction, Wilson chamber, Franz Herz, x-ray diffraction, and optics. Professor Flammersfeld

GC 114. Theory of Electricity. (7½) I.

Prerequisite: consent of the instructor. Electromagnetic phenomena with emphasis on physical concepts; introduction to mechanics, vector-analysis, electrostatic fields in empty space and isolators, induction phenomena, and application of Maxwell's theory to magnetic fields. Professor Lüders

GC 114(S). Theory of Electricity. (Seminar). (1½). I.

Prerequisite: Physics GC 114 taken concurrently. Professor Lüders

GC 118. Nuclear Reactions. (1½) I.

Prerequisite: consent of instructor. Introduction to the study of nuclear reactions.

Dr. Langhoff

GC 121. Atomic Physics. (3) II.

Prerequisite: consent of instructor. Atomic structure, electron and nuclear spins, special relativity, thermionic emission, spectra, and X-rays. Professor Flammersfeld

GC 122. Fundamental Experiments for the Quantum Theory. (3) I.

Prerequisite: consent of instructor. Description of the fundamental physical phenomena that form the foundation of quantum theory.

Dr. Sander

GC 124A-124B. Introductory Nuclear Physics. (3-3) Yr.

Prerequisite: Calculus and consent of the instructor. Radioactivity, elementary particles, and nuclear reactions. Professor Flammersfeld

GC 125. Neutron Physics. (3) I.

Prerequisite: consent of the instructor. The discovery of the neutron, its magnetic moment, interaction with nuclei, and decay.

Professor Schmidt-Ott

GC 126. Cosmic Radiation. (1½) I.

Prerequisite: consent of instructor. Introduction to the study of cosmic radiation.

Professor Ehment

GC 127. Radio Astronomy. (1½) I.

Prerequisite: consent of instructor. Introduction to radio astronomy. Professor Dieminger

GC 131. Physics of Semi-Conductors. (3) I.

Prerequisite: consent of instructor. A short description of magnetic, electrical, and physical properties of some metals, particularly semiconductors. Professor Harten

GC 135. Atomic and Nuclear Moments. (1½) II.

Prerequisite: consent of instructor. General description of atomic moments and nuclear moments. Professor Schmidt-Ott

GC 198. Selected Topics in Modern Physics.

(2) I, (1½) II.

Prerequisite: consent of instructor. Selected topics in modern physics, including X-ray and gamma radiations. Professor Schmidt-Ott

POLITICAL SCIENCE**GC 110. Issues of the Theory of Politics.**

(4½) II.

Introduction to some of the main concepts of political philosophy and their relevance to modern society. Emphasis on such concepts as the nature and purpose of the political community. Professor Huber

GC 140A-140B. The Theory of Politics.

(10½-7½) Yr.

Problems concerning the nature and influence of state bureaucracy. The bureaucracy of pressure groups and political parties, party ideologies, and major twentieth century developments will be discussed, particularly as they affect Germany. Professor Seidel

GC 143. Government and Politics in the Soviet Union. (4½) II.

Prerequisite: consent of instructor. Ideological foundations. Structure and methods of the Communist Party. The apparatus of government and its development. Professor Schultz

PSYCHOLOGY**GC 106. Psychological Methods. (3) II.**

Prerequisite: consent of instructor. The design and conduct of psychological investigations through demonstration experiments and consideration of specific studies. Professor Gottschaldt

GC 112. Seminar in Child Psychology. (3) II.

Performance, description, and evaluation of various experiments in developmental psychology. Professor Gottschaldt

GC 130. Psychology of Learning. (3) II.

Prerequisite: consent of instructor. Introduction to the psychology of learning through demonstration experiments on human and animal subjects. Professor Gottschaldt

GC 144. Selected Topics in Social Psychology:

Kurt Lewin. (3) II.

Prerequisite: consent of instructor. Study of Kurt Lewin's theory of social psychology and its application to the fields of learning, development and regression, social psychology, and group dynamics. Professor Spiegel

GC 148. Psychology of Personality. (7½) I.

Prerequisite: consent of instructor. Modern psychology as approached through the study of personality. Neurological, ethological, genetic, environmental, and psycho-pathological evidence is examined. Problems considered include attitudes, prejudices, memory, association, and personality diagnosis. Professor Gottschaldt

SLAVIC LANGUAGES**GC 4. Intermediate Russian. (6) I.**

Prerequisite: Russian 3. Grammar, translation, dictation, and oral practice. Mr. Block

GC 10A. Elementary SerboCroatian. (4½) I.

Prerequisite: consent of instructor. Grammar and conversation. Dr. Milošević

SOCIOLOGY**GC 101A-101B. General Sociology. (7½-6) Yr.**

A study of the hypotheses, principles, and problems of sociology. Professor Bahrdt

GC 120. Sociology of the Family. (6) II.

The human family, past and present; adjustments in the modern family. Professor Bahrdt

GC 129. Sociology of the Community. (4½) II.

Prerequisite: consent of instructor. Comparative and historical analysis of various types of communities: village, urban, rural and suburban; institutional structure; socialization and interpersonal relations; social control; theories of community change and consideration of planned development. Professor Bahrdt

GC 188A-188B. Analysis of Contemporary Society. (10½-7½) Yr.

The role of such factors as science, technology, industrialization and bureaucracy; developed through lectures, seminars, and tutorial discussions. Professor Bahrdt

The Hong Kong Study Center

The University of California Study Center, Hong Kong, opened in fall, 1965 for both undergraduate and graduate students. The undergraduates elect programs from among the regular courses offered by Chung Chi College in the English language. While not required to have a knowledge of the Chinese language, all undergraduates include the study of Chinese in their programs at Chinese University of Hong Kong. A list of available courses will be published later in the year.

The Madrid Study Center

The courses listed below are the 1966-67 University of California selections from the regu-

lar offerings of the University of Madrid. With some additions and substitutions these courses may be taken for academic credit by the 1967-68 participants. The University of California students may audit widely throughout the University of Madrid.

ANTHROPOLOGY**MC 105. Anthropology and Ethnology of the Americas. (12) Yr.**

An introduction to the theory and methods of anthropology and a study of the anthropology and ethnology of North and South America with special attention to indigenous cultures.

Professor Esteva Fabregat

ART**MC 163A. Spanish Painting. (12) Yr.**

The history of Spanish painting through the collection of the Prado Museum.

Professor Azcárate

ECONOMICS**MC 104. Problems in Economics. (12) Yr.**

Monographic study of economic theory illustrated with Spanish examples.

Professor Vincente-Arche

GEOGRAPHY**MC 123. Geography of Spain. (12) Yr.**

Study of the geography of Spain.

Professor Terán

HISTORY**MC 160A. The Spanish Empire. (12) Yr.**

The Spanish conquest and colonization of the Americas. Professor Hernández-Sánchez-Barba

MC 160B. Spain in the Middle Ages. (12) Yr.

History of Spain in the Middle Ages.

Professor Pérez de Urbel

MC 160C. Early Modern Spain. (12) Yr.

History of Spain from the Renaissance to modern times. Professor Jover

MC 160D. The Spain of Philip II. (12) Yr.

Monographic study of the Spanish Empire under Philip II. Professor Moxó

MC 160E. Spanish Legislation in the Americas. (12) Yr.

Study of Spanish legislation and jurisprudence in the American colonies.

Professor García Gallo

MC 160F. Recent History of Spain. (12) Yr.

A history of Spain from the Napoleonic invasion (1808) to the end of the Civil War (1939). Professor Palacio Atard

MC 162. Introduction to Spanish Civilization. (3) I.

Contemporary Spain: its recent historical background, regional characteristics, governmental institutions, economy, art, architecture, education, and customs and mores.

Professor Powell and Staff

SOCIOLOGY**MC 132. Urban Sociological Problems. (12) Yr.**

Readings and discussion of the sociological problems pertaining specifically to the cities of Spain.

Professor Terán

SPANISH**MC 25A-25B. Advanced Spanish. (4½-4½) I.**

Prerequisite: Spanish 4 or equivalent. Intensive preparatory course.

The Staff

MC 105. Pérez Galdós and the Realistic Novel.

(12) Yr.

Monographic study of the nineteenth century novel and its principal exponent.

Professor Valbuena Prat

MC 106. History of the Spanish Language. (12) Yr.

A philological course for students specializing in Romantic languages and literatures.

Professor Bustos

MC 107. Spanish American Literature. (12) Yr.

Survey of Spanish American literature, from the sixteenth century to the contemporary.

Professor Morales

MC 109. Spanish Literature to the Seventeenth Century. (12) Yr.

Survey of Spanish literature from its beginnings through the Golden Age.

Professor Entrambasaguas

MC 110. Modern Spanish Literature. (12) Yr.

Survey of modern Spanish literature from 1700 to the present.

Professor Rozas

MC 112. The Life and Work of Lope de Vega. (12) Yr.

Monographic study of Lope de Vega's dramatic theory, analysis of selected works, and discussions of his relationship to the other authors of the Golden Age.

Professor Entrambasaguas

MC 113. Spanish Literature and Its Relationships with Universal Literature (12) Yr.

A history of Spanish literature with particular attention to its relations with universal literature.

Professor Valbuena Prat

MC 116A-116B. Advanced Grammar and Composition. (4½-4½) I.

Prerequisite: Spanish MC 25A-25B, or equivalent. An advanced course in conversation,

grammar, and composition. Intensive preparatory course.

The Staff

MC 118A. The Life and Work of Juan Ruiz. (12) Yr.

Monographic study of the work and times of a major medieval poet and of the beginning of the medieval theater.

Professor Criado de Val

MC 118B. Unamuno and Ortega y Gasset. (12) Yr.

Monographic study of two outstanding writers and philosophers of the twentieth century.

Professor Cimadevilla

The Padua Study Center

The courses listed below are the 1965-66 University of California selections from the regular offerings of the University of Padua. With some additions and substitutions these courses may be taken for academic credit by the 1967-68 participants.

The University of California students may audit widely throughout the University of Padua.

ANTHROPOLOGY**PC 103. Prehistorical Civilizations. (12) Yr.**

Course will vary in specific content from year to year according to the Italian university system.

Professor Polacco

ART**PC 152. History of Art. (12) Yr.**

Prerequisite: consent of instructor. Archeology and history of Greek and Roman art with intensive emphasis on the art of the Venetian region in the Roman Era.

Professor Polacco

PC 156. Italian Renaissance Art. (12) Yr.

Course which will deal intensively with particular aspects of the general subject cited but will vary in specific content from year to year according to the Italian university system.

Professor Pallucchini

CLASSICS**PC 100. Greek Language and Civilization. (12) Yr.**

Greek Civilization, including development of the arts, science and literature; an intensive period of Greek history; basic language requirements which will enable the student to understand the development of the Greek language and original passages he will encounter. Content will vary from year to year in accordance with Italian university custom.

Professor Zadro

HISTORY**PC 109. Ancient History. (12) Yr.**

A course in Roman history which will deal intensively with particular aspects of the general

subject cited but will vary in content from year to year.
Professor Sartori

PC 113. History of Europe in the Nineteenth and Twentieth Centuries. (12) Yr.

Prerequisite: consent of instructor. Emphasis on a detailed study of Italian politics before World War I. Specific contents will vary from year to year in accordance with Italian university custom.
Professor De Rosa

PC 125. History of Europe from the Renaissance to the Nineteenth Century. (12) Yr.

Course which will deal intensively with particular aspects of the general subject cited but will vary in content from year to year.
Professor Seneca

ITALIAN

PC 101A-101B. Grammar, Composition and Conversation. (6-6) I.

Prerequisite: Italian 4 or equivalent. Original composition; translation and discussion of selected passages from Italian literature; conversation; lectures on Italian language and literature. Highly intensive six weeks preparatory course for students in the Padua Center.
Professor Policardi and Staff

PC 112. History of Modern and Contemporary Italian Literature. (12) Yr.

General history of Italian literature from 1850 to the present. Includes intensive monographic studies which vary from year to year according to the Italian university system.
Professor Pullini

PC 130A-130B. Advanced Grammar, Composition and Conversation. (6-6) I.

Prerequisite: Italian 101A-101B or equivalent. An emphasis on original composition, grammar review and analysis in greater depth, conversation, and lectures on Italian language and literature. Highly intensive six weeks preparatory course for students in the Padua Center.
Professor Policardi and Staff

PC 160. Italian Literature and Criticism. (15) Yr.

Prerequisite: consent of instructor. History of Italian literature from its origins to the present day, including currents of criticism and philosophy. The *Divine Comedy* is studied. The monographic portion of the course varies from year to year according to Italian university custom.
Professor Branca

POLITICAL SCIENCE

PC 125. History of Treaties and International Policy. (15) Yr.

Course which will deal intensively with particular aspects of the general subject cited but

will vary in specific content from year to year. Study of basic documents.
Professor Anchieri

The Tokyo Study Center

The courses listed below are the 1965-66 University of California selections from the regular offerings (in English) of the International Christian University in Mitaka-Tokyo. With some deletions, additions, and substitutions, these courses may be taken by the 1967-68 participants.

ANTHROPOLOGY

TC 125A-125B. Social Anthropology. (4½-4½) I, II.

Prerequisite: principles of Sociology or consent of instructor. The principles of political, kinship, legal, religious, and economic organization as illustrated by the study of particular tribal groups.
Professor Newell

TC 135A-135B. Introduction to the Study of Asian Societies. (4½-4½) I, II.

Study of the chief cultural traditions of Asia and of the character of their different responses to the Western impact. A—China and Korea; B—India and Japan.
The Staff

TC 137. Culture Change in Japan. (4½) III.

Prerequisite: consent of instructor. A study of the cultural modernization of Japan, emphasizing both ideology and social structure.
Professor Kiyoko Cho

ART

TC 2. Introduction to Western Art. (4½) II.

The architecture, sculpture, and painting of Europe.
Professor Kidner

TC 4. Introduction to the Art of the Far East. (4½) I.

The architecture, sculpture, painting, and minor arts of China, Korea, and Japan from prehistoric to modern times.
Professor Kidder

TC 162A. Eastern Art. (4½) III.

Chinese art of the Ming and Ch'ing dynasties; Japanese art of the Momoyama and Edo periods, including wood prints and ceramics.
Professor Yamada

TC 162B. The Art of India. (4½) I.

The architecture, sculpture, painting, and minor arts of Prehistoric, Buddhist, and Mogul India.
Professor Yamada

TC 162C. The Art of China. (4½) II.

A survey of Chinese art from prehistoric times to modern, with emphasis on stylistic character-

istics and changes in architecture, sculpture, painting, pottery, and the metal crafts.

Professor Yamada

TC 162D. The Art of Japan. (4½) II.

The development of Japanese art from prehistoric times to the twentieth century is traced in the fields of architecture, sculpture, painting, and the minor arts.

The Staff

TC 199. Independent Studies in Art.

(1½–6) I, II, III.

Prerequisite: consent of department. Special independent work in the history of art.

The Staff

BIOLOGY

TC 140. Principles of Ecology. (4½) III.

Prerequisite: six units of biological science. A study of the interrelationship between living organisms and their environment; biological zones, relationships between organisms, plant succession, and specific modifications.

Professor Hoslett

TC 194. Group Studies in Biology. (3) I, II, III.

Prerequisite: consent of department. Independent study of topics of particular interest and value to the individual student. (UCSB students may repeat this course for a maximum of six units.)

The Staff

BOTANY

TC 1. General Botany. (4½) III.

Introduction to some of the phenomena and problems of the living world. Emphasis on fundamental knowledge of histology, morphology, classification, and general problems in the plant kingdom.

Professor Hoslett

ZOOLOGY

TC 1. General Zoology. (4½) I.

Introduction to some of the phenomena and problems of the living world. Emphasis on fundamental knowledge of histology, morphology, classification, and general problems in the animal kingdom.

Professor Hoslett

TC 106. Comparative Vertebrate Anatomy. (4½) II.

A comparative study of the gross structural anatomy of several major vertebrate groups, specifically the Prochordates, the fishes, and the mammals. Traces evolutionary development with emphasis on the circulatory, excretory, and nervous systems.

Professor Hoslett

TC 114. Vertebrate Biology. (4½) I.

A study of major groups of vertebrates with emphasis on taxonomy, geographic distribution, ecology, and methods for research study in the field.

Professor Hoslett

CHINESE

TC 1. Elementary Chinese. (6) I.

A basic course in spoken Mandarin. After foundation work in phonology, transcribed and taped texts are studied and used as a basis for practice. Grammatical patterns are analyzed and described, and fluency is developed through drill.

Mr. Owyang

DRAMATIC ART

TC 143. Dramatic Interpretation. (3) I.

The analysis, adaptation, and oral presentation of dramatic literature, including dialogue, choral reading, and the development of characterization.

Professor Cubbage

TC 199. Independent Studies in Drama.

(3–9) I, II, III.

Prerequisite: consent of instructor. Study of Japanese drama, both classical and modern, culminating in a research paper.

The Staff

ECONOMICS

TC 1A. Principles of Economics. (4½) III.

The elements of economics, with an emphasis on macro-theory.

Professor Sun

TC 1B. Principles of Economics. (4½) I.

Prerequisite: Economics 1A. The elements of economics, with an emphasis on micro-theory.

Professor Sun

TC 114. Economic Development. (4½) III.

Prerequisite: Economics 1A–1B. Theories of economic development. Problems of accelerated development in poor countries and of maintaining development in rich countries.

Professor Sun

TC 115. Economic Development of China and India. (4½) II.

Prerequisite: Economics 1A–1B. Comparative study of the economic development of China and India.

Professor Sun

TC 119. Economic Development of Modern Japan. (4½) II.

Prerequisite: Economics 1A–1B. Study of the historical bases of Japan's modern industrial and financial systems; the role of foreign trade in economic development; the origins and significance of such problems as the dual structure and disguised unemployment.

The Staff

TC 135. Money and Banking in Japan. (4½) II.

Prerequisite: Economics 1A–1B, or consent of instructor. Functions of money in the economic system; monetary values and price movement; quantity theory; income theory; fiscal policy.

Professor Sun

TC 153. Labor Problems in Japan. (4½) I.

Prerequisite: consent of instructor. Study of the origin and peculiar nature of labor problems in Japan; development of labor laws; extent and character of trade unions; labor disputes; systems of mediation, conciliation, and arbitration.

Professor Iwas Ayusawa

TC 154. Introduction to Labor Problems. (4½) III.

The origin of labor problems; questions relating to hours, wages, dangerous or unsanitary employment, women and minors; trade unionism, labor disputes, unemployment, social security.

Professor Okada

TC 180. International Trade and Commercial Policy. (4½) II.

Prerequisite: Economics 1A-1B. Classical theory of international trade, and recent modifications. The gold standard, inconvertible paper currencies, problems of exchange, theory of capital movement, government controls, import quotas, barter and reciprocal trade agreements, the economic development of backward areas, and related problems.

Professor Okada

EDUCATION**TC 105. Fundamentals of Comparative Education.**

(4½) III.

Study of the similarities and differences in the educational systems of France, England, the U.S.A., Japan, and Malaysia. Historical, sociological, and political influences on education are analyzed from a comparative perspective.

Professor Duke

TC 117. Guidance in Secondary Schools. (4½) II.

The role of guidance in the teaching process and in the learning experience.

Professor Bale

ENGLISH**TC 111A. English Literature: 1740-1805. (4½) I.**

A survey of the characteristics of the literature of the period and of its background.

Professor Hardie

TC 111B. English Literature: 1805-1830. (4½) I.

A survey of the characteristics of the literature of the period and of its background.

Professor Hardie

TC 111C. English Literature: 1830-1900. (4½) II.

A survey of the characteristics of the literature of the period and of its background.

Professor Hardie

TC 111D. English Literature: 1900 to the Present.

(4½) II.

A survey of the latest developments in English literature.

Professor Hardie

TC 119. Classical and English Comedy. (4½) III.

Greek and Roman comedy, with emphasis on Aristophanes, Plautus, and Terence; medieval comedy, including interludes; early Renaissance comedy.

Professor Hardie

TC 120A-120B. Tragedy. (4½-4½) I, II.

Focuses on the moral and religious implications of tragedy. Works read include, in the first term, Aristotle's *Poetics*, Greek tragedies, and early religious tragedies in England; in the second, tragedies by Shakespeare and other writers up to the Restoration.

Professor Hardie

TC 131A-131B. Survey of American Literature.

(4½-4½) I, II.

Survey of American literature from the colonial period to the present time.

The Staff

TC 133. American Poetry. (4½) III.

Introduction to American poetry.

The Staff

TC 161. Renaissance Comedy. (4½) I.

Shakespeare's comedies; the Jacobean comedy of manners, with special reference to Jonson and to Beaumont and Fletcher.

Professor Hardie

TC 169. Restoration and Eighteenth Century Comedy. (4½) II.

Comedies by Congreve, Wycherley, Farquhar, Steele, and Goldsmith.

Professor Hardie

FRENCH**TC 25. Readings in French. (4½) III.**

Prerequisite: consent of instructor. Intended to develop speed and accuracy in the reading of more advanced texts. Current French texts are studied and discussions are conducted in French. Further training in grammar and emphasis on subtleties of meaning.

Professor Fukui

GERMAN**TC 1. Elementary German. (6) III.**

An introduction to the basic patterns of German. After a study of basic sentence forms, pattern practice and combination drills are introduced with the aim of producing an ability to converse fluently and read easily.

Professor Oshio

HISTORY**TC 185A. Introduction to Japanese History (4½) III.**

A survey of Japanese history from ancient times to 1600.

Professor Miller

TC 185B. History of Japan. (4½) I.

The history of Japan from 1600 to the present.

Professor Miller

TC 195A-195B-195C. Senior Thesis. (3-3-3)

I, II, III.

Prerequisite: consent of department. Preparation of a thesis in the student's field of interest under the supervision of a staff member of appropriate specialization. The Staff

JAPANESE**TC 1A-1B-1C. Elementary Japanese. (6-6-6)**

I, II, III.

Elementary course in the Japanese language; pronunciation, basic structure, conversation, and idiom. Includes Kana and some simple Kanji, but the principal emphasis is on conversational vocabulary. The Staff

TC 2A-2B. Semi-Intensive Japanese. (9-9) I, II.

Beginning course in oral and written Japanese, including pronunciation, basic structure, conversation, and reading and writing of Kana and Kanji. The Staff

TC 3. Intensive Japanese. (18) I.

An intensive beginning course in oral and written Japanese. Includes pronunciation, grammar, and the reading and writing of Kana and Kanji. The Staff

TC 109. Intermediate Japanese. (9) III.

Prerequisite: Japanese TC 2B. Further study of oral and written Japanese. Includes grammar and the reading and writing of Kana and Kanji. The Staff

TC 119A-119B. Advanced Japanese. (18-18) II, III.

Prerequisite: Japanese TC 3. Full-time advanced study of oral and written Japanese. The Staff

TC 139A-139B-139C. A Survey of Japanese Literature. (3-3-3) Yr.

Selected readings in English translation; designed to give a broad survey of Japanese literature with special reference to the western impact exerted upon its development. Mr. Zolbrod

TC 199. Independent Studies in Japanese.

(1½-6) I, II, III.

Prerequisite: Japanese TC 119B or equivalent. Mrs. Kitajo

JOURNALISM**TC 182A-182B. Magazine and Newspaper Writing.**

(4½-4½) I, II.

Prerequisite: consent of instructor. Effective style in writing for mass media; emphasis on selecting and organizing facts, especially under deadline pressure. Professor Brown

LINGUISTICS**TC 120. Contrastive Grammar. (4½) III.**

Prerequisites: Modern English Grammar (ICU 203); Syntactical Structure of Japanese (ICU 301). Contrastive analysis of two languages to discover and resolve the specific difficulties of teaching one language to a native speaker of the other. Special emphasis is put upon English and Japanese. Certain psychological foundations of linguistic differences are included. Professor Kleinjans

TC 150A-150B. Comparative Indo-European Linguistics. (4½-4½) I, II.

Prerequisite: six units of a European language other than English; consent of instructor. The reconstruction of Indo-European, with particular reference to Germanic, Romance, and Slavic languages. The historical approach to phonology, morphology, and other aspects of grammar is considered, especially in relation to modern linguistic theory. Professor Ege

MATHEMATICS**TC 3A-3B. Analytic Geometry and Calculus.**

I and II. (4½-4½) I, II.

Prerequisite: Advanced algebra, trigonometry. An introduction to differential and integral calculus supplemented by analytic geometry. Professor Geeslin

TC 118A-118B. Real Analysis. (3-3) II, III.

Prerequisite: consent of instructor. Includes an introduction to real analysis, i.e., theoretic foundations of calculus, point set theory, Lebesgue integral, Fourier analysis, etc. Professor Geeslin

TC 122. Theory of Complex Variables. (3) III.

Prerequisite: consent of instructor. Theory of functions of one complex variable. Includes conformal mappings, complex integration, regular functions and harmonic functions, analytic functions and analytic continuation, Riemann surfaces, elliptic functions, gamma functions, Bessel functions, and other special functions. Professor Geeslin

TC 194A-194B. Group Studies for Advanced Students. (4½-4½) I, II.

Prerequisite: consent of instructor. Topics in functional analysis, theory of probability, number theory, Riemannian geometry, algebraic topology, etc. The Staff

PHILOSOPHY**TC 123. Comparative Ethics: The Chinese Tradition.**

(4½) II.

Study of Confucian, Taoist, and Buddhist philosophies and their relationship with Western Thought. Professor Norimoto Ino

TC 132. Semantics. (4½) III.

Prerequisite: consent of instructor. Analysis of modern investigations on the implications and the use of language for clarity, accuracy, and proper evaluation; the role of language in the development of conflict, confusion, and prejudice; the phenomena of identification, oversimplification, distortion, abstracting, ambiguity, and projection. Professor Takeshi Saito

TC 198A-198B-198C. Readings in Philosophy.

(3-3-3) I, II, III.

Prerequisite: admission by special arrangement. Individual readings of the works of specific philosophers. Professor Norimoto Iino

PHYSICS**TC 11. Introduction to the Physical Sciences.**

(4½) II.

To assist an understanding of natural phenomena and the values and limitations of science and its methods. The emphasis is on the physical sciences. An attempt is made to integrate the physical, chemical and geological facts of nature. Professor Worth

TC 124. Nuclear Physics. (4½) II.

Prerequisite: consent of instructor. Nuclear phenomena and theory. Includes study of nucleons and nuclear structure, nuclear transformation process, the interactions of nuclear radiation with matter, the machines and devices of nuclear physics, and cosmic radiation. Professor Worth

POLITICAL SCIENCE**TC 46. World Politics. (4½) I.**

Study of the factors affecting international relations and the basic policies of selected national states. Professor Dugliss

TC 105. Contemporary Social Movements. (4½) I.

Prerequisite: consent of instructor. The study of Socialism, Communism, Fascism, Totalitarianism, and Democracy. Professor Davis

TC 120. Government of the United States. (4½) II.

Prerequisite: six units of political science or consent of instructor. Constitutional structure of the United States national, state, and local governments. Analysis of the operation of government in the United States in the light of both theory and social process. Professor Dugliss

TC 122. International Politics: Selected Problems.

(3) II.

Prerequisite: six units of political science or consent of instructor. Study of the basic elements in different kinds of international conflict. Detailed study of one or more contemporary

problems in international relations, with some attention to primary sources.

Professor Soon Sung Cho

TC 137. Political and Social Development of Southeast Asia. (4½) I.

Prerequisite: consent of instructor. Development of the societies of Southeast Asia from the colonial period to the present. Comparison of the major colonial regimes and their impact on indigenous cultures; postwar developments; comparative analysis of contemporary national problems. The Staff

TC 138. Japanese Government and Politics.

(4½) II.

An analysis of the structure and functions of Japanese government. Structural description and functional analysis of Japanese political parties. Special emphasis on historical background of the Constitution and leading Supreme Court cases. Professor Inomata

TC 142. Comparative Government. (4½) III.

The British Commonwealth (Asian, African, and Western) used as a context for the comparative study of theory, institutions, and political behavior. Special attention to problems of cross-cultural comparison and the future of the Commonwealth idea. Professor Dugliss

TC 151. Parties and Elections. (4½) II.

Prerequisite: six units of political science or consent of instructor. A study of the practical adaptations of political theory. Electoral and party systems in various countries, but especially in Great Britain, the United States, France, and Japan. Professor Dugliss

TC 185A-185B. Modern Japanese Political Thought.

(4½-4½) I, II.

Prerequisite: consent of instructor. A study of the political thought which shapes contemporary Japan. Traces the current streams of political thought in their historical, legal, and social origins from China, Japan, and the West. Professor Tatsuo Arima

TC 199. Independent Study in Political Science.

(1½-6) I, II, III.

Prerequisite: consent of the department. Special independent work in political science. The Staff

7

RELIGIOUS STUDIES**TC 10. Introduction to the Judeo-Christian Heritage.**

(4½) III.

An introductory study of the Judaic and Christian Scriptures. Professor Barksdale

TC 115A-115B-115C. Readings in the Texts of Religion. (4½-4½-4½) I, II, III.

Prerequisite: consent of the department. Study of the ideas of the great religious thinkers of all ages, reading of their works, in the original language when possible. The Staff

TC 116A-116B. Literature and Religion of the New Testament. (4½-4½) I, II.

Prerequisite: consent of instructor. Introduction to early Christianity and its literature, with special consideration of the Jewish matrix and its adaptation to the Hellenistic world.

Professor Barksdale

TC 194. Group Studies in Religious Thought. (4½) III.

A study of the Old Testament in the context of Near Eastern civilization. The types of literature in the Old Testament compared with similar types in Egypt and Mesopotamia.

Professor Barksdale

SOCIOLOGY**TC 10. Principles of Sociology.** (4½) III.

Some problems in the history of sociological theory and the classification of social systems. Traditional economic, political, and religious systems; modern societies and the problems of urbanization.

Professor Newell

TC 127. Japanese Social Groups. (4½) III.

Designed to give non-Japanese students an understanding of the structure and functions of social groups such as the family, the kinship group, the community, vocational and political groups, etc.

Professor Okada

ENGINEERING

Roy Bainer, M.S., *Dean of the College*

College Office, 205 Walker Engineering Building

Lower Division Courses**1. Plane Surveying.** (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: plane trigonometry. Not open to students in Engineering. Principles of measurement of horizontal distances, horizontal angles, elevations and leveling, including stadia methods. Field problems, including mapping with special reference to agricultural and landscaping applications.

Mr. Goss

3A. Introduction to Engineering Measurements.

(2) I, III.

Lecture—1 hour; laboratory—3 hours. Prerequisite: None. No credit given to students who have received credit for course 1. Introduction to and the analysis of systematic, random, probable, and maximum errors; the precision of measure-

TC 173. Sociology of American Religious Institutions. (4½) II.

Prerequisite: consent of instructor. Conceptual approaches to the study of religion; the nature of religious inquiry; theories of sectarianism; religion and class stratification; the impact of religion on Western Culture. Professor Lee

SPEECH**TC 101. Introduction to Public Speaking.** (4½) III.

A foundation course involving a survey of the major areas of the speaking and listening processes, together with the study of current research reported in journals, theses, and texts.

Professor Pfister

TC 107. Argumentation and Debate. (4½) II.

Prerequisite: consent of instructor. The study of argumentation and logical discourse.

Professor Cubbage

TC 158. Discussion and Conference. (4½) I.

Principles and practice of discussion and group dynamics in committees, conferences, panels, and symposia.

Professor Cubbage

The United Kingdom Study Center

The University of California Study Center in the United Kingdom opened in fall, 1965. The participants study at the Universities of Birmingham, Edinburgh, St. Andrews and Sussex where they elect courses in the Arts, Humanities, and Social Sciences. Students selected to study at the University of Sussex also are able to elect courses in the Natural Sciences. Additional information will be available later in the year.

ments as applied to elementary plan surveying problems using the surveyor's steel tape, engineer's level, level rod, transit, and stadia board.

Mr. Goss

3B. Introduction to Engineering Measurements.

(2) I, II.

Lecture—1 hour; laboratory—3 hours. Prerequisite: Mathematics 1A (may be taken concurrently). Elementary problems in engineering measurement, instrumentation, and data analysis applied to temperature, fluid flow, micro-distance, electrical, and other physical quantities; engine power and concrete strength tests.

Mr. Goss

4. Engineering Geometry. (3) I, II, III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: mechanical drawing; Mathematics 1A

(may be taken concurrently). Principles of descriptive geometry and of mechanical and free-hand drawing; their application in the representation, visualization and solution of engineering problems. Introduction to engineering design.

Mr. J. M. Henderson

5. Engineering Applications of Computers.

(2) II, III.

Laboratory—6 hours. Prerequisite: Mathematics 1B (may be taken concurrently). Operation of electronic analog computers and their application to the solution of simple engineering problems. Programming digital computers; the FORTRAN language; applications of the computer to both numerical and non-numerical problems.

Mr. Loomis

35. Statics. (3) II, III.

Lecture—3 hours. Prerequisite: Mathematics 1C; Physics 4A. Force systems and equilibrium conditions with emphasis on engineering problems. Includes an introduction to the method of virtual work.

Mr. Hanson

45. Properties of Materials. (4) I, III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: sophomore standing in engineering. An introductory course on the properties of engineering materials and their relation to the internal structure of the materials.

Mr. Moon

Upper Division Courses

100. Electronics. (2) I, II, III.

Lecture—2 hours. Prerequisite: course 107 (may be taken concurrently). Characteristics of vacuum and semi-conductor devices; graphical analysis and the development of small signal equivalent circuits.

Mr. Soohoo

101. Electrical Laboratory. (2) I, II, III.

Laboratory—6 hours. Prerequisite: course 107 (may be taken concurrently). Laboratory use of basic electronic devices and measuring instruments. Problem topics include passive and active circuits, electro-mechanical devices, signal analysis, and nonlinear components.

Mr. Green

102A. Dynamics. (3) I, II, III.

Lecture—3 hours. Prerequisite: course 35, Mathematics 2C. Kinematics and kinetics of particles, of systems of particles, and of rigid bodies applied to engineering problems.

Mr. J. M. Henderson

102B. Dynamics. (3) II, III.

Lecture—3 hours. Prerequisite: course 102A. Topics in rigid body dynamics; elementary dynamics of vibrating systems; introduction to energy methods.

Mr. J. M. Henderson

103A. Elementary Fluid Mechanics. (3) I, II.

Lecture—3 hours. Prerequisite: course 102A. Fluid properties; fluid statics; continuity and

linear momentum equations for control volumes; flow of incompressible fluids in pipes; dimensional analysis; laminar, transition, and turbulent flow regimes.

Mr. McKillop

103B. Elementary Fluid Mechanics. (3) II, III.

Lecture—3 hours. Prerequisite: course 103A. Potential flow; open channel flow; boundary layer flow; one dimensional compressible flow.

Mr. McKillop

104A. Mechanics of Materials. (3) I, II, III.

Lecture—3 hours. Prerequisite: course 35; Mathematics 2C (may be taken concurrently) or equivalent. Analysis of stress and strain; combined stresses; stresses and deformation of bars, shafts, and beams; simple buckling.

Mr. Herrmann

104B. Mechanics of Materials. (3) II, III.

Lecture—3 hours. Prerequisite: course 104A. Energy methods; failure theories; buckling and lateral instability; shear center; unsymmetrical loading.

Mr. Herrmann

105A. Thermodynamics. (3) I, II, III.

Lecture—3 hours. Prerequisite: Mathematics 2C. Equations of state and thermodynamics of one-component systems; first and second laws; phase equilibria.

Mr. Giedt

105B. Thermodynamics. (3) II, III.

Lecture—3 hours. Prerequisite: course 105A. Gas mixtures; work-producing and work-absorbing cycles (vapor and gas); measures of performance. Recent developments.

Mr. Giedt

106. Engineering Economics. (3) I, II.

Lecture—3 hours. Prerequisite: upper division standing in engineering. The analysis, synthesis and evaluation of problems in engineering economics; operations research techniques; relevant differences between alternatives; discounted cash flow concept; income tax considerations; recovery of proposed investment plus return commensurate with the risk.

Mr. Krone

107. Circuits. (3) I, II, III.

Lecture—3 hours. Prerequisite: Mathematics 2C (may be taken concurrently, or equivalent; Physics 4C. Basic circuit analysis techniques; transient and steady-state solutions using differential equations.

Mr. LaPatra

180. Engineering Analysis. (3) I.

Lecture—3 hours. Prerequisite: senior standing in engineering. The analysis of steady-state and non-steady-state problems for discrete and continuous systems; analytic and approximate solutions. Typical engineering problems in heat transfer, fluid mechanics, electrical networks, mechanical vibrations, and elasticity.

Mr. McKillop

183. Intermediate Mechanics of Materials. (3) I.

Lecture—3 hours. Prerequisite: course 104B. Stresses and deformations of curved beams; beams on elastic foundations; introduction to plates and shells; thick-walled cylinders; beam columns.

Mr. Brush

185. Heat Transfer. (3) I, III.

Lecture—3 hours. Prerequisite: course 103B and 105A. Fundamental concepts of heat transfer; conduction, radiation, and convection.

Mr. Whitaker

186. Intermediate Heat Transfer. (3) II.

Lecture—3 hours. Prerequisite: course 185. Transient and steady-state heat conduction. Intermediate problems in free and forced convection. Boiling and evaporative cooling.

Mr. McKillop

187. Introduction to Theory of Elasticity. (3) I, III.

Lecture—3 hours. Prerequisite: course 183. Fundamental equations in three dimensions; plane stress and plane strain; flexure and torsion of bars of various shapes.

Mr. Cheney

190. Professional Responsibilities of Engineers.

(3) II, III.

Lecture—2 hours; discussion—1 hour. Prerequisite: senior standing in engineering. Interaction between the engineer and society; organization of the engineering profession; engineering and management; technical innovation and product development; introduction to contracts and business law; engineering specifications; written and oral presentation of brief reports.

Mr. Kemper

ENGINEERING: AGRICULTURALCoby Lorenzen, M.S., *Chairman of the Department*

Department Office, 206 Walker Engineering Building

Professors:

S. Milton Henderson, M.S.

Robert A. Kepner, B.S.

Coby Lorenzen, M.S.

Loren W. Neubauer, Ph.D.

systems; muscle physiology; traction and vehicle mechanics; implement control systems.

Mr. Chancellor

Associate Professors:

William J. Chancellor, Ph.D.

John R. Goss, M.S.

Samuel A. Hart, Ph.D.

117. Developing and Evaluating Farm Machines.

(3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 114; Mechanical Engineering 118. Design procedures; effects of biological factors, labor requirements, crop values, and annual use upon the design approach; designing a production unit; hydraulic controls and power transmission in farm machines; testing and evaluating machine performance and durability.

Mr. Kepner

Assistant Professors:

Robert B. Fridley, M.S.

Errol D. Rodda, Ph.D.

Cletus E. Schertz, Ph.D.

**Lecturers:**

Roger E. Garrett, M.S.

Joe P. Gentry, M.S.

Upper Division Courses**114. Principles of Farm Machinery. (4) I.**

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102B. Functional requirements, basic principles, and performance characteristics of field machines; cost analysis; general design considerations; laboratory studies and tests with specific machines.

Mr. Gentry

116. Agricultural Power. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 105B. Sources and systems for supplying energy to agricultural operations: internal combustion engines; fuels; electric power; solar energy; power transmission

118. Development Engineering. (2) III.

Lecture—2 hours. Prerequisite: Mechanical Engineering 118 (may be taken concurrently). Failure modes; determination of the causes of systems malfunction by analysis of interactions and variations in effects; experiment design; development procedures.

Mr. Garrett

125. Agricultural Structures and Sanitation. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 35 and 104A. Functional and material requirements of storage and production structures; lighting, heating, insulating, and ventilating; water supply and sanitation for the farm home and for animal structures; methods and economics of farm waste disposal.

Mr. Neubauer

126. Design of Agricultural Structures. (3) III.

Lecture—3 hours. Prerequisite: course 125; Civil Engineering 131A. Agricultural building

loads and codes; design with steel, concrete, and timber; glued-laminated and plywood box beams; pole buildings and connections; lumber rigid frames; arches.

Mr. Rodda

132. Unit Operations in Agricultural Processing.

(4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 185. Thermodynamics and mass transfer principles applied to such processes as drying, dehydration, refrigeration, size reduction, separation, and materials handling.

Mr. Henderson

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of the instructor.

The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Graduate Courses

215. Soil-Machine Relations in Tillage and Traction.

(2) II.

Lecture—2 hours. Prerequisite: courses 114 and 116 (may be taken concurrently); Civil Engineering 133A. Recommended: Soil and Water Science 101. Mechanics of interactions

between agricultural soils and tillage and traction devices; determination of relevant physical properties of soil; analyses of stresses and strains in soil due to machine-applied loads; experimental and analytical methods for synthesizing characteristics of overall systems.

Mr. Chancellor

225. Advanced Agricultural Structures Design. (3) II.

Lecture—3 hours. Prerequisite: course 126. Recommended: Civil Engineering 132B and 132C. Critical evaluation of codes as applied to agricultural structures; safe design criteria, load sharing, and statistical reliability concepts; computer analysis of indeterminate wood structures; stressed skin construction; ultimate strength design in reinforced concrete; applications of new materials and methods.

Mr. Rodda

290. Seminar. (1) III.

Seminar—1 hour. Discussion of current graduate research with particular attention to validity of experimental procedures; includes oral and written presentation of a term paper.

The Staff

298. Group Study. (1-5) I, II, III.

The Staff (Mr. Henderson in charge)

299. Research. (1-12) I, II, III.

The Staff

ENGINEERING: APPLIED SCIENCE

Albert J. Kirschbaum, Ph.D., *Chairman of the Department*

Department Office, TB 106

Professors:

Stewart D. Bloom, Ph.D.
Edward Teller, Ph.D.

Associate Professors:

Richard J. Borg, Ph.D.
Albert J. Kirschbaum, Ph.D.

Assistant Professors:

Carl A. Jensen, Ph.D.
Wilson K. Talley, Ph.D.

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Professor:

Richard F. Post, Ph.D. (*In Residence*)

Assistant Professor:

George D. Sauter, Ph.D. (*Acting*)

Lecturers:

Berni J. Alder, Ph.D.
Sidney S. Fernbach, Ph.D.
John G. Fletcher, Ph.D.
Harold P. Furth, Ph.D.
Michael N. Guinan, Ph.D.
Montgomery H. Johnson, Ph.D.

John Killeen, Ph.D.
Leroy D. Krider, B.S.
Cecil E. Leith, Ph.D.
Harry L. Sahlin, Ph.D.
Frederick O. Wooten, Ph.D.

Davis

Upper Division Courses

100. Production and Use of Nuclear Energy. (3) I.

Lecture—3 hours. Prerequisite: Mathematics 2C, Physics 4C. General discussion of nuclear energy, fission chain reaction, phenomenological description of reactors, elementary reactor analysis, reactor types and applications. Nature and use of nuclear explosives in excavation, mining, power production, etc. Experimental approaches to development of controlled fusion reactors.

Mr. Talley

115. Elements of Programming. (3) III.

Lecture—3 hours. Prerequisite: Mathematics 2C. Lectures and laboratory work on electronic computers; programming systems, languages, flow charts, and numerical analysis. Applications to engineering problems.

Mr. Jensen

Graduate Courses**230A-230B-230C. Structure of Matter**

(3-3-3) Year.

Lecture—3 hours. Prerequisite: course 110C. Classical properties of matter; introduction of quantum mechanics by the correspondence principle; perturbation theory; electron theory of atoms, molecules and solids; quantum theory of cooperative effects. Mr. Jensen

240A-240B-240C. Nuclear Reactor Analysis.

(3-3-3) Year.

Lecture—3 hours. Prerequisite: course 110C. The physical concepts and mathematical techniques used in the analysis of nuclear reactors. Mr. Sauter

245A-245B. Nuclear Reactor Systems. (3-3) II-III.

Lecture—3 hours. Prerequisite: course 240A. Those aspects of fluid dynamics, thermodynamics, heat transfer, and thermal stress analysis that apply to the engineering design of nuclear reactors. Radiation shielding, fuel cycles, and isotope separation. Mr. Sauter

246. Nuclear Explosives: Phenomenology. (3) II.

Lecture—3 hours. Prerequisite: Mathematics 220A. The phenomenology of nuclear explosives; the theoretical and empirical laws for such effects; the scientific uses of such phenomena. Offered in odd-numbered years. Mr. Talley

260A-260B. Statistical Theory of Equilibrium and Transport Phenomena. (3-3) I-II.

Lecture—3 hours. Prerequisite: courses 110A and 120B. Statistical mechanical formulation of thermodynamics with application to the various states of matter. Statistical foundation of irreversible phenomena; evaluation of the transport coefficients in fluids and metals. Mr. Jensen

290. Seminar. (1-2) I, II, III.

The Staff

Seminar—2 hours.

298. Group Study. (1-3) I, II, III.

Lecture—1-3 hours. Such topics as neutron physics, nuclear technology, advanced hydrodynamics, plasma physics, or advanced mathematics. The Staff

299. Research. (1-12) I, II, III.

The Staff

Livermore**Upper Division Courses****110A-110B-110C. Mathematical Methods.**

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: Mathematics 2C. Infinite series; infinite integrals; functions of a complex variable; series solution of ordinary differential equations; Legendre functions; Bessel functions; Fourier series and integrals;

Fourier and Laplace transforms; vectors; matrices; orthogonal functions; eigenvalue problems; vector analysis; boundary value problems; conformal mapping. Mr. Fletcher

115. Elements of Programming. (3) III.

Lecture—3 hours. Prerequisite: Mathematics 2C. Lectures and laboratory work on electronic computers; programming systems, languages, flow charts, and numerical analysis. Applications to engineering problems. Mr. Krider

120A-120B. Chemistry for Physicists and Engineers. (3-3) I-II.

Lecture—3 hours. Prerequisite: Chemistry 1C; Mathematics 2C. Concepts of chemistry and physical chemistry, including atomic and molecular structure and the properties of liquids and solids. Mr. Borg

Graduate Courses**210A-210B-210C. Advanced Mathematical Methods. (3-3-3) Year.**

Lecture—3 hours. Prerequisite: course 110C. Calculus of variations; Green's functions; Sturm-Liouville problems; integral equations; elliptic equations; hyperbolic equations in two independent variables; difference methods for initial-value problems in two or more independent variables; difference methods for elliptic equations; Monte Carlo methods. Mr. Killeen

220A-220B-220C. Advanced Physical Chemistry.

(3-3-3) Year.

Lecture—3 hours. Prerequisite: course 120B. Advanced chemical thermodynamics, chemical kinetics, and electro-chemistry.

Mr. Borg, Mr. Guinan

230A-230B-230C. Structure of Matter.

(3-3-3) Year.

Lecture—3 hours. Prerequisite: course 110C. Classical properties of matter; introduction of quantum mechanics by the correspondence principle; perturbation theory; electron theory of atoms, molecules and solids; quantum theory of cooperative effects. Mr. Teller

231A-231B-231C. Theory of the Solid State.

(3-3-3) Year.

Lecture—3 hours. Prerequisite: courses 230A-230B-230C. Structure binding and mechanical properties of crystals; dielectrics, electrons in metals, metals and alloys; magnetism, superconductivity, and semi-conductors. Mr. Johnson

235A-235B. Nuclear Physics. (3-3) I-II.

Lecture—3 hours. Prerequisite: course 230C. Basic properties of nuclei; radioactive decay; nuclear models; low energy nuclear reactions; neutron physics. Interaction of particles and radiation with matter. Mr. Bloom

240A-240B-240C. Nuclear Reactor Analysis.

(3-3-3) Year.

Lecture—3 hours. Prerequisite: course 110C. The physical concepts and mathematical techniques used in the analysis of nuclear reactors.

Mr. Kirschbaum

245A-245B. Nuclear Reactor Systems. (3-3) II-III.

Lecture—3 hours. Prerequisite: course 240A. Those aspects of fluid dynamics, thermodynamics, heat transfer, and thermal stress analysis that apply to the engineering design of nuclear reactors. Radiation shielding, fuel cycles, and isotope separation.

250A-250B. Continuum Mechanics. (3-3) I-II.

Lecture—3 hours. Prerequisite: course 110C. Tensor notation, algebra, and analysis. Theory of elasticity, stress-strain relation, strain energy, reciprocity laws, elastic waves. Hydrodynamics of incompressible and compressible flows in two and three dimensions.

Mr. Leith

260A-260B. Statistical Theory of Equilibrium and Transport Phenomena. (3-3) II-III.

Lecture—3 hours. Prerequisite: courses 110A and 120B. Statistical mechanical formulation of thermodynamics with application to the various states of matter. Statistical foundation of irreversible phenomena; evaluation of the transport coefficients in fluids and metals.

270A-270B-270C. Electromagnetic Theory.

(3-3-3) Year.

Lecture—3 hours. Prerequisite: Electrical Engineering 171B and Mathematics 2C. Electromagnetic field theory; physical properties of dielectrics and conductors; magnetic properties of materials, steady and quasi-steady currents; propagation of electromagnetic waves in vacuum and through matter.

275A-275B-275C. Plasma Physics. (3-3-3) Year.

Lecture—3 hours. Prerequisite: course 270C. The basic equations governing the behavior of a fully ionized plasma in a magnetic field; simple plasma configurations in controlled fusion research and space applications. Theory of plasma waves and instabilities. Transport coefficients and radiation phenomena.

Mr. Furth

290. Seminar. (1-2) I, II, III.

The Staff

Seminar—2 hours.

298. Group Study. (1-3) I, II, III.

Lecture—1-3 hours. Such topics as neutron physics, nuclear technology, advanced hydrodynamics, plasma physics, or advanced mathematics.

The Staff

299. Research. (1-12) I, II, III.

The Staff

ENGINEERING: CHEMICALJ. M. Smith, Sc.D., *Chairman of the Department*

Department Office, TB-108

Professor:

J. M. Smith, Sc.D.

Associate Professor:

Stephen Whitaker, Ph.D.

Assistant Professor:

Richard L. Bell, Ph.D.

Upper Division Courses**151. Material and Energy Balances. (3) I.**

Lecture—3 hours. Prerequisite: Chemistry 110A (may be taken concurrently). Use of principles of conservation of mass and energy in chemical process calculations, with emphasis on problem solving.

Mr. Smith

152. Chemical Engineering Thermodynamics. (3) III.

Lecture—3 hours. Prerequisite: Engineering 105A and Chemistry 110A. Application of the laws of thermodynamics, with particular emphasis on the behavior of fluids, phase equilibria, and chemical reaction equilibria.

Mr. Bell

154A. Mass Transfer. (3) I.

Lecture—3 hours. Prerequisite: course 185 (may be taken concurrently); Chemistry 110A. Fundamental concepts of mass transfer in fluids. Problems in pure diffusion and convective mass transfer.

Mr. Whitaker

154B. Applications of Mass Transfer. (3) II.

Lecture—3 hours. Prerequisite: course 154A. Application of the principles of mass transfer and thermodynamic equilibrium to absorption, extraction, distillation and other separation processes.

Mr. Bell

155. Chemical Engineering Laboratory. (3) III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 154A and 156A. Laboratory experiments in heat, mass, and momentum transfer and in chemical kinetics.

The Staff

156A. Chemical Engineering Kinetics. (3) II.

Lecture—3 hours. Prerequisite: courses 152; 154A; and Chemistry 110C (may be taken con-

currently). Chemical kinetics and introduction to homogeneous and heterogeneous reactor design.
Mr. Smith

156B. Chemical Engineering Kinetics. (3) III.

Lecture—3 hours. Prerequisite: course 156A. Continuation of course 156A. Mr. Smith

158. Chemical Engineering Process Design. (3) III.

Lecture—3 hours. Prerequisite: courses 154B and 156B. Chemical Engineering process design; optimization and process dynamics.

Mr. Bell

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: senior standing in engineering with at least a B average. Student groups may be organized in instrumentation and design problems. Students may enroll in one or more separate subjects.

The Staff

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

(1-5) I, II, III.

Prerequisite: consent of instructor. The Staff

Graduate Courses

252. Advanced Thermodynamics. (3) I.

Lecture—3 hours. Prerequisite: course 152; Engineering 105B. A general treatment of the first and second laws; applications of thermodynamic relationships to phase and chemical reaction equilibria; introduction to statistical thermodynamics.

Mr. Smith

253A. Advanced Transport Phenomena. (3) I.

Lecture—3 hours. Prerequisite: course 185. Tensor and vector methods in the formulation of the equations of mass, momentum, energy, and entropy in continuous media with particular emphasis on fluids. Applications to the formulation of rheological equations of state for visco-elastic fluids and fluid interfaces.

Mr. Whitaker

253B. Advanced Transport Phenomena. (3) II.

Lecture—3 hours. Prerequisite: course 253A. Continuation of 253A, with application to both differential and integral mass, momentum, and energy balances.

Mr. Whitaker

253C. Advanced Transport Phenomena. (3) III.

Lecture—3 hours. Prerequisite: course 253B. Continuation of 253B with special emphasis on multi-component systems. The laws of molecular diffusion and energy transport, including the effects of concentration, temperature, electric and pressure fields. Convective mass transfer and chemically reacting flows.

Mr. Whitaker

255A. Equilibrium Stage Processing. (3) I.

Lecture—3 hours. Prerequisite: course 154B; course 252 (may be taken concurrently). The concept of equilibrium stage processing; applications to the design of distillation, absorption, and extraction processes.

Mr. Bell

255B. Equilibrium Stage Processing. (3) II.

Lecture—3 hours. Prerequisite: course 255A. Continuation of course 255A.

Mr. Bell

256A. Applied Kinetics and Reactor Design. (3) I.

Lecture—3 hours. Prerequisite: courses 156B and 252. Application of kinetics and molecular transport rates to the design of chemical reactors, with emphasis on homogeneous systems.

Mr. Smith

256B. Applied Kinetics and Reactor Design. (3) II.

Lecture—3 hours. Prerequisite, course 256A. Continuation of 256A, with emphasis on convective transport and heterogeneous catalytic systems.

Mr. Smith

290. Seminar. (1) I, II, III.

Seminar—1 hour.

The Staff

298. Group Study. (1-5) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

ENGINEERING: CIVIL

Don O. Brush, Ph.D., *Chairman of the Department*

Department Office, 222 Walker Engineering Building

Professors:

Jaime Amorocho, Ph.D. (*Civil Engineering and Water Science and Engineering*)

Don O. Brush, Ph.D.

Robert H. Burgy, M.S. (*Civil Engineering and Water Science and Engineering*)

James N. Luthin, Ph.D. (*Civil Engineering and Water Science and Engineering*)

Verne H. Scott, Ph.D. (*Civil Engineering and Water Science and Engineering*)

Associate Professors:

James A. Cheney, Ph.D.

Ray B. Krone, Ph.D.

Assistant Professors:

John C. Badoux, Ph.D.

Robert D. Hanson, Ph.D.

Leonard R. Herrmann, Ph.D.

James R. Hutchinson, Ph.D.

Theodor S. Strelkoff, Ph.D. (*Civil Engineering and Water Science and Engineering*)

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Assistant Professor:

Edward D. Schroeder, M.S. (*Acting*)

Lecturer:

William O. Pruitt, Jr., M.S., (*Civil Engineering and Water Science and Engineering*)

Upper Division Courses

131A. Structural Analysis. (3) I, III.

Lecture—3 hours. Prerequisite: Engineering 104B (may be taken concurrently). Structural analysis of beams, trusses, frames; influence lines; moving loads; introduction to statically indeterminate structures; moment distribution. Mr. Badoux

131B. Structural Analysis. (2) II.

Lecture—2 hours. Prerequisite: course 131A. Analysis of statically indeterminate structures by energy methods, slope-deflection, moment distribution; matrix formulations. Mr. Badoux

132A. Design of Structural Elements. (3) II, III.

Lecture—3 hours. Prerequisite: Engineering 104B (may be taken concurrently). Metallic beams, columns, other members; analysis and design of riveted, bolted, and welded joints; design of simple beam connections, moment resistant connections, and column base plates. Mr. Badoux

132B. Design of Structural Elements. (3) I, III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 104B. Reinforced concrete beams, columns, slabs, and footings; elastic and ultimate design. Introduction to prestressed concrete and plastics. Mr. Badoux

132C. Design of Structural Elements. (2) III.

Lecture—2 hours. Prerequisite: course 132A. Elements of timber structures and laminated structures, including connection design. Mr. Rodda

133A. Soil Mechanics. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 104B; Geology 150. Nature and physical properties of soils; theories of strength and stability; soils and soil deposits; classification and genesis, seepage, drainage, consolidation, settlement, and frost action. Demonstrations and laboratory measurements. Mr. Cheney

133B. Soil Mechanics. (3) II.

Lecture—3 hours. Prerequisite: course 133A. Foundations, earth pressure, soil construction; compaction and stabilization; stability of earth masses; sub-surface investigation. Mr. Cheney

134. Analysis and Design of Buildings. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: courses 131A, 132B, 132C, and 133A. Vertical dead and live loading; earthquake and wind forces. Building code and structural requirements for the use of timber, steel frame, reinforced concrete, and brick. Drafting room problems in design. Mr. Hanson

135. Advanced Structural Analysis. (4) III.

Lecture—4 hours. Prerequisite: course 131B. Analysis of stiffened and unstiffened shell structures; limit analysis of frame structures; analysis of statically indeterminate box beams, rings, and arches. Buckling of flat plates and shells. Introduction to matrix analysis of space frames.

Mr. Cheney

137. Construction Principles. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: senior standing in engineering. A study of the construction industry; its form, evolution, and methods of operation; fundamental principles underlying construction practices; economic factors in planning, organizing, and operating a construction force. Field trips and analysis of local construction projects.

Mr. Hanson

138. Dynamic Loads on Stationary Structures. (3) II.

Lecture—3 hours. Prerequisite: course 131B, Engineering 102B, 103B. Determination of loads on structures due to base movements (earthquakes), steady and non-steady aerodynamic forces (wind and blast), and impact and vibration forces; comparison of dynamic loads with stationary loads and determination of equivalent load factors.

Mr. Hanson

*139. Design of Earthquake and Blast Resistant Structures. (3) III.

Lecture—3 hours. Prerequisite: course 138. Methods of lateral force design as presently used for conventional building structures; current research in earthquake and blast resistant design with application of results to the design of simple structures.

Mr. Hanson

141. Engineering Hydromechanics. (3) I.

Lecture—3 hours. Prerequisite: Engineering 103B. Application of principles of mechanics to flows of heavy, incompressible fluids. Flow visualization, configuration of free surfaces, streamlines, flow nets, separation, cavitation; pressure distribution in non-uniform, unsteady flow; turbulence; surface and form drag; conduit flow. Engineering approximations.

Mr. Strelkoff

142. Water Supply. (4) I.

Lecture—4 hours. Prerequisite: Engineering 103B or consent of instructor. Study of surface and ground water supplies; analysis for predic-

* Not to be given, 1966-1967.

tion of surface and ground water yields; water requirements; water supply and distribution systems including dams, reservoirs, wells, pumping plants, open channels, and pipe lines; water treatment methods and processes. Mr. Burgy

143. Water Resources Engineering. (3) II.

Lecture—3 hours. Prerequisite: course 142. Basic concepts of water resources planning; water inventories, use, and control; water conservation measures and legislation; multiple-purpose project planning, domestic and foreign water development projects; simulation optimization and dynamic programming studies.

Mr. Scott

144. Drainage Engineering. (3) III.

Lecture—3 hours. Prerequisite: Engineering 103B. Elements of seepage through porous media; theory of drainage; depth and spacing of drains; methods of drainage investigation; project planning for drainage; loads on buried pipe; design of gravel filters; strength of tile; engineering analysis of surface drainage.

Mr. Luthin

145. Hydraulic System Design. (3) III.

Lecture—3 hours. Prerequisite: course 141. Principles of project planning; methods of analysis and hydraulic design of storage systems, diversion structures, conveyance and regulation systems, and structures for irrigation, power and flood control projects.

Mr. Amorochio

146. Hydraulic Engineering Design Laboratory. (2) III.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 145 (may be taken concurrently). Experimental analysis and design of hydraulic systems including related storage and conveyance structures, and of irrigation and drainage systems; measurements and instrumentation.

Mr. Scott

147. Solid and Radioactive Waste Management. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 103B and course 133A; Chemistry 8 and Bacteriology 2 recommended. Characteristics and amounts of solid wastes; collection systems; introduction to waste treatment processes and return of treated wastes to the environment. Origins, nature, and management of radioactive wastes.

Mr. Hart

148. Waterborne Waste Management. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 142; Chemistry 8 and Bacteriology 2 recommended. Characteristics and amounts of liquid wastes; sewerage; introduction to waste treatment processes; return of treated wastes to the environment.

Mr. Krone

149. Air Pollution Control. (3) III.

Lecture—3 hours. Prerequisite: course 147; Chemistry 8, Geography 3 and Agricultural En-

gineering 106 recommended. Origins, characteristics, and amounts of air pollutants; atmospheric reactions and behavior of airborne wastes; methods of controls.

Mr. Krone

160. Traffic Engineering. (3) II.

Lecture—3 hours. Prerequisite: senior standing in engineering. Principles of planning and design of highways, airports, railroads, mass transit, etc. Trip generation, desires, capacity, design, pavements, tracks, finance, economy, relationships with land use, interrelationships between modes of transportation.

198. Directed Group Study. (1-5) I, II, III.

Lecture—1-5 hours. Prerequisite: consent of the instructor. Selected topics. Students may enroll in one or more separate sections. The Staff

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Lecture—1-5 hours. Prerequisite: senior standing in engineering and at least a B average.

The Staff

Graduate Courses

225. Theory of Elasticity. (3) III.

Lecture—3 hours. Prerequisite: Engineering 187. Tensor formulation of the elastic field equations. Plane stress and strain in rectangular and cylindrical coordinates. Solution by complex variable method. Introduction to three-dimensional problems.

Mr. Herrmann

226A. Theory of Elastic Stability. (2) II.

Lecture—2 hours. Prerequisite: Engineering 187. Basic concepts of the stability of elastic systems. Derivation of the differential equations of stability by summation of forces and moments and by the variational method. Applications to bars, frames, and rings.

Mr. Brush

226B. Theory of Elastic Stability. (2) III.

Lecture—2 hours. Prerequisite: course 226A. Continuation of course 226A. Application to plates and shells.

Mr. Brush

227. Theory of Plates. (3) II.

Lecture—3 hours. Prerequisite: Engineering 187. Stress and deformation analysis of plates bent by transverse loads; applications to circular, rectangular, and other shapes.

Mr. Hermann

228. Theory of Shells. (3) II.

Lecture—3 hours. Prerequisite: Engineering 187. Direct stresses in shells with axial symmetry. Applications to shell roofs, tanks, cylindrical shells, pipelines; bending stresses in shells.

Mr. Cheney

229. Plasticity. (3) III.

Lecture—3 hours. Prerequisite: course 225. Analysis of beams, frames, plates, and shells in the plastic range. Introduction to the general theory of plasticity. Plastic theory of plane stress.

Mr. Hutchinson

240. Water Quality. (3) I.

Lecture—3 hours. Prerequisite: Bacteriology 2 and Mechanical Engineering 185B or equivalent; Chemistry 110A (may be taken concurrently). Water quality requirements for domestic, industrial, agricultural, and recreational and wildlife water uses; properties of natural surface and ground waters; transport and fates of water-borne pollutants; methods of analysis; and transfer of pollutants in the aquatic food chain.

Mr. Hart

241. Land Quality. (2) II.

Lecture—2 hours. Prerequisite: Bacteriology 2; Chemistry 110B (may be taken concurrently) and consent of the instructor. Factors determining land quality for use in man's activities; origins of soil pollutants; uptake of pollutants by plants; interrelations of land and vegetation and qualities of air and water.

Mr. Krone

242. Air Quality. (3) III.

Lecture—3 hours. Prerequisite: Engineering 105A; Engineering 185; Chemistry 110B. Properties of the air and the atmosphere; atmospheric phenomena; factors determining air quality; origins, transport and degradation of atmospheric pollutants; effects of pollutants on men, plants, soil, and water.

Mr. Krone

243A. Water and Waste Treatment. (3) I.

Lecture—3 hours. Prerequisite: Bacteriology 131 (may be taken concurrently); Mechanical Engineering 185. Characteristics of water- and airborne-wastes; treatment processes and process kinetics; treatment system design.

Mr. Schroeder

243B. Water and Waste Treatment. (3) II.

Lecture—3 hours. Prerequisite: course 243A. Continuation of course 243A.

Mr. Schroeder

243C. Water and Waste Treatment Laboratory. (2) III.

Laboratory—6 hours. Prerequisite: course 243B. Operation of modal treatment units; measurements of waste and process effluent characteristics; evaluation of process parameters.

Mr. Schroeder

244. Environment Quality Management. (2) III.

Lecture—2 hours. Prerequisite: course 243B. Fates of pollutants in the overall environment; requirements for environment quality; monitoring methods; environment quality control methods.

Mr. Krone

247. Nuclear Civil Engineering. (3) III.

Lecture—3 hours. Prerequisite: Applied Science 246. The engineering uses of nuclear explosives; earthmoving for canals, harbors, highways and water resource development; mining; petroleum; desalination. Offered in odd-numbered years.

Mr. Cheney

271. Advanced Topics in Surface Water Hydrology. (2) I.

Lecture—2 hours. Prerequisite: course 142, Water Science 141 and consent of instructor. Analysis of hydrologic processes and procedures in water supply investigations including topics in atmospheric relationships, research methods, water balances, and water yield prediction methods.

Mr. Burgy

272. Groundwater Flow and Seepage. (2) II.

Lecture—2 hours. Prerequisite: Engineering 103B. Flow of fluids through porous media. Methods of solving flow problems including mathematical analysis, models and analogs. Solution of transient problems by the Laplace transform method. Method of images and solution of an infinite array of images.

Mr. Luthin

273. Groundwater Hydrology. (3) III.

Lecture—3 hours. Prerequisite: course 272. Hydrologic and engineering consideration of groundwater development, geophysical exploration, well hydraulics, and recharge.

Mr. Scott

276. Hydrologic and Hydraulic System Analysis. (3) II.

Lecture—3 hours. Prerequisite: courses 142, 145., Water Science 141, and Mathematics 2C. Theory and application of the methods and techniques of modern system analysis to hydrologic and hydraulic systems; emphasis on current developments in parametric hydrology and on application of control theory to water supply and distribution projects.

Mr. Amorocho

277. Mechanics of Open Channel Flow. (3) II.

Lecture—3 hours. Prerequisite: course 141 and Mathematics 2C. Recommended: a short course in FORTRAN programming (may be taken concurrently). Free surface flow; resistance in uniform flows; gradually and rapidly varied flows; critical depth; unsteady flows; supercritical flows; shock waves. Graphical and digital-computer solutions. To be offered in odd-numbered years.

Mr. Strelkoff

278. Hydraulics. (3) II.

Lecture—3 hours. Prerequisite: Mathematics 2C and 185. Recommended: a short course in FORTRAN programming (may be taken concurrently); Mechanical Engineering 185. General equations of motion, momentum, and energy. Stream functions; velocity potential; conformal mapping. Direct solutions for irrotational flow around bodies and in conduits; gravitational effects. To be offered in even-numbered years.

Mr. Strelkoff

279. Advanced Mechanics of Fluids. (4) I.

Lecture—4 hours. Prerequisite: Mathematics 2C and Mechanical Engineering 185. Rotational flows. Navier-Stokes equations and solutions for laminar, viscous flows; turbulent flow

and Reynolds equations, isotropy simplification, diffusion, phenomenological theories; the boundary layer approximation. Mr. Strelkoff

290. Seminar. (1) III.

Seminar—1 hour. Discussion of current graduate research, and guest lectures on recent

advances. Oral presentation of individual study. The Staff

298. Group Study. (1-5) I, II, III.

Lecture—1-5 hours.

The Staff

299. Research. (1-12) I, II, III.

The Staff

ENGINEERING: ELECTRICAL

Ronald F. Soohoo, Ph.D., *Chairman of the Department*

Department Office, 228 Walker Engineering Building

Professors:

John B. Powers, Ph.D.
Ronald F. Soohoo, Ph.D.

Associate Professor:

Jack W. LaPatra, Ph.D.

Assistant Professors:

Vidal R. Algazi, Ph.D.
Verne R. Brown, Ph.D.
Robert B. Green, Ph.D.
Tien C. Hsia, Ph.D.
Victor R. Latorre, Ph.D.
Herschel H. Loomis, Jr., Ph.D.
Earle W. Owen, Ph.D.

Upper Division Courses

160A. Electronics. (3) II, III.

Lecture—3 hours. Prerequisite: course 160. Analysis of linear amplifiers; single stage and multistage amplifiers, tuned amplifiers, oscillators. Mr. Latorre

160B. Electronics. (3) I, III.

Lecture—3 hours. Prerequisite: course 160A. Nonlinear electronic circuits; large signal amplifiers, oscillators, and switching circuits. Mr. Powers

161A. Electronics Laboratory. (2) II, III.

Laboratory—6 hours. Prerequisite: Engineering 100 (may be taken concurrently), 101 Properties of transistors and vacuum tubes. Small signal single stage and multistage resistance coupled and transformer coupled class A amplifier. Mr. Latorre

161B. Electronics Laboratory. (2) I, III.

Laboratory—6 hours. Prerequisite: course 161A. Tuned amplifiers and oscillators. Switching circuits and large signal amplifiers. Mr. Hsia

162. Network Analysis. (3) I.

Lecture—3 hours. Prerequisite: course 182. Topics in modern network analysis, including two-port networks, matrix methods, graph theory, non-linear circuits, and computer solutions. Mr. LaPatra

163. Data Systems. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 107. Theoretical and practical aspects of data systems; Boolean algebra; switching circuits; sequential machines; computer systems organization; laboratory investigation of switching circuits and sequential machines including design and construction of computer functional parts. Mr. Loomis

164. Random Signals and Noise. (4) III.

Lecture—4 hours. Prerequisite: course 182 or equivalent. Signal analysis, including the mathematical representation of non-random and random signals; probability correlation applications to digital and analog communications systems. Mr. Algazi

165A. Solid State Electronics. (3) I.

Lecture—3 hours. Prerequisite: Physics 121. Electric and magnetic properties of solids. Topics discussed include electrical conductivity, dielectric constant, and various types of magnetism in solids. Mr. Soohoo

165B. Solid State Electronics. (3) II.

Lecture—3 hours. Prerequisite: course 165A. Electrical characteristics of dielectric and semiconducting materials, with application to such solid state electronics devices as transistors, tunnel diodes, parametric amplifiers, and their associated circuits. Mr. Soohoo

165C. Solid State Electronics. (3) III.

Lecture—3 hours. Prerequisite: course 165A. Characteristics of magnetic materials, with application to such magnetic devices as ferrite cores, thin films, and their associated computer memory and logic circuits. Mr. Soohoo

166. Physical Electronics. (3) I, II.

Lecture—3 hours. Prerequisite: Physics 121. Motion of charges through vacuum, gases and solids. Topics include discussion of vacuum tubes, gaseous electronic and semiconductor devices, and magnetic materials. Mr. Soohoo

167. Network Synthesis. (3) II.

Lecture—3 hours. Prerequisite: course 182. An introduction to modern network synthesis

techniques. Topics include one- and two-port networks, approximation problems, realization procedures, and filter theory. Mr. LaPatra

169. High Frequency Laboratory. (2) I, II.

Laboratory—6 hours. Prerequisite: course 181B. Steady-state and transient transmission line behavior; wave propagation in linear and non-linear artificial lines; rudimentary experiments with reflex klystrons and wave guides.

Mr. Green

170. Communications Systems. (3) I, III.

Lecture—3 hours. Prerequisite: course 160B. Introduction to information transmission systems; response of networks and systems to signals; modulation and demodulation; sampling and pulse modulation. Mr. Loomis

171A. Electromagnetic Fields and Waves. (3) I.

Lecture—3 hours. Prerequisite: course 181B. Maxwell's equations and the derivation of high frequency circuit concepts from these field equations; the skin effect. Mr. Powers

171B. Electromagnetic Fields and Waves. (3) II.

Lecture—3 hours. Prerequisite: course 171A. Propagation and reflection of electromagnetic waves and their application to transmission lines and wave guides. Mr. Latorre

171C. Electromagnetic Fields and Waves. (3) III.

Lecture—3 hours. Prerequisite: course 171B. The behavior of resonant cavities, microwave networks, radiation, and antennas. Mr. Green

180. Instrumentation Systems. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 107. Analytical and design methods common to all instrumentation systems; statistical methods; dynamic response, transducers; signal conditioning. Mr. Owen

181A. Introduction to Field Theory. (3) I, II.

Lecture—3 hours. Prerequisite: Mathematics 2C. Use of vector calculus in the description of steady potential and solenoidal fields with illustration in gravitational, electrostatic, thermal, thermodynamic, elastic and fluid domains.

Mr. Powers

181B. Introduction to Field Theory. (3) II, III.

Lecture—3 hours. Prerequisite: course 181A. Oscillations and wave propagation on transmission lines, static electric and magnetic fields, potential concepts and solution of Laplace's equation, solution of wave equation and application to elementary wave guide problems.

Mr. Green

182. Linear Systems Analysis. (3) II, III.

Lecture—3 hours. Prerequisite: Engineering 107. The use of operational mathematics in the analysis of lumped parameter systems. Topics include the Laplace transform, Fourier methods,

singularity functions, and the convolution integral. Mr. Algazi

187A. Control Systems. (3) II.

Lecture—3 hours. Prerequisite: course 182. Design and analysis of closed loop automatic control systems. Examples are drawn from all engineering fields. The mathematical representation of systems; frequency and s-plane methods; stability criteria; application of analog computers; introduction to non-linear systems.

Mr. Owen

187B. Control Systems. (3) III.

Lecture—3 hours. Prerequisite: course 187A. Design and analysis of closed loop automatic control systems. Examples are drawn from all engineering fields. The mathematical representation of systems; frequency and s-plane methods; stability criteria; application of analog computers; introduction to non-linear systems.

Mr. Owen

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: senior standing in engineering with at least a B average. Group study of selected topics. Students may enroll in one or more separate subjects. The Staff

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Prerequisite: consent of the instructor.

The Staff

Graduate Courses

210A. Advanced Electromagnetic Theory. (3) I.

Lecture—3 hours. Prerequisite: course 171C or equivalent. The exact formulation of electromagnetic problems by using vector potentials and Green's functions. Applications of these techniques to radiation and transmission problems.

Mr. Green

210B. Advanced Electromagnetic Theory. (3) II.

Lecture—3 hours. Prerequisite: course 210A. Advanced topics in propagation such as propagation through anisotropic media, duct theory of propagation over the earth, ray tracing through the ionosphere.

Mr. Green

210C. Advanced Electromagnetic Theory. (3) III.

Lecture—3 hours. Prerequisite: course 210A. Advanced topics in radiation and scattering such as reception of statistically varying signals, diffracted ray theory, and quasi static solutions.

Mr. Green

260A. System Analysis. (3) I.

Lecture—3 hours. Prerequisite: course 182. Properties of systems and their mathematical characteristics; state space concepts, matrix methods; multivariable systems, time-invariant systems, time varying systems, discrete time systems; real time analysis, frequency methods, the identification problem, adaptive systems.

Mr. Hsia

260B. System Analysis (3) II.

Lecture—3 hours. Prerequisite: course 260A. Continuation of course 260A. Mr. Owen

261. Nonlinear Control Systems. (3) I.

Lecture—3 hours. Prerequisite: course 187A or equivalent. Techniques for solving nonlinear control problems; state space methods, stability theorems; Lyapunov's methods; sinusoidal describing function and on-off systems. Mr. Owen

262. Control System Optimization. (3) III.

Lecture—3 hours. Prerequisite: course 187A or equivalent. Optimization of systems by the adjustment of parameters; deterministic inputs, stochastic inputs. Optimization of systems by the calculus of variations: Pontryagin's maximum principle, Bellman's principle of optimality. Mr. Hsia

263A–263B. Theory of Automata. (3–3) II–III.

Lecture—3 hours. Prerequisite: course 163 or equivalent. Theory of finite and infinite automata including advanced topics in computer design; finite-state machines, the state assignment problem, questions of synchronization, delay and relay of operation. Turing machines and computability; reliability. Mr. Loomis

264A. Noise, Communication and Information Theory. (3) I.

Lecture—3 hours. Prerequisite: course 164 or equivalent. Fundamentals of the theory of random processes pertinent to communications, control and other physical applications. Review of probability theory. Characterization of random processes. Correlation functions and power spectra. Linear and nonlinear operations on random processes. Mr. Algazi

264B. Noise, Communication and Information Theory. (3) II.

Lecture—3 hours. Prerequisite: course 264A. Application of statistical techniques to the areas of detection, estimation, and modulation theory. Detection problem and application to radar and digital communication. Estimation theory for signals described by finite parameter sets. Linear and non-linear modulation and efficient demodulators. Mr. Algazi

264C. Noise, Communication and Information Theory. (3) III.

Lecture—3 hours. Prerequisite: course 264A. Information theory and coding. Definition of a measure of information and study of its properties. Introduction to channel capacity and error free communications over noisy channels. Encoding and decoding of data for transmission over noisy channels. Mr. Algazi

265A. Applied Solid State Physics. (3) I.

Lecture—3 hours. Prerequisite: course 165C or equivalent. The physics of solids relevant to solid state applications. Topics include classical statistics, band theory of solids, electric polarization, conductivity, and magnetism in solids. Mr. Brown

265B. Applied Solid State Physics. (3) II.

Lecture—3 hours. Prerequisite: course 265A. The theory of semiconductors with application to transistors. Topics include electrons, holes, mobility, and transistor circuitry. Brief discussion of superconductivity and superconducting solenoids. Mr. Brown

265C. Applied Solid State Physics. (3) III.

Lecture—3 hours. Prerequisite: course 265A. The theory of magnetism in solids, with application to ferromagnetic devices and circuits. Topics include paramagnetism, ferromagnetism, magnetic resonance, and switching properties of individual magnetic elements and magnetic arrays. Mr. Brown

266A. Microwave and Quantum Electronics. (3) I.

Lecture—3 hours. Prerequisite: courses 169 and 171C. Interaction between electromagnetic fields and the electron charge and spin. Topics include Lorentz force law, energy levels in matter, Zeeman splitting, magnetic resonance and relaxation, and the absorption and radiation of electromagnetic energy. Mr. Soohoo

266B. Microwave and Quantum Electronics. (3) II.

Lecture—3 hours. Prerequisite: course 266A. Theory of interaction between electromagnetic fields and the electronic charge, with applications to microwave tubes and plasmas. Beam formation, velocity, and density modulation, plasma oscillation, space charge wave propagation in klystrons. Mr. Soohoo

266C. Microwave and Quantum Electronics. (3) III.

Lecture—3 hours. Prerequisite: course 266A. Theory of interaction between electromagnetic fields and the electron-spin, with applications to quantum oscillators and amplifiers such as masers and lasers. Mr. Soohoo

267A. Network Theory. (3) I.

Lecture—3 hours. Prerequisite: course 167 or equivalent. Advanced topics in network analysis such as time-varying parameters, distributed circuits, matrix methods, non-linear circuits, and computer methods. Mr. LaPatra

267B. Network Theory. (3) II.

Lecture—3 hours. Prerequisite: course 267A. The graph theory approach to networks. Graphic theoretic concepts as applied to analysis and synthesis problems. Mr. LaPatra

267C. Network Theory. (3) III.

Lecture—3 hours. Prerequisite: course 267A. Advanced topics in network synthesis such as approximation techniques, n-port realizations, driving point and transfer function realizations, and active synthesis. Mr. LaPatra

290. Seminar. (1) I, II, III.

Seminar—1 hour. Discussion of current research. Written and oral reports will be given. The Staff

298. Group Study. (1-5) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

ENGINEERING: MECHANICAL

Warren H. Giedt, Ph.D., *Chairman of the Department*

Department Office, 224 Walker Engineering Building

Professors:

Clyne F. Garland, M.S.

Warren H. Giedt, Ph.D.

Associate Professors:

Charles W. Beadle, Ph.D.

Harry Brandt, Ph.D.

John D. Kemper, M.S.

Allan A. McKillop, Ph.D.

Assistant Professors:

Jerald M. Henderson, D.Eng.

Alan T. McDonald, Ph.D.

Paul S. Moller, Ph.D.

Donald W. Moon, Ph.D.

An Tzu Yang, Ph.D.

**Lecturer:**

Arthur S. Leonard, M.S.

Upper Division Courses**111. Engineering Principles Laboratory. (4) III.**

Discussion—2 hours; laboratory—4 hours. Prerequisite: Engineering 103A, 104A, 105B. Experimental investigation of the steady state and transient behavior of thermal, mechanical, structural, and fluid systems. Mr. Brandt

114. Kinematics of Mechanisms. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 102B. Classification of kinematic elements and mechanisms; graphical and analytical determination of displacements, velocities, and accelerations within planar mechanisms involving turning, sliding, and higher pairs. Kinematic design of cams, gears, and gear trains; intermittent-motion mechanisms. Mr. Yang

115. Dynamics of Machinery. (3) II.

Lecture—3 hours. Prerequisite: course 114. Analysis of dynamic response of machine elements such as cams, springs, gears, and links, with emphasis on high speed operation; gyroscopic forces in machines; balancing of machinery; introduction to dynamics of feedback control systems. Mr. Yang

118. Mechanical Design. (3) I.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 104B; course 121 recommended. Application of the principles of engineering mechanics in the design of mechanical components, with special emphasis on stress concentration, theories of failure, fatigue, and fluctuating stresses. Mr. Kemper

120. Advanced Mechanical Design. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 118. Continuation of course 118, with special emphasis on advanced design analysis; application of two-dimensional theory of elasticity to stress analysis; contact stresses; thermal stresses; elastic impact; creep; hydrodynamic lubrication and bearing design. Mr. Yang

121. Manufacturing Methods. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 104A. Introduction to the methods employed in modern manufacturing, with particular emphasis on the interrelationships between engineering design and manufacturing methods. Introduction to the theoretical basis of metal forming. Mr. Kemper

122. Introduction to Mechanical Vibrations. (3) I.

Lecture—3 hours. Prerequisite: Engineering 102B. Free and forced vibrations in lumped-parameter systems with and without damping; vibrations in coupled systems; electromechanical analogs; use of energy conservation principle. Mr. Kemper

123A. Experimental Engineering. (2) I, II.

Laboratory—6 hours. Prerequisite: senior standing in engineering. Projects chosen to acquaint students with experimental methods in fluid mechanics, heat transfer, thermodynamics, and energy conversion. Mr. Henderson

123B. Experimental Engineering. (2) I, III.

Laboratory—6 hours. Prerequisite: senior standing in engineering. Projects chosen to acquaint students with experimental methods in mechanical design, stress analysis, vibrations, elasticity and plasticity. Mr. Henderson

124. Engineering Systems Design. (3) III.

Lecture—3 hours. Prerequisite: senior standing in engineering. Synthesis of the several fields of engineering, with applications in the design of systems.

Mr. McKillop

125. Mechanics of Compressible Fluids. (3) III.

Lecture—3 hours. Prerequisite: Engineering 103B. Introductory concepts of compressible flow. Isentropic flow; normal shock waves; frictional and diabatic flow; generalized one-dimensional continuous flow.

Mr. Moller

127. Aerodynamics. (3) I.

Lecture—3 hours. Prerequisite: Engineering 103B. Lift and drag; aerodynamic load distributions; thin aerofoil and slender body theory; boundary layer control; compressibility effects; mutual interference; static and elementary dynamic stability; propulsion.

Mr. Moller

128. Aerospace Design. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 127; Engineering 104B. Design of aircraft and missile systems; influence of aerodynamic and inertial loading on structural integrity; guidance and control.

Mr. Moller

130A. Intermediate Thermodynamics. (3) I.

Lecture—3 hours. Prerequisite: Engineering 105B. Real gases. General equations of equilibrium; thermodynamic properties of fluids; vaporization and condensation.

Mr. Giedt

130B. Intermediate Thermodynamics. (3) II.

Lecture—3 hours. Prerequisite: course 130A. Introduction to kinetic theory of gases. High temperature effects; dissociation and combustion. Non-steady state processes.

Mr. Giedt

135. Aircraft and Rocket Propulsion. (4) III.

Lecture—4 hours. Prerequisite: Engineering 103B, 105B. Principles of fluid propulsion and propulsive efficiency of air-breathing systems. Principles of rocket propulsion. Dynamics of launch in gravitational field and with air drag; thrust programming; and multistaging. Satellite orbital mechanics and interplanetary flight.

Mr. Leonard

140. Engineering Physical Metallurgy. (3) II.

Lecture—3 hours. Prerequisite: senior standing in engineering, or consent of instructor. Principles of treatment of metals to alter their properties for specific applications in engineering. Ferrous and non-ferrous metals and alloys will be considered.

Mr. Moon

142. Crystal Structure and X-Ray Diffraction. (3) I.

Lecture—3 hours. Prerequisite: Engineering 45. Crystallography, including crystal structure and symmetry operations. Stereographic projection. Reciprocal lattice. Physics of X-rays.

Theory of diffraction for X-rays, electrons and neutrons.

Mr. Moon

184. Experimental Stress Analysis. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 104B. Experimental methods for the analysis of stress and strain, including photoelasticity, brittle lacquers, mechanical and electrical strain gages. Analog methods and principles of similitude for loaded structural models.

Mr. Beadle

185A. Intermediate Fluid Mechanics. (3) I, III.

Lecture—3 hours. Prerequisite: Engineering 103B. Formulation of continuity, momentum, and energy equations; applications to control volumes; two-dimensional and axially symmetric potential flows.

Mr. McDonald

185B. Intermediate Fluid Mechanics. (3) I, II.

Lecture—3 hours. Prerequisite: course 185A. Incompressible flows of real fluids; Navier-Stokes equations; unsteady flows in conduits and open channels; flow around immersed bodies; one-dimensional compressible flow.

Mr. McDonald

188. Engineering Materials. (3) III.

Lecture—3 hours. Prerequisite: Engineering 45; Mathematics 2C. Characteristics of engineering materials including metals and natural and synthetic organic materials. Illustrations for engineering design.

Mr. Moon

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Prerequisite: consent of the instructor.

The Staff

Graduate Courses**203A-203B. Convective Heat Transfer. (3-3) II-III.**

Lecture—3 hours. Prerequisite: course 210A; Engineering 186; or Chemical Engineering 253A. Analysis of heat and momentum transfer by forced and natural convection during laminar and turbulent flow; discussion of allied topics in heat transfer.

Mr. McKillop

204. Heat Conduction. (3) I.

Lecture—3 hours. Prerequisite: Engineering 180, 186. Steady-state and transient problems in heat conduction, using both mathematical and numerical methods of solution.

Mr. Giedt

205. Thermal Radiation. (3) I.

Lecture—3 hours. Prerequisite: Engineering 186, or consent of the instructor. The transfer of radiant energy. Geometrical and spectral characteristics of systems involving thermal radiation. Gaseous radiation.

Mr. Brandt

210A. Boundary Layer Theory. (3) I.

Lecture—3 hours. Prerequisite: course 185B or consent of the instructor; Mathematics 2C. Introduction to boundary layer theory. Boundary

layers for two-dimensional flow. Similarity solutions of boundary layer equations. Axially symmetrical and three-dimensional boundary layers.

Mr. Brandt

210B. Boundary Layer Theory. (3) II.

Lecture—3 hours. Prerequisite: course 210A, or consent of the instructor. Non-steady state boundary layers. Approximate methods for solution of boundary layer equations. Boundary layers in compressible flow. Turbulent boundary layers along a flat plate. Turbulent boundary layers with positive and negative pressure gradients.

Mr. Brandt

211. Turbulence. (3) III.

Lecture—3 hours. Prerequisite: course 210B. Methods of description and basic equations of turbulent flow; isotropic and homogeneous turbulence; phenomenological theories; wall turbulence; boundary layer calculations; transition; jets and wakes.

Mr. McDonald

212. Gas Dynamics. (3) II.

Lecture—3 hours. Prerequisite: courses 125 and 185B. Unsteady motion in one dimension; supersonic flow of real gases with viscosity and heat conductivity; mixed flow; small perturbation theory; method of characteristics; oblique shocks; similarity rules; experimental methods.

Mr. Moller

220A-220B. Mechanical Vibrations. (3-3) II-III.

Lecture—3 hours. Prerequisite: course 122. Applications of vibration theory to systems with many degrees of freedom and continuous systems. Oscillations in systems having nonlinear characteristics. Self-excited oscillations. Response curves and stability considerations.

Mr. Kemper

222. Advanced Dynamics. (3) I.

Lecture—3 hours. Prerequisite: Engineering 102B. Kinematics of rigid body motion: properties of transformation matrices, Eulerian angles,

ENGLISH

Robert A. Wiggins, Ph.D., *Chairman of the Department*

¹Brom Weber, Ph.D., *Vice-Chairman of the Department*

Department Office, 224 Sproul Hall

Professors:

- Everett Carter, Ph.D.
- Solomon Fishman, Ph.D.
- Thomas A. Hanzo, Ph.D.
- Gwendolyn B. Needham, Ph.D.
- William V. O'Connor, Ph.D.
- Linda Van Norden, Ph.D.
- Brom Weber, Ph.D.
- Robert A. Wiggins, Ph.D.
- James L. Woodress, Ph.D.
- Celeste T. Wright, Ph.D.

¹Absent on leave, 1966-67.

Cayley-Klein parameters. Development of principles of rigid body dynamics: Newtonian formulation, D'Alembert's principle, Lagrange's equations, Hamilton's principles. Gyroscopes, Engineering applications.

Mr. Beadle

223. Advanced Kinematic Analysis. (3) I.

Lecture—3 hours. Prerequisite: course 115. Advanced kinematic analysis of planar mechanism, poles and centrododes, Euler-Savary equation, inflection circle, curvative theory, Bobillier's construction, Hartmann's construction. Four-bar coupler-point curves.

Mr. Yang

224. Kinematic Synthesis of Mechanisms. (3) II.

Lecture—3 hours. Prerequisite: course 115. Introduction to curve and function synthesis. Chebychev's theorem. Structure errors. Complex number methods. Geometrical synthesis using poles, pole paths, and center point curves. Burmester's theorem.

Mr. Yang

225. Spatial Mechanisms. (3) III.

Lecture—3 hours. Prerequisite: courses 115 and 223. Constraints and pairing in spatial mechanisms. Analysis of spatial mechanisms; application of vector, dual number, dual vector, matrix, quaternions, and associated computer methods. Synthesis of spatial mechanisms for path and function generation.

Mr. Yang

240. Theory of Crystal Dislocations. (3) II.

Lecture—3 hours. Prerequisite: course 142, Engineering 187, or consent of instructor. Edge, screw and mixed dislocation concepts. The stress field and energy of dislocations. Force on a dislocation. Motion of dislocations and its relation to plastic deformation. Dislocation multiplication and interaction with point, line, and surface defects.

Mr. Moon

298. Group Study. (1-5) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

Associate Professors:

- Jay L. Halio, Ph.D.
- Robert Hogan, Ph.D.
- Elizabeth R. Homann, Ph.D.
- Hilton J. Landry, Ph.D.

Assistant Professors:

- Elliot L. Gilbert, Ph.D.
- Wayne C. Harsh, Ph.D.
- John O. Hayden, Ph.D.
- Peter L. Hays, Ph.D.

Robert H. Hopkins, Ph.D.
 John L. Magnus, Ph.D.
 Lindsay A. Mann, Ph.D.
 Arthur E. McGuinness, Ph.D.
 Daniel S. Silvia, Jr., Ph.D.

◇ ◇ ◇

Assistant Professors:

Leonard Michaels, M.A. (*Acting*)
 Sarita G. Schotta, B.A., B.M. (*Acting
English and Linguistics*)

Lecturer:

Gorham B. Munson, B.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Departmental Major Advisers.—Mr. Gilbert, Mr. Halio, Mr. Harsh, Mr. Hayden, Mr. Hays, Mr. Hogan, Mrs. Homann, Mr. Magnus, Mr. Mann, Mr. McGuinness, Mrs. Needham, Mrs. Schotta, Mr. Silvia, Miss Van Norden.

The Major Program

Lower Division Courses.—Required: first year, courses 1A and 1B; second year, course 45; courses 46A, 46B, and 46C (these courses should be taken in order). Recommended: courses 30A, 30B, 30C; a course in philosophy; and a course in classics.

Upper Division Courses.—Thirty-six units of upper division courses 32 of which must be in literature, including either course 117A or 117B, 12 units of courses in literature prior to 1800, and 12 units of literature after 1800. The remaining 4 units may be either in literature or in one of the following language and creative writing courses: 100A, 100B, 105. Recommended: a course in English history.

Teaching Major.—The English teaching major in the teacher-training curriculum requires not only the departmental major but also courses 103, 105A, 105B, and 300 (which counts as 3 units of credit in education). Although these courses may be postponed to the fifth year, course 105A should be taken before course 300.

Teaching Minor.—The teaching minor consists of 32 units, including courses 45, 46A, 46B, 46C, either 30B or 30C, and at least 12 units of upper division work including English 103, 117A or 117B, and 155B or 155C. Course 300 (which counts as 3 units of credit in education) must be taken in the senior or postgraduate year. Recommended in addition to the required 32 units, especially in preparation for course 300: course 105A. *Subject Representative:* Mr. Harsh.

Foreign Languages.—Students who contemplate advanced study in English at Davis should keep in mind the following foreign-language re-

quirements for higher degrees: a reading knowledge of French or German for the M.A.; of French, German, and Latin for Ph.D.

Honors and Honors Program.—See page 95.

Graduate Study.—The Department of English offers programs of study and research leading to the M.A. and Ph.D. degrees. Detailed information may be obtained from the Chairman of the Department.

Lower Division Courses

1A-1B. First-Year Reading and Composition.

(4-4) I, II, III.

Lecture—2 hours; discussion—2 hours. Principles of expository writing. Analysis and evaluation of various kinds of written discourse.

The Staff

20. Intermediate Composition. (4) I, III.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1B. Designed primarily for non-majors who wish to improve their skills in expository writing; the content of the course includes basic principles of rhetoric and rules of usage in present-day English.

Mr. Mann, Mr. Hopkins

25. English for Foreign Students. (4) I.

Lecture—discussion—4 hours. For foreign students only. Required of those who do not pass the examination in English.

Mrs. Schotta

26. English for Foreign Students. (4) II.

Lecture—discussion—4 hours. Continuation of course 25; required of those who have taken course 25.

Mr. Harsh

30A. Survey of American Literature. (4) I.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1A. American literature from its seventeenth-century beginnings to 1830.

Mr. Wiggins

30B. Survey of American Literature. (4) II.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1A. Nineteenth-century American literature from 1830 to 1900.

Mr. Wiggins

30C. Survey of American Literature. (4) III.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1A. American literature in the twentieth century.

Mr. Wiggins

45. Critical Reading of Poetry. (4) I, II, III.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1B. Close reading of selections from English and American poetry. Frequent written exercises.

Mr. Landry, Mr. McGuinness, Mr. Magnus

46A. Masterpieces of English Literature. (4) I.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1A. Selected works of principal writers to 1640. The history of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms.

Mr. McGuinness

46B. Masterpieces of English Literature. (4) II.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1A. Selected works of principal writers from 1640 to 1800. The history of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms.

Mr. Hopkins

46C. Masterpieces of English Literature. (4) III.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1A. Selected works of principal writers from 1800 to the present. The history of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms.

Mr. Michaels

47. Introduction to Modern Literature. (4) II.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 1A. Chief twentieth-century writers of England and America. Mr. Hanzo

Upper Division Courses**100A. Creative Writing. (4) I.**

Lecture—3 hours. Prerequisite: course 1B; sophomores may enroll with consent of instructor.

Mr. Michaels

100B. Creative Writing. (4) II.

Lecture—3 hours. Prerequisite: course 1B; course 100A recommended. Sophomores may enroll with consent of instructor.

Mr. Michaels

100C. Creative Writing. (4) III.

Lecture—3 hours. Prerequisite: course 1B; course 100B recommended; sophomores may enroll with consent of instructor.

103. Advanced Composition. (4) I, II, III.

Lecture—3 hours. Prerequisite: course 1B; required of prospective high school English teachers. Survey of prose styles, the principles of prose rhetoric, and the usage patterns of present-day English grammar. Frequent written composition stressing the principles studied.

Mr. Harsh, Mr. Silvia

105A. Language. (4) I.

Lecture—3 hours. Prerequisite: course 1B. Present-day English grammar and pronunciation according to the perspectives of traditional grammar and contemporary linguistics. Preparation for stylistic analysis and historical study of English language and literature. Required of prospective English teachers.

Mrs. Schotta

105B. Language. (4) II.

Lecture—3 hours. Prerequisite: course 1B. History of the English language. Examination of the language as recorded in literary texts from Old English to present-day English. Relationship of English to other languages; development of vocabulary, phonology, and grammatical patterns. Required of prospective English teachers.

Mr. Harsh

***110A. Introduction to Principles of Criticism. (4) I.**

Lecture—3 hours. Prerequisite: course 45 or equivalent. Methods and assumptions of critical theory from Aristotle to the present. Emphasis on major contributions to the history of literary criticism.

Mr. Fishman

***110B. Introduction to Principles of Criticism. (4) II.**

Lecture—3 hours. Prerequisite: course 45. Continuation of 110A.

Mr. Fishman

111. Old English and Early Medieval Literature. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Major types, traditions, and conventions of literature in England from the time of *Beowulf* to the late medieval romances, with special emphasis on the heroic strain, courtly love and its impact, and the development of Arthurian literature. Mostly in translation.

Mr. Silvia

112. The Age of Chaucer. (4) II.

Lecture—3 hours. Prerequisite: course 1A. The literary, religious, and social movements of the later fourteenth century in England as they are reflected in the writings of Chaucer, Langland, the *Gawain* poet, and their contemporaries; the fifteenth-century Chaucerians.

Mr. Silvia

113. Chaucer. (4) III.

Lecture—3 hours. Prerequisite: course 1A. *Troilus and Criseyde*, selected *Canterbury Tales*; central ideas in the fourteenth century.

Mr. Silvia

115. The English Renaissance. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Selected poetry and prose: More, Spenser, Hooker, Bacon, and others. The New Learning; the Reformation; psychological and moral concepts of the age.

Mr. Landry

116. The Age of Elizabeth. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Poetry of Marlowe, Shakespeare, Sidney and others; fiction of Gascoigne, Lyl, Lodge; representative plays.

Mr. Landry

117A. Shakespeare. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Selected major works.

Mr. Halio

117B. Shakespeare. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Continuation of 117A.

Mr. Halio

120. Earlier Seventeenth-Century Prose. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Bacon, Browne, and Hobbes. Sermon literature, religious and philosophical prose, and the development of prose style; the art and theory of translation, evolution of literary criticism and critical theory, emergence of the essay.

Mr. Mann

Blake, Burns, Wordsworth, Coleridge, Scott; the eighteenth-century background and the development of Romantic concepts of the imagination.

Mr. Hayden

132. Later Romantic Literature. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Byron, Shelly, Keats. Individualism and revolt.

Mr. Michaels

121. Earlier Seventeenth-Century Poetry. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Donne, Jonson, Herbert, and Marvell. The metaphysical style, its influence and history; religious poetry; the cavalier poets; the early neoclassicists.

Mr. Mann

122. Milton. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Selected major works, including *Paradise Lost*.

Mr. Mann

123. Dryden and His Contemporaries. (4) III.

Lecture—3 hours. Prerequisite: course 1A. The Restoration in English Literature; Neoclassicism, Ancients versus Moderns, Pyrrhonism, the New Philosophy. Drama, criticism, and satire. Emphasis on the work of John Dryden.

Miss Van Norden

125A. The Age of Swift and Pope: Prose and Drama. (4) I.

Lecture—3 hours. Prerequisite: course 1A. The Augustan Age: the nature of man and society—reason, satire, sentiment, and reform. Readings in Swift, Defoe, Addison, Steele, and others.

Mr. Hopkins

125B. The Age of Swift and Pope: Poetry and Criticism. (4) II.

Lecture—3 hours. Prerequisite: course 1A. The Augustan Age: neoclassical rules and forms, judgment and imagination, satire and song in poetry and criticism. Readings in Pope, Gay, Addison, Prior, Thomson, and others.

Mr. Hopkins

127. Johnson and His Contemporaries. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Sense and Sensibility in poetry, biography, journals, fiction, comedy, and criticism. Readings in Johnson, Boswell, Goldsmith, Fielding, and others.

Mr. McGuinness

128. Prose and Poetry of the Later Eighteenth Century. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Sense and Sensibility in criticism, history, philosophy and the novel. Readings in Hume, Burke, Gibbon, Sterne, Cowper, and others. The mysticism of Blake.

Mr. McGuinness

130. Early Romantic Literature. (4) I.

Lecture—3 hours. Prerequisite: course 1A.

Blake, Burns, Wordsworth, Coleridge, Scott; the eighteenth-century background and the development of Romantic concepts of the imagination.

Mr. Hayden

132. Later Victorian Literature. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Tennyson, Browning, Arnold, and selected prose writers. The Victorian temper; the individual and society; the search for faith. The impact of scientific thought upon creative thinkers.

Mr. Gilbert

134. Later Victorian Literature. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Ruskin, Hardy, Hopkins, and others. The Oxford movement; the Pre-Raphaelites; art and sociology; aestheticism and decadence; pessimism. Tendencies continuing into the Edwardian period.

Mr. Gilbert

136. British Literature from 1880 to 1918. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Yeats, Conrad, Joyce. Aestheticism, naturalism, symbolism, and impressionism. The transition from Victorian to twentieth-century styles and attitudes.

Mr. Fishman

***137. British Literature from 1918 to 1940. (4) II.**

Lecture—3 hours. Prerequisite: course 1A. Lawrence, Eliot, Forster, and others. Post-war attitudes. Modern psychology and the awareness of myth.

Mr. Hanzo

***138. British Literature from 1940 to the Present. (4) III.**

Lecture—3 hours. Prerequisite: course 1A. Literature of England and Ireland from World War II to the present. Major themes in the novel, poetry, and short story.

Mr. O'Connor

140. Origins of American Literature. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Seventeenth-century American literature; special attention to European literary-intellectual traditions, dominant American forms (poem, sermon, history), and major writers (Ann Bradstreet, Edward Taylor, and others).

Mr. Weber

141. The American Enlightenment and Its Reaction. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Eighteenth-century American literature; rise of neoclassicism, liberal religion, popular literature, scientific thought, satiric temper; decline of Puritan traditions; major writers, including Franklin, Edwards, Freneau, and Brackenridge.

Mr. Woodress

* Not to be given, 1966-67.

142. Early Nineteenth-Century American Literature.

(4) III.

Lecture—3 hours. Prerequisite: course 1A. Beginnings of American romanticism; sentimentalism. Gothic vogue, cultural nationalism, Southwestern humor; prose and poetry of Brown, Bryant, Irving, Cooper, Poe, and Longstreet.

143. Transcendentalism and Its Reaction. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Flowering of American romanticism; the metaphysical tradition, Oriental and European antecedents, philosophical idealism, and literary achievement of Transcendentalism (Emerson, Thoreau, Whitman); the critical tempers of Hawthorne and Melville; Emily Dickinson.

Mr. Magnus

144. American Literature from 1865 to 1914. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Religion, local color, social criticism, naturalism, *fin de siècle* aestheticism; Twain, James, Crane, Dreiser, Wharton.

Mr. Carter

146. Modern American Literature: 1914 to 1940.

(4) III.

Lecture—3 hours. Prerequisite: course 1A. The Modernist movement, disillusionment, artistic experimentalism, classical revival, New Criticism, proletarian literature, romantic nationalism, European currents, Pound, Eliot, Frost, Hemingway, Fitzgerald, Crane, Faulkner, and Stevens.

Mr. Hays

147. Modern American Literature: 1940 to the Present. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Contemporary fiction, poetry, and drama. The impact of World War II on the younger writers; experimentation and formalism in poetry and the drama.

Mr. Weber

150A. English Drama to Marlowe. (4) I.

Lecture—3 hours. Prerequisite: course 1A. The development of the drama from its beginnings to the Renaissance. Miracle and mystery plays; the morality tradition. Early comedy, tragedy, and chronicle plays.

Mrs. Homann

150B. English Drama from Marlowe to 1642. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Shakespeare's contemporaries in the drama, including Webster, Jonson, Beaumont and Fletcher, and others. The revenge play and tragicomedy; post-Shakespearean development of dramatic action and blank verse.

Mrs. Wright

150C. English Drama from 1642 to 1890. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Restoration comedy, eighteenth-century sentimental comedy, and nineteenth-century melo-

drama, with particular attention to plays of Congreve, Sheridan, and Boucicault.

Mr. Hogan

150D. British Drama from 1890 to the Present.

(4) I.

Lecture—3 hours. Prerequisite: course 1A. The rise of dramatic realism; the chief reactions against it; emphasis on Shaw, O'Casey, and Osborne.

Mr. Hogan

152. American Drama from its Beginnings to the Present. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Critical and historical survey of drama in America from its eighteenth-century origins with emphasis on Boucicault, Rice, O'Neill, Williams, and Miller.

Mr. Hogan

155A. The English Novel: 1700–1770. (4) I.

Lecture—3 hours. Prerequisite: course 1A. Realism and the rise of the modern novel. Defoe, Richardson, Fielding, Sterne, and Smollett.

Mr. Hopkins

155B. The English Novel: 1770–1850. (4) II.

Lecture—3 hours. Prerequisite: course 1A. Sense and Sensibility in the novel. Walpole, Radcliffe, Austen, Scott, Dickens, Bronte sisters.

Mrs. Needham

155C. The English Novel: 1850–1900 (4) III.

Lecture—3 hours. Prerequisite: course 1A. Major Victorian novelists: their theory and practice. Dickens, Thackeray, Trollope, Eliot, Meredith, and Hardy.

Mr. Gilbert

***155D. The English Novel: 1900 to the Present. (4) I.**

Lecture—3 hours. Prerequisite: course 1A. Major figures including Conrad, Joyce, and Lawrence. Impressionism, the revolt against naturalism; the experimental novel; the anti-modernist reaction.

Mr. Fishman

158A. The American Novel to 1900. (4) II.

Lecture—3 hours. Prerequisite: course 1A. The rise and development of the American novel from its eighteenth-century beginnings; Cooper, Hawthorne, Melville, Howells, Twain, James, Crane.

Mr. Magnus

158B. The American Novel from 1900 to Present.

(4) III.

Lecture—3 hours. Prerequisite: course 1A. Major American novelists of the twentieth century. Wharton, Dreiser, Faulkner, Hemingway, Fitzgerald, Bellow.

Mr. Hays

160. The English Lyric. (4) III.

Lecture—3 hours. Prerequisite: course 1A. The history of poetic style from the sixteenth to the twentieth centuries. Major examples of

* Not to be given, 1966–67.

the short poem in relation to intellectual history, to foreign influences, and to the development of poetic forms.

Mr. Landry

***170A. The Epic. (4) II.**

Lecture—3 hours. Prerequisite: course 1A. Studies in the development of the epic.

Miss Van Norden

170B. European Influences on the English and American Novel. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Studies in the English and American novel, with special reference to continental influences.

Mr. Carter

171. English Bible as Literature. (4) III.

Lecture—3 hours. Prerequisite: course 1A. Old Testament poetry and prophecy; the Gospels and certain Epistles.

Miss Van Norden

***175. American Literary Humor. (4) I.**

Lecture—3 hours. Prerequisite: course 1A. The American humorous vision as expressed in such modes as comedy, satire, irony, and their combinations from the seventeenth century to the present, with attention given to such matters as the nature of humor and the cultural influences affecting its development.

Mr. Weber

189. Study of a Major Writer. (4) II.

Lecture—3 hours. Prerequisite: course 1A. The artistic development of one major writer and his intellectual and literary milieu. May be repeated for credit when a different writer is studied.

Mr. Landry

The Staff

194H. Special Study for Honors Students.

(2) I, II, III.

Prerequisite: honors status. Individual directed study leading to preparation of a long paper. May be repeated once for credit.

The Staff

198. Directed Group Study. (4) I, II, III.

The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses

200. Techniques of Literary Scholarship. (4) I, II.

Lecture—3 hours. The elements of bibliography with special attention to literature and discussion of the principal modes of literary investigation—critical, historical, textual, and others.

Mr. O'Connor

201. Literary Criticism. (4) II.

Lecture—3 hours. Survey of the major critics from Aristotle to the present, with emphasis on the relationship of critical theory to the history of literature.

Mr. Hayden

205. Introduction to Old English. (4) I.

Lecture—3 hours. The language of Anglo-Saxon England; readings in Old English prose and poetry.

Mr. Harsh, Mrs. Schotta

206. Beowulf. (4) II.

Lecture—3 hours. A study of the poem and the Heroic Age of Germanic literature.

Mr. Silvia

207. Middle and Early Modern English. (4) III.

Lecture—3 hours. Earlier dialects; the new vocabulary; the later sound shifts and changes to the seventeenth century. Readings in illustrative documents.

Mr. Harsh

***210. Readings in English and American Literature.**

(4) I.

Lecture—3 hours.

The Staff

***215. Arthurian Romance. (4) I.**

Lecture—3 hours. The sources of Arthurian Romantic literature; Continental and English literary treatment; Malory's synthesis; significant changes of attitudes in post-Malory literature.

Mrs. Homann

225. Modern Anglo-Irish Writers. (4) I.

Lecture—3 hours.

Mr. Hogan

230A. Studies in Major Writers: Chaucer. (4) III.

Seminar—3 hours.

Mrs. Homann

***230B. Studies in Major Writers: Milton. (4) II.**

Seminar—3 hours.

Miss Van Norden

231. American-European Literary Relations (4) I.

Lecture—3 hours. The interchange of ideas and forms between America and Europe.

Mr. Carter

232. Problems in English Literature. (4) I.

Seminar—3 hours. Selected issues in the study and critical assessment of literature. The problems will be of current interest.

The Staff

233. Problems in American Literature. (4) II.

Seminar—3 hours. Selected topics for intensive investigation.

Mr. Carter

234. Dramatic Literature. (4) III.

Seminar—3 hours. A historical introduction to dramatic theory; the genres of tragedy, comedy, and tragicomedy.

Mr. Hogan

***235. Fiction. (4) I.**

Seminar—3 hours. Theories of fiction as reflected in the practice of writers from the eighteenth century to the present.

Mrs. Needham

***236. Poetics. (4) II.**

Seminar—3 hours. Metaphor, style, and structure in English poetry from the sixteenth century to the present.

Mr. Weber

* Not to be given, 1966-67.

***237. Modern Critical Theory. (4) III.**

Seminar—3 hours. Examination of problems in the theory underlying the practice of literary criticism from I. A. Richards and T. S. Eliot to the present.
Mr. Fishman

240A-240B-240C. Medieval Literature.

(4-4-4) I-II-III.

Seminar—3 hours. Mrs. Homann

***242A-242B-242C. Sixteenth-Century Literature.**

(4-4-4) I-II-III.

Seminar—3 hours. Mr. Landry

244A-244B-244C. Shakespeare. (4-4-4) I-II-III.

Seminar—3 hours. Mr. Halio

246A-246B-246C. Seventeenth-Century Literature.

(4-4-4) I-II-III.

Seminar—3 hours. Mr. Hanzo

248A-248B-248C. Eighteenth-Century Literature.

(4-4-4) I-II-III.

Seminar—3 hours. Mrs. Needham

***250A-250B-250C. Romantic Literature.**

(4-4-4) I-II-III.

Seminar—3 hours. Mr. Fishman

***252A-252B-252C. Victorian Literature.**

(4-4-4) I-II-III.

Seminar—3 hours. Mr. Fishman

254A-254B-254C. Twentieth-Century British Literature. (4-4-4) I-II-III.

Seminar—3 hours. Mr. O'Connor

ENTOMOLOGYRichard M. Bohart, Ph.D., *Chairman of the Department*

Department Office, 124 Robbins Hall

Professors:

Oscar G. Bacon, Ph.D.
 Stanley F. Bailey, Ph.D.
 Richard M. Bohart, Ph.D.
 John E. Eckert, Ph.D. (*Emeritus*)
 Harry H. Laidlaw, Jr., Ph.D.
 William H. Lange, Jr., Ph.D.
 Leslie M. Smith, Ph.D. (*Emeritus*)
 Eugene M. Stafford, Ph.D.
 Francis M. Summers, Ph.D.

Associate Professors:

Albert A. Grigarick, Jr., Ph.D.
 Frank E. Strong, Ph.D.

Assistant Professors:

Norman E. Gary, Ph.D.

***256A-256B-256C. Early American Literature.**

(4-4-4) I-II-III.

Seminar—3 hours. Mr. Weber

***258A-258B-258C. American Literature: 1800 to the Civil War. (4-4-4) I-II-III.**

Seminar—3 hours. Mr. Seelye

260A-260B-260C. American Literature: Civil War to 1914. (4-4-4) I-II-III.

Seminar—3 hours. Mr. Woodress

262A-262B-262C. American Literature after 1914. (4-4-4) I-II-III.

Seminar—3 hours. Mr. Weber

***264A-264B-264C. Studies in Modern British and American Literature. (4-4-4) I-II-III.**

Seminar—3 hours. Mr. Hanzo

299. Individual Study. (1-4) I, II, III.

The Staff

299D. Special Study for the Doctoral Dissertation.

(1-8) I, II, III. The Staff

Professional Course**300. Problems in Teaching English Literature and Composition in Secondary Schools. (3) I, III.**

Lecture—2 hours. Prerequisite: senior or graduate standing; an English teaching major or minor. This course should be completed before practice teaching. The course is accepted in partial satisfaction of the requirement in education for the general secondary credential.
Mr. Harsh

♦ Not to be given, 1966-67.

Charles L. Judson, Ph.D.
 G. A. H. McColland, Ph.D.

◇ ◇ ◇

Professors:

Merlin W. Allen, Ph.D. (*Nematology*)
 James R. Douglas, Ph.D. (*Veterinary Microbiology*)

Lecturers:

Herman F. Beckman, Ph.D.
 Paul D. Hurd, Jr., Ph.D. (*Berkeley Campus*)
 Donald L. McLean, Ph.D.
 Jerry A. Powell, Ph.D. (*Berkeley Campus*)
Departmental Major Advisers.—See Schedule and Directory Listing.

Bachelor of Science Major Program and Graduate Study. See page 51.

Lower Division Courses

1. An Introduction to Entomology. (5) III.

Lecture—3 hours; laboratory—6 hours. A basic study of insects: their biology, anatomy, classification, and relation to human welfare.

Mr. Strong

10. Natural History of Insects. (3) I.

Lecture—3 hours. Designed for students not specializing in entomology. Not open for credit to students who have had course 1 but students who have taken course 10 may take course 1 for credit. Biology, taxonomy and behavior of insects. A cultural and technical course providing an introduction to the insects. Mr. Bacon

Upper Division Courses

101. Introduction to Structure and Function in Insects. (4) I.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 1. General principles of insect morphology with emphasis on the functional approach. Comparative anatomy of selected insect types.

Mr. Summers

102. Insect Physiology. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 1, Chemistry 8. Recommended: course 101. Vital functions of insects and related organisms.

Mr. Judson

103. Systematic Entomology. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: introductory course in zoology or entomology. The principles of taxonomy in animals; speciation; introduction to classification and nomenclature.

Mr. Bohart

104. Insect Ecology. (4) III.

Lecture—4 hours. Prerequisite: upper division standing in one of the biological sciences. Principles of ecology with examples from the insects; analysis of the insect environment; population dynamics.

Mr. Bailey

109. Field Taxonomy and Ecology. (5) Summer.

Lecture—2 hours; laboratory—24 hours. Prerequisite: an introductory course in Entomology or consent of instructor. The study of insects in their natural habitats; their identification and ecology.

Mr. Bohart, Mr. Hurd, Mr. Powell

110. Economic Entomology. (4) III.

Lecture—2 hours; laboratory—6 hours. An introductory course dealing with the identification, biology, and control of economic insects, with emphasis on those attacking agricultural crops.

Mr. Grigarick

112. Principles of Agricultural Entomology. (4) II.

Lecture—4 hours. Prerequisite: an introduc-

tory course in entomology or consent of instructor. Principles and problems in the control of insects and mites; integrated control, residues, considerations of application equipment, philosophy of sampling.

Mr. Lange

116. Biology of Aquatic Insects. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: an introductory course in entomology or consent of instructor. A study of the life histories, ecology, and identification of insects associated with streams, ponds, and lakes. Offered in even-numbered years.

Mr. Grigarick

117. Chemistry of Insecticides. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 8, or consent of instructor. Chemical composition and reactions of insecticides; their physiological effects on plant and animal tissues.

Mr. Stafford

119. Apiculture. (3) II.

Lecture—3 hours. Biology and behavior of honeybees; communication, orientation, social organization, foraging activities, honey production, pollination activities.

Mr. Laidlaw, Mr. Gary

119L. Apiculture Laboratory. (2) II.

Laboratory—6 hours. Prerequisite: course 119 (may be taken concurrently). Biology and behavior of honeybees (especially communicative behavior); fundamentals of colony management necessary for efficient agricultural use; utilization of bees in research and teaching.

Mr. Gary, Mr. Laidlaw

121. Insect Behavior. (3) I.

Lecture—3 hours. Prerequisite: upper division standing in one of the biological sciences. Evolution of behavior, sense organs, specific types and patterns of behavior, comparative behavior, learning, and applied aspects of behavioral phenomena.

Mr. Gary

123. Classification of Immature Insects. (4) I.

Lecture—2 hours; laboratory—6 hours. Prerequisite: introductory course in entomology. Criteria used to identify the immature forms of the principal orders and families of insects; primary emphasis on economic groups. Offered in even-numbered years.

Mr. Lange

125. Insect Vectors of Plant Pathogens. (3) III.

Lecture—3 hours. Prerequisite: an introductory course in entomology. Recommended: Plant Pathology 120. The role of insects and mites in the transmission of plant pathogens with emphasis on the vector-pathogen relationships. Approaches to control. Offered in odd-numbered years.

Mr. McLean

125L. Insect Vectors of Plant Pathogens Laboratory.

(1) III.

Laboratory—3 hours. Prerequisite: course

125 (may be taken concurrently). Practical experience in specialized techniques used in the study of relationships of plant viruses to their insect vectors. Offered in odd-numbered years.

Mr. McLean

127. Acarology. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 103 or 110. The morphology, taxonomy, and ecology of mites, with emphasis on plant and animal parasites. Offered in odd-numbered years.

Mr. Summers

130. Biological Control of Insect and Weed Pests.

(4) I.

Lecture—4 hours. Prerequisite: introductory course in entomology or consent of instructor. Theories and practices of biological control; population phenomena, and the biology of entomophagous insects. Offered in odd-numbered years.

Mr. Bacon

153. Medical Entomology. (3) III.

Lecture—3 hours. Prerequisite: one course in entomology or consent of instructor. The worldwide relationships of insects and other arthropods to human health. The biology and basic classification of medically important arthropods with special emphasis on the ecology of arthropod-borne diseases of man and principles of their control.

Mr. McClelland

153L. Medical Entomology Laboratory. (2) III.

Laboratory—6 hours. Prerequisite: course 153 (may be taken concurrently). Demonstration and practice in the entomological aspects of human disease epidemiology.

Mr. McClelland

194H. Special Study for Honors Students.

(1–5) I, II, III.

Prerequisite: open only to majors who are honor students of senior standing. 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.

The Staff

198. Directed Group Study. (1–5) I, II, III, S.

Prerequisite: consent of instructor.

The Staff (Mr. Bacon in charge)

FAMILY AND CONSUMER SCIENCES

Glenn R. Hawkes, Ph.D., Associate Dean, Family and Consumer Sciences
Office, Administration Building

Committee in Charge:

Benjamin C. French, Ph.D. (*Agricultural Economics*)

Glenn R. Hawkes, Ph.D. (*Agricultural Education*)

Frederic W. Hill, Ph.D. (*Nutrition*)

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III, S.

The Staff (Mr. Grigarick in charge)

Graduate Courses

202. Advanced Insect Physiology. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 102 or Zoology 112, or consent of instructor. Recommended: Biochemistry 101A or 101B. Selected topics of insect physiology. Intensive study of topics of current interest, which will vary from year to year. The course may be repeated for credit. Offered in odd-numbered years.

Mr. Judson

203. Principles of Systematic Entomology. (3) II.

Lecture—3 hours. Prerequisite: course 103. Theory and philosophy of taxonomy with emphasis on phylogeny, zoogeography, and nomenclature of insects. Offered in even-numbered years.

Mr. Bohart

219. Advanced Apiculture. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 119, or consent of instructor. Advanced topics in bee biology with special consideration of morphology, genetics, caste differentiation, and artificial insemination. Offered in even-numbered years.

Mr. Laidlaw

275. Principles and Methods of Entomological Research. (4) II.

Lecture—2 hours; laboratory—6 hours. Techniques and purposes of the scientific method as related to the field of entomological research with emphasis on problem selection, methods of attack, and the accompanying collection, evaluation, and presentation of data. Offered in odd-numbered years.

Mr. Strong

290. Seminar. (2) I, II, III.

Seminar—2 hours.

The Staff (Mr. Strong in charge)

299. Research. (1–9) I, II, III, S.

The Staff (Mr. Summers in charge)

Mary Ann Morris, Ph.D. (*Consumer Sciences*)

Thomas A. Nickerson, Ph.D. (*Food Science and Technology*)

Orville E. Thompson, Ph.D. (*Agricultural Education*)

Teaching Faculty in Design:

Associate Professor:

Richard D. Cramer, M.F.A.

Lecturers:

Helen A. Giambruni, B.A.

Doris F. Heineman, B.A.E.

Helge B. Olsen

Rosana Pistolese, Classica

Participating Departments:

AGRICULTURAL ECONOMICS

B. C. French, Ph.D., *Chairman of the Department*

Department Office, 118 Voorhies Hall

AGRICULTURAL EDUCATION

O. E. Thompson, Ph.D., *Chairman of the Department*

Department Office, 272 Voorhies Hall

Associate Professor:

Emmy E. Werner, Ph.D.



Assistant Professor:

Roberta R. Collard, Ph.D.

Lecturers:
Arline Johnson, M.S.
Jane N. Welker, M.A.

CONSUMER SCIENCES

Mary Ann Morris, Ph.D., *Chairman of the Department*

Department Office, 229 Home Economics Building

Professors:

Mary Ann Morris, Ph.D.

Pauline C. Paul, Ph.D.



Assistant Professor

Elizabeth M. Elbert, Ph.D.

Lecturers:

R. Lorene Dryden, M.A.
Agnes McClelland, M.A.

NUTRITION

Fredric W. Hill, Ph.D., *Chairman of the Department*

Department Office, 148 Home Economics Building

Professors:

Gladys J. Everson, Ph.D.

C. Richard Grau, Ph.D. (*Poultry Husbandry and Nutrition*)

Fredric W. Hill, Ph.D.

Lucille S. Hurley, Ph.D.

Samuel Lepkovsky, Ph.D. (*Poultry Husbandry and Nutrition, Berkeley Campus*)

Aloys L. Tappel, Ph.D. (*Food Science and Technology and Nutrition*)

Associate Professor:

Magnar Ronning, Ph.D. (*Animal Husbandry and Nutrition*)

Assistant Professors:

Betty E. Haskell, Ph.D.

Harold F. Hintz, Ph.D. (*Animal Husbandry and Nutrition*)

Frances J. Zeman, Ph.D.



Professors:

Hubert Heitman, Jr., Ph.D. (*Animal Husbandry*)

Robert E. Hungate, Ph.D. (*Bacteriology*)
 F. Howard Kratzer, Ph.D. (*Poultry Husbandry*)
 Glen P. Lofgreen, Ph.D. (*Animal Husbandry*)
 William C. Weir, Ph.D. (*Animal Husbandry*)

Associate Professors:

Richard A. Freedland, Ph.D. (*Physiological Sciences*)
 William N. Garrett, Ph.D. (*Animal Husbandry*)
 Marvin Goldman, Ph.D. (*Physiological Sciences*)
 Daniel W. Peterson, Ph.D. (*Poultry Husbandry*)

Assistant Professor:

Ransom L. Baldwin, Jr., Ph.D. (*Animal Husbandry*)

Lecturers:

Rocco J. Della Rosa, Ph.D. (*Physiological Sciences*)
 Leo C. Norris, Ph.D. (*Poultry Husbandry*)

Departmental Major Advisers.—See *Schedule and Directory Listing*.

Graduate Adviser.—See *Schedule and Directory Listing*.

Teaching Credential Adviser.—Miss Johnson.
Bachelor of Science Major Program and Graduate Study. See page 62.

Consumer Economics**Upper Division Courses****141. Consumers and the Market. (4) II.**

Lecture—4 hours. Prerequisite: Economics 1A; Mathematics 13. Social and economic factors affecting consumer expenditures. The structure of the retail market and the effects of its performance on consumers. Agencies aiding and protecting consumers, sources of information available to consumers.

142. Social and Economic Problems of Families. (4) III.

Lecture—4 hours. Prerequisite: Economics 1A; Mathematics 13. The management of income and expenditures by the family. The use of consumer credit, savings, investments, and insurance by families.

198. Directed Group Study. (1-5) I, II, III. The Staff**199. Special Study for Advanced Undergraduates. (1-5) I, II, III.** The Staff**Graduate Courses****247. Consumption and Standards of Living. (4) III.**

Lecture—4 hours. Prerequisite: course 141. An analytical treatment of household consumption behavior. The effects of income, prices, and household characteristics on expenditures. Standards of income and consumption adequacy.

290. Seminar. (1) I, II, III.

Seminar—1 hour.

299. Research. (1-12) I, II, III.

The Staff

Design**Upper Division Courses****130. Interior Design. (3) III.**

Lecture—3 hours. Prerequisite: Art 2. Introduction to the principles of design. Analysis, organization, and solution of problems in interior design in reference to functional and aesthetic aspects.

Mrs. Heineman

130L. Interior Design. (2) I, III.

Laboratory—6 hours. Prerequisite: course 130 (may be taken concurrently). Introduction to the principles of design. Analysis, organization, and solution of problems in interior design with reference to functional and aesthetic aspects.

Mrs. Heineman

150. The House. (4) II.

Lecture—3 hours. Prerequisite: Art 2. The tenets of modern architecture as illustrated in the contemporary house.

Mr. Cramer

160A-160B-160C. Textile Design. (2-2-2) I-II-III.

Laboratory—6 hours. Prerequisite: Art 2 or consent of instructor. Studio projects in textile printing.

Mrs. Heineman

191. History of Design. (3) I.

Lecture—3 hours. Prerequisite: 2 quarters of history of art. From ancient to modern times.

192A-192B. Costume Design. (3-3) II-III.

Laboratory—9 hours. Prerequisite: Art 2 and Art 16, or consent of instructor. Studio projects in contemporary costume design.

193. History of Costume. (3) II.

Lecture—3 hours. Prerequisite: 2 quarters of history of art. From ancient to modern times.

195. History of Interior Design. (3) I.

Lecture—3 hours. Prerequisite: 2 quarters of history of art. From ancient to modern times.

196A-196B. Advanced Interior Design. (3-3) I-II.

Laboratory—9 hours. Prerequisite: course 130L and Art 16, or consent of instructor; Studio projects in interior design.

197. Individual Problems in Design. (3) II, III.

Laboratory—9 hours. Prerequisite: one year upper division work in design or consent of instructor. Senior thesis: a comprehensive design problem independently pursued under the direction of a member of the faculty. The Staff

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: upper division standing and consent of instructor. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Foods**Upper Division Courses****100A. Experimental Food Study. (3) II.**

Lecture—3 hours. Prerequisite: Bacteriology 2 (may be taken concurrently); Chemistry 8. Chemical and microbiological aspects of food, and their relation to physical and chemical changes in foods; regulatory agencies and laws. Miss Elbert

100B. Experimental Food Study. (3) III.

Lecture—3 hours. Prerequisite: course 100A. Chemical and microbiological aspects of food, and their relation to physical and chemical changes in foods; factors influencing food combinations and service. Miss Elbert

101A. Experimental Food Study Laboratory. (1) II.

Laboratory—3 hours. Prerequisite: course 100A should be taken concurrently. Chemical and microbiological aspects of food and their relation to physical and chemical changes in foods. Miss Elbert

101B. Experimental Food Study Laboratory. (2) III.

Laboratory—3 hours, discussion—1 hour. Prerequisite: course 101A; course 100B should be taken concurrently. Chemical and microbiological aspects of food and their relation to physical and chemical changes in foods; food combinations and service. Miss Elbert

104A-104B. Advanced Food Studies. (4-4) I-II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 100B and Physics 2C; or consent of instructor. Chemical and physical properties influencing characteristics of food materials.

104C. Introduction to Research in Foods. (4) III.

Lecture—1 hour; laboratory—9 hours. Prerequisite: course 104B. Senior thesis on independent problems.

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to honors students of senior standing. 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. The Staff

198. Directed Group Study. (1-5) I, II, III. The Staff**199. Special Study for Advanced Undergraduates.**

(1-5) I, II, III.

The Staff

Graduate Courses**290. Seminar. (1) I, II, III.**

Seminar—1 hour.

The Staff

298. Group Study. (1-9) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

Home Economics Education**Professional Course****300. Teaching Home Economics in Secondary Schools. (3) I, II, III.**

Lecture—3 hours. Prerequisite: senior or graduate standing; a teaching major or minor in home economics. Instructional procedures and materials used in teaching home economics in secondary schools. This course should be completed before student teaching and is accepted as a part of the professional education requirements for the teaching credential.

Miss Johnson

Housing**Upper Division Course****151A-151B. Housing. (4-4) II-III.**

Lecture—4 hours. Housing problems as they have developed in Europe and in America; social, economic, technical, and aesthetic aspects; activities of private agencies and programs of government; the current scene as indicative of problems ahead.

Mr. Cramer

Human Development**Upper Division Courses****131. Development in Infancy and Early Childhood. (4) I.**

Lecture—3 hours; discussion—1 hour. Prerequisite: Psychology 1B. Psychological and cultural factors in the development of infants and preschool children.

Miss Collard

133. Laboratory in Child Development. (2) I, II, III.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 131 (may be taken concurrently). Laboratory conducted at the nursery school.

Mrs. Welker

136. Development in Middle Childhood and Adolescence. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: Psychology 1C. Psychological and cultural factors in the development of school-age children and adolescents. Offered in odd-numbered years.

Miss Werner

137. The Contemporary American Family. (4) III.

Lecture—4 hours. Sociological and psychological factors influencing marriage and the family in present-day society.

138A. Exceptional Children. (3) II.

Lecture—2 hours; discussion—1 hour. Prerequisite: courses 131 and 136, or Psychology 112. Discussion of psychosis, neurosis, behavior disorders, and learning difficulties in children.

Miss Collard

138B. Exceptional Children. (3) III.

Lecture—3 hours. Prerequisite: courses 131 and 136, or Psychology 112. General consideration of physically handicapped, retarded and gifted children.

Miss Werner

139. Diagnostic Techniques with Children. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 131 and 136, or Psychology 112. Evaluation of intelligence, personality, and special abilities of children. Class demonstration of individual tests for infants, preschool, and school-age children. Concepts of environment. Relevant research findings. Offered in even-numbered years.

198. Directed Group Study. (1-5) I, II, III. The Staff**199. Special Study for Advanced Undergraduates.**

(1-5) I, II, III.

The Staff

Graduate Courses**290. Seminar. (1) I, II, III.**

The Staff

299. Research. (1-12) I, II, III.

The Staff

Management**Upper Division Courses****121. Institution Food Study. (5) I.**

Lecture—3 hours; laboratory—6 hours. Prerequisite: Foods 100B. The principles and problems involved in the preparation and service of food in institutions.

Miss Zeman

122A. Organization and Management of Institutions. (3) II.

Lecture—3 hours. Prerequisite: Foods 100B. Recommended: course 121. Organization and administration of institutional food services; management and training of personnel; work simplification, sanitation.

Miss Zeman

122B. Food Service Planning and Control. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 122A. Design of food service facilities; selection of equipment and furnishings. Procedures employed in financial control.

Miss Zeman

140. Home Management. (4) I.

Lecture—4 hours. Prerequisite: Psychology 1B. Management principles in relation to home and family resources.

140L. Laboratory in Home Management. (3) II, III.

Prerequisite: course 140 and senior or graduate standing. Integrated experiences in the various phases of home management, as provided by five weeks' residence in the home management house. A fee is required.

Nutrition**Lower Division Course****10. Discoveries and Concepts in Nutrition. (3) III.**

Lecture—3 hours. Nutrition as a science; its historical development; the properties of foods.

Upper Division Courses**110. Principles of Nutrition. (5) II.**

Lecture—4 hours; discussion—1 hour. Prerequisite: Biochemistry 101B (may be taken concurrently); a course in physiology or zoology. The fundamental principles of the nutrition of man and other animals. The nutrients in relation to physiological processes of growth, maintenance, and reproduction. Nutritional disorders.

Mr. Hintz, Mr. Grau

112A-112B. Nutrition and Dietetics. (3-4) I-II.

Lecture—3-4 hours. Prerequisite: Chemistry 8; Physiology 1. An introduction to the principles of nutrition; study of the nutrients and their chemical and physiological roles in metabolism; nutrient requirements of man at various phases of the life cycle.

Miss Everson

113A-113B. Nutrition and Dietetics Laboratory.

(1-1) I-II.

Laboratory—3 hours. Prerequisite: course 112A-112B should be taken concurrently. An introduction to the principles of nutrition; study of the nutrients and their chemical and physiological roles in metabolism; nutrient requirements of man at various phases of the life cycle.

Miss Everson

114. Physiological Processes in Child Development. (4) I.

Lecture—4 hours. Prerequisite: course 112B; Biochemistry 101B or consent of instructor. Physical development, physiological changes, and nutritional needs during the embryological period, infancy, childhood, and youth.

Mrs. Hurley

116. Nutrition and Diet Therapy. (5) I.

Lecture—5 hours. Prerequisite: course 112B; Biochemistry 101B. Physiological basis for the use of special diets. Problems in the planning and computation of dietaries for normal and pathological conditions.

Mrs. Haskell

117. Problems in Human Nutrition. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 112B; Biochemistry 101B; Chemistry 5. Evaluation of methods of assessing nutritional status in humans. Application of chemical, microbiological, chromatographic and enzymatic techniques to current problems in human nutrition.

Mrs. Haskell

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to honors students of senior standing. Independent study of selected topics under the direction of a staff member or members of the staff. Completion will involve the writing of a senior thesis.

The Staff

198. Directed Group Study. (1-5) I, II, III.

The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses**201A. Advanced General Nutrition. (3) I.**

Lecture—3 hours. Prerequisite: Bacteriology 2; Biochemistry 101B; Physiology 110B; a course in nutrition. Advanced studies of protein and amino acid metabolism; animal energetics and energy metabolism. Comparative aspects.

The Staff (Mr. Hill in charge)

201B. Advanced General Nutrition. (3) II.

Lecture—3 hours. Prerequisite: Bacteriology 2; Biochemistry 101B; Physiology 110B; a course in nutrition. Advanced studies of problems in nutrition with emphasis on minerals; water balance. Comparative aspects.

The Staff (Mr. Kratzer in charge)

201C. Advanced General Nutrition. (3) III.

Lecture—3 hours. Prerequisite: Bacteriology 2; Biochemistry 101B; Physiology 110B; a course in nutrition. Advanced studies of metabolic function and nutritional importance of vitamins; essential fatty acids; deficiency and degenerative diseases. Comparative aspects.

The Staff (Mrs. Hurley in charge)

250. Concepts of Animal Nutrition. (3) II.

Lecture—3 hours. Prerequisite: courses 201A 201B, 201C. Dynamic interrelationships between food, animal, and environment, including concepts in food intake, digestion, absorption, and utilization of nutrients.

Mr. Lepkovsky

290. Seminar. (1) I, II, III.

Seminar—1 hour.

The Staff

298. Group Study. (1-5) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

Textiles and Clothing**Lower Division Course****7. Clothing Study. (2) I, III.**

Lecture—2 hours. Prerequisite: Art 2, Psychology 1B. Social, psychological, and artistic aspects of clothing as related to selection and design for individuals.

Miss Dryden

Upper Division Courses**160. Introduction to Textiles. (3) II.**

Lecture—3 hours. Prerequisite: Chemistry 8. Study of plant, animal, and synthetic fibers used in textiles and of the finished textile fabrics.

Miss Morris

160L. Introduction to Textiles Laboratory. (2) II, III.

Laboratory—6 hours. Prerequisite: course 160 (may be taken concurrently). Study of plant, animal, and synthetic fibers used in textiles and of the finished textile fabrics.

Miss Dryden

161. Textile Fibers. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 160. The chemical and physical structure of textile fibers, and its relation to fiber and fabric properties.

Miss Morris

162. Textile Fabrics. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 160. The properties of fabrics as related to serviceability, comfort, and appearance.

Miss Morris

172. Socio-Economic Factors of Clothing and Textiles. (3) II.

Lecture—3 hours. Prerequisite: Economics 1A, sociology or cultural anthropology; Psychology 1B. Clothing and textiles as related to social, economic, and psychological aspects of families and cultures.

Miss Dryden

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to honors students of senior standing. Independent study of selected topics under the direction of a staff member, or

members of the staff. Completion will involve the writing of a senior thesis.

The Staff

198. Directed Group Study. (1-5) I, II, III. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses

292. Seminar in Textiles. (3) II, III.

Seminar—3 hours.

The Staff

298. Group Study. (1-5) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

Professional Courses

370. Clothing Study Laboratory. (2) I, II, III.

Laboratory—6 hours. Prerequisite: course 7 (may be taken concurrently). Application of selection, design, and construction principles in different textile fabrics.

Miss McClelland

375. Clothing Design Laboratory. (2) I, II, III.

Laboratory—6 hours. Prerequisite: course 370. A knowledge of the principles of fitting and basic dress design through the medium of flat pattern designing, drafting and draping.

Miss McClelland

376. Advanced Clothing Laboratory. (3) I, III.

Laboratory—9 hours. Prerequisite: course 370. Advanced problems and tailoring techniques in clothing construction.

Miss McClelland

FOOD SCIENCE (A Graduate Group)

George K. York II, Ph.D., *Chairman of the Group*
Group Office, 233 Cruess Hall

Members of the Group:

Professors:

Maynard A. Amerine, Ph.D. (*Viticulture and Enology*)

George A. Baker, Ph.D. (*Mathematics*)

Harold W. Berg, M.S. (*Viticulture and Enology*)

Clinton O. Chichester, Ph.D. (*Food Science and Technology*)

Lawrence L. Claypool, Ph.D. (*Pomology*)

Edwin B. Collins, Ph.D. (*Food Science and Technology*)

Walter L. Dunkley, Ph.D. (*Food Science and Technology*)

Robert E. Feeney, Ph.D. (*Food Science and Technology*)

James F. Guymon, Ph.D. (*Viticulture and Enology*)

John L. Graham, Ph.D. (*Bacteriology*)

Walter G. Jennings, Ph.D. (*Food Science and Technology*)

Richard E. Kepner, Ph.D. (*Chemistry*)

George L. Marsh, M.S. (*Food Science and Technology*)

Emil M. Mrak, Ph.D. (*Food Science and Technology*)

Leonard L. Morris, Ph.D. (*Vegetable Crops*)

Thomas A. Nickerson, Ph.D. (*Food Science and Technology*)

Pauline C. Paul, Ph.D. (*Consumer Sciences*)

Herman J. Phaff, Ph.D. (*Food Science and Technology*)

Edward B. Roessler, Ph.D. (*Mathematics*)

Walter W. Sadler, D.V.M., M.P.H. (*Public Health*)

Joseph M. Smith, Sc.D. (*Chemical Engineering*)

Mortimer P. Starr, Ph.D. (*Bacteriology*)

Clarence Sterling, Ph.D. (*Food Science and Technology*)

George F. Stewart, Ph.D. (*Food Science and Technology*)

Aloys L. Tappel, Ph.D. (*Food Science and Technology and Nutrition*)

Nikita P. Tarassuk, Ph.D. (*Food Science and Technology*)

Reese H. Vaughn, Ph.D. (*Food Science and Technology*)

Robert J. Weaver, Ph.D. (*Viticulture and Enology*)

A. Dinsmoor Webb, Ph.D. (*Viticulture and Enology*)

Associate Professors:

Richard A. Bernhard, Ph.D. (*Food Science and Technology*)

John C. Harper, D.Sc. (*Agricultural Engineering*)

Peter W. M. John, Ph.D. (*Mathematics*)

Mendel Mazelis, Ph.D. (*Food Science and Technology*)

Martin W. Miller, Ph.D. (*Food Science and Technology*)

Daniel W. Peterson, Ph.D. (*Poultry Husbandry*)
Donald M. Reynolds, Ph.D. (*Bacteriology*)
Lloyd M. Smith, Ph.D. (*Food Science and Technology*)
John R. Whitaker, Ph.D. (*Food Science and Technology*)

Assistant Professors:

Elizabeth M. Elbert, Ph.D. (*Consumer Sciences*)
Norman E. Gary, Ph.D. (*Entomology*)
Ralph E. Kunkee, Ph.D. (*Viticulture and Enology*)
George K. York II, Ph.D. (*Food Science and Technology*)

Lecturers:

A. Wade Brant, Ph.D. (*Food Science and Technology*)
Donald G. Crosby, Ph.D. (*Food Science and Technology*)
Michael J. Lewis, Ph.D. (*Food Science and Technology*)
Bor S. Luh, Ph.D. (*Food Science and Technology*)
Cornelius S. Ough, B.S., (*Viticulture and Enology*)
Rose Marie Pangborn, M.S., (*Food Science and Technology*)
Hans Riemann, Ph.D. (*Public Health*)
Vernon L. Singleton, Ph.D. (*Viticulture and Enology*)
Morris H. Woskow, Ph.D. (*Food Science and Technology and Psychology*)

FOOD SCIENCE AND TECHNOLOGY

Reese H. Vaughn, Ph.D., *Chairman of the Department*
Department Office, 126A Cruess Hall

Professors:

Clinton O. Chichester, Ph.D.
Edwin B. Collins, Ph.D.
Walter L. Dunkley, Ph.D.
Robert E. Feeney, Ph.D.
Eugene L. Jack, Ph.D. (*Emeritus*)
Walter G. Jennings, Ph.D.
George L. Marsh, M.S.
Emil M. Mrak, Ph.D.
Thomas A. Nickerson, Ph.D.
Herman J. Phaff, Ph.D. (*Food Science and Technology and Bacteriology*)
Chester L. Roadhouse, D.V.M. (*Emeritus*)
Clarence Sterling, Ph.D.
George F. Stewart, Ph.D.
Aloys L. Tappel, Ph.D. (*Food Science and Technology and Nutrition*)
Nikita P. Tarassuk, Ph.D.
Reese H. Vaughn, Ph.D.

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Martin W. Miller, Ph.D.
Lloyd M. Smith, Ph.D.
John R. Whitaker, Ph.D.

Assistant Professor:

George K. York II, Ph.D.

Professors:

Maynard A. Amerine, Ph.D. (*Viticulture and Enology*)
Harold W. Berg, M.S. (*Viticulture and Enology*)
James F. Guymon, Ph.D. (*Viticulture and Enology*)
Samuel B. Lepkovsky, Ph.D. (*Poultry Husbandry; Berkeley Campus*)
Edward B. Roessler, Ph.D. (*Mathematics*)
Joseph M. Smith, Sc.D. (*Chemical Engineering*)
A. Dinsmoor Webb, Ph.D. (*Viticulture and Enology*)

Associate Professors:

John C. Harper, D.Sc. (*Agricultural Engineering*)
Daniel W. Peterson, Ph.D. (*Poultry Husbandry*)

Assistant Professor:

Ralph E. Kunkee, Ph.D. (*Viticulture and Enology*)

Lecturers:

A. Wade Brant, Ph.D.
Donald G. Crosby, Ph.D.
Wendell W. Kilgore, Ph.D.
Michael J. Lewis, Ph.D.
Bor S. Luh, Ph.D.
Rose Marie Pangborn, M.S.
Vernon L. Singleton, Ph.D. (*Viticulture and Enology*)



Morris H. Woskow, Ph.D. (*Food Science and Technology and Psychology*)

Departmental Major Advisers.—See *Schedule and Directory Listing*.

Bachelor of Science Major Program and Graduate Study. See page 65.

Lower Division Course

1. Introduction to Food Science. (3) I.

Lecture—3 hours. Historical and philosophical aspects of food processing and its relationships to man's health and well-being. World's food supply and its use by human populations. Trends in the processing, preservation, and utilization of food.

Mr. Amerine, Mr. Stewart, Mr. Vaughn

Upper Division Courses

100. Processing Agricultural Products. (5) I.

Lecture—4 hours; laboratory—3 hours. Prerequisite: Biology 1; Chemistry 8. Processing of foods, feeds, and fibers to provide desirable qualities, such as convenience, economy and utility. Principles used in raw product selection, conversion, preservation, and quality control.

Mr. Miller, Mr. Dunkley

101. Chemistry and Biochemistry of Food Processing. (3) III.

Lecture—3 hours. Prerequisite: Biochemistry 101B. Chemical and biochemical principles in relation to food processing problems: hydrophilic polymers, enzymes, lipids, proteins, and vitamins.

Mr. Sterling, Mr. Tappel

102. Biochemistry and Technology of Malting and Brewing. (2) III.

Lecture—2 hours. Prerequisite: Biochemistry 101A. Special attention is paid to the complex biochemistry of raw materials, malting, brewing, and fermentation as it affects industrial practice. The industrial process is thoroughly described. Field trips and pilot brewing by arrangement.

Mr. Lewis

103. Physical and Chemical Methods for Food Analysis. (5) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biochemistry 101B; Chemistry 5; Chemistry 8 (may be taken concurrently). Theory and application of physical and chemical methods for analyzing foods.

Mr. Whitaker, Mr. Bernard

104A. Food and Industrial Microbiology. (2) II.

Lecture—2 hours. Prerequisite: Bacteriology 2; Chemistry 8. Taxonomy, physiology, ecology, and control of microorganisms important in manufacturing and ripening foods, producing defects, and spoilage; disposing of wastes and

protecting public health; bacteriophage action and control. Mr. Collins and Mr. York

104B. Food and Industrial Microbiology. (2) III.

Lecture—2 hours. Prerequisite: course 104A. Continuation of course 104A with emphasis on destruction of microorganisms, and food-borne infections and intoxications.

Mr. Collins and Mr. York

105A-105B. Food and Industrial Microbiology Laboratory. (2-2) II-III.

Laboratory—6 hours. Prerequisite: courses 104A-104B (should be taken concurrently); Bacteriology 2; Chemistry 8. Laboratory procedures selected to follow subject matter sequence of course 104A-104B.

Mr. Collins and Mr. York

106. Industrial Fermentations. (3) III.

Lecture—3 hours. Prerequisite: Bacteriology 2. Microorganisms and their activity in relation to industrial processes such as baking, brewing, and the production of industrial solvents, vitamins, enzymes, and drugs. For laboratory experience in this field, students may register in Food Science and Technology 106L.

Mr. Lewis, Mr. Phaff, Mr. Kunkee

106L. Food and Industrial Microbiology Summer Laboratory. (3)

Laboratory—90 hours total. Prerequisite: A course in Industrial Fermentation. Microorganisms and their activities in relation to industrial processes such as baking; brewing; production of industrial alcohol, yeasts, solvents, vitamins, enzymes, antibiotics, and other drugs.

Mr. Lewis

107. Analysis of Foods by Sensory Methods. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 13. Nature of sensory response with emphasis on taste and smell as related to foods; design and methodology of small panel and consumer panel testing; and application of appropriate mathematical procedures.

Mr. Amerine, Mrs. Pangborn,
Mr. Roessler, Mr. Woskow

108A. Food Plant Sanitation. (2) I.

Lecture—2 hours. Prerequisite: Chemistry 1A. Principles of water conditioning and water treatment, chemical sanitizing agents, metallic corrosion, fundamental concepts in the disposal of wastes, and discussion of other factors relating to food plant sanitation. Mr. Jennings

108B. Food Plant Sanitation. (2) II.

Lecture—2 hours. Prerequisite: Chemistry 8. Principles of hard-surface detergency; detergent classification and formulations, soil and substrate considerations, energy relationships in detergency, and theories and mechanisms of detergency.

Mr. Jennings

109. Quality Control for Food Processing Operations. (3) III.

Lecture—3 hours. Prerequisite: course 103, and Mathematics 13. Objectives of quality control; measurement of quality attributes; development of grades and standards of quality; sampling and inspection techniques; statistical procedures; application of analyzed data to control of quality.

Mr. Bernard and Mr. Smith

110A. Engineering Principles of Food Processing. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 109B; Mathematics 16C; Physics 2B, 3B. Application of the conservation of mass and energy to food processing. Elements of fluid mechanics and heat transfer and introduction to process principles, including counter-current operation and equilibrium stage processing. Field trips to food processing operations in the area.

Mr. Dunkley, Mr. Guymon, Mr. Harper

110B. Engineering Principles of Food Processing. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 110A. Continuation of course 110A, with emphasis on evaporation, psychrometry, dehydration, sterilization, freezing, process control, and process evaluation.

Mr. Dunkley, Mr. Harper, Mr. Guymon

114. Principles of Processing Fruit and Vegetable Products. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Bacteriology 2; Chemistry 8. Technical principles relating to processing operations used in the commercial preservation of fruit and vegetable products; theory and practical applications; field trips.

Mr. Marsh

Mr. Dunkley

118. Principles of Dairy Processing. (3) I.

Lecture—3 hours. Prerequisite: Bacteriology 2; Chemistry 8. Principles of selected processes, including pasteurization, sterilization, homogenization, separation and condensing, and their application in the processing of fluid dairy foods.

Mr. Dunkley

119. Principles of Dairy Processing. (3) III.

Lecture—3 hours. Prerequisite: Bacteriology 2; Chemistry 8. Principles of freezing, drying, crystallization, emulsification, stabilization, and fermentation and their application in the manufacture of frozen, dried and cultured dairy products, cheese, and butter.

Mr. Nickerson

Mr. Dunkley

122. Enzyme Technology. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biochemistry 101B. Principles of purification, physicochemical and enzymatic properties, and utilization with emphasis on enzymes which are used, or have potential use, in the food and beverage industries.

Mr. Whitaker

130. Chemistry of Milk and Dairy Products. (3) III.

Lecture—3 hours. Prerequisite: Biochemistry 101A. The chemistry of milk constituents; physical and chemical properties of milk; and the changes that occur during the processing and storage of dairy products, with emphasis on quality. Offered in even-numbered years.

Mr. Tarassuk

190. Recent Advances in Food Technology. (1) I.

Lecture—1 hour. Prerequisite: two courses in Food Science and Technology. Assigned topics, reports, and discussions concerning recent advances in food technology.

Mr. Chichester

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to majors who are honors students of senior standing. 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.

The Staff

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor.

The Staff (Mr. Vaughn in charge)

199. Special Study for Advanced Undergraduates.

(1-6) I, II, III.

The Staff (Mr. Vaughn in charge)

Graduate Courses

210A. Proteins: Functional Activities and Interactions. (3) II.

Lecture—3 hours. Prerequisite: Biochemistry 101B. The relationships of structure of proteins to their biological functions. Structural proteins, complexing proteins, and catalytic proteins in plant and animal materials and products.

Mr. Feeney

210B. Proteins: Functional Activities and Interactions. (2) III.

Lecture—2 hours. Prerequisite: course 210A or Biochemistry 201A. The relationships of structure of proteins to their biological functions. Structural proteins, complexing proteins, and catalytic proteins in plant and animal materials and products.

Mr. Feeney

211. Chemistry of the Food Lipids. (3) II.

Lecture—3 hours. Prerequisite: Biochemistry 101A. Chemical constitution, molecular structure, and stereo chemistry of the fats, phospholipids, and related compounds. Methods of isolation, characterization, and synthesis. Relation of molecular structure to physical properties.

Mr. Smith

220. The Natural Coloring Matters. (2) I.

Lecture—1 hour; laboratory—3 hours. Prerequisite: 3 units of biochemistry or plant bio-

chemistry; 3 units of upper division organic chemistry. Chemistry of natural pigments and related compounds; spectrophotometric and chromatographic techniques; special emphasis on pigments in relation to foods.

Mr. Chichester

290. Seminar. (1) I, II, III.

Seminar—1 hour.

Mr. Mazelis

299. Research. (1-12) I, II, III.

Prerequisite: graduate standing.

The Staff (Mr. Vaughn in charge)

FOREIGN LITERATURE IN TRANSLATION

The following courses are open to students throughout the campus. The readings are in English. Refer to departmental listing for descriptions of courses.

Classics

139A and 139B. Greek Literature in Translation.

140. Latin Literature in Translation.

Dramatic Art

20. Introduction to Dramatic Art.

158A, 158B, and 158C. World Drama.

159. Contemporary Drama.

English

170A. The Epic.

170B. European Influences on the English and American Novel.

171. English Bible as Literature.

French

120A-120B. Twentieth-Century Drama.

150. Masterpieces of French Literature.

German

110. Masterpieces of German Prose from Goethe to Kafka.

111. Masterpieces of German Drama from Lessing to Brecht.

112. Masterpieces of German Poetry from Walther von der Vogelweide to Rilke.

114. Goethe's Faust.

115. German Literature of the Twentieth Century.

Russian

39. Great Russian Writers.

110. Survey of Russian Literature to 1800.

111. Survey of Russian Literature: Nineteenth Century.

112. Survey of Russian Literature: Twentieth Century.

121. The Russian Novel: Pushkin to Turgenev.

122. The Russian Novel: Tolstoy and Dostoevsky.

123. The Russian Novel: Saltykov to Pasternak.

Spanish

150. Masterpieces of Spanish Literature.

FRENCH AND ITALIAN

¹Merle L. Perkins, Ph.D., *Chairman of the Department*

Marshall Lindsay, Ph.D., *Acting Chairman of the Department*

Department Office, 524 Sproul Hall

Professor:

Merle L. Perkins, Ph.D.

George H. Keith, Ph.D.

Ruth B. York, Ph.D.



Associate Professors:

Max Bach, Ph.D.

Marshall Lindsay, Ph.D.

Associate Professor:

Colin Duckworth, Ph.D. (*Visiting*)

Assistant Professors:

Alfredo A. Bonadeo, Ph.D.

Assistant Professors:

Edward M. Bloomberg, M.A. (*Acting*)

¹ Absent on leave, 1966-67.

Jo Ann Creore, M.A. (*Acting*)
 Eugène Eiché, M.A. (*Acting*)
 Gerald Herman, M.A. (*Acting*)

Lecturers:

Teresa de Lauretis, Ph.D.
 William P. Galvin, M.A.
 Marie-Madeleine Ory, Licence

Associate:

Bernadette Barrio de Mendoza, M.A.
 Frieda M. Lacina, M.A.
 Rosabianca T. LoVerso, M.A.

French

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. (See page 98.)

Departmental Major Advisers.—Mr. Bach, Mr. Kanes, Mr. Keith, Mr. Lindsay, Miss York.

Graduate Adviser.—Mr. Perkins.

The Major Program

Lower Division Courses.—Required: French 1, 2, 3, 4, 5, and 6, or their equivalents. Recommended; one year of college Latin or the equivalent; Classics 39A and 39B.

Upper Division Courses.—Required: at least 36 units of upper division courses, including 101, 102, 103, 109A, 109B, and a separate course in each of the following periods: seventeenth century, eighteenth century, nineteenth century.

Course 107 and either course 104 or 105 are required for the General Secondary Teaching Credential in French.

Honors and Honors Program (see page 95).

The honors program comprises two quarters of study under course 194H, which will include a research paper and a comprehensive examination.

Graduate Study.—The Department offers programs of study and research leading to the M.A. and Ph.D. degrees in French. Detailed information regarding graduate study may be obtained by writing to the Graduate Adviser, Department of French and Italian.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major.

Teaching Minor.—Six quarter French courses in the lower division, or their equivalents. Usually these will consist of French 1, 2, 3, 4, 5, 6.

At least 18 units of upper division work in French, including French 107, and at least 9 units taken from the following conversation and composition courses: French 101, 102, 103, 104, 105. French 109A, 109B, or French 109C may be used to complete the program.

Subject Representative: Mr. Perkins

Lower Division Courses

A course may not ordinarily be taken for credit if it is a prerequisite to a course already

completed. Students offering high school language preparation as a prerequisite must take a placement test.

1. Elementary French. (4) I, II, III.

Laboratory—2 hours; recitation—3 hours.
 The Staff

1R Elementary French—Reading. (4) I.

Laboratory—2 hours; recitation—3 hours. This variant of course 1 places greater emphasis on reading than the regular course. The Staff

2. Elementary French. (4) I, II, III.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 1 or equivalent. A continuation of course 1. The Staff

2R. Elementary French—Reading. (4) II.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 1R or equivalent. This variant of course 2 places greater emphasis on reading than the regular course. The Staff

3. Elementary French. (4) I, II, III.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 2. A continuation of course 2. The Staff

3R. Elementary French—Reading. (4) III.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 2R or equivalent. This variant of course 3 places greater emphasis on reading than the regular course. The Staff

4. Intermediate French. (3) I, II, III.

Laboratory—1 hour; recitation—3 hours. Prerequisite: course 3 or equivalent. The Staff

4R. Intermediate French—Reading. (4) I.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 3R or equivalent. This variant of course 4 places greater emphasis on reading than the regular course. The Staff

5. Intermediate French. (3) I, II, III.

Laboratory—1 hour; recitation—3 hours. Prerequisite: course 4 or equivalent. Continuation of course 4. The Staff

5R. Intermediate French—Reading. (4) II.

Laboratory—1 hour; recitation—4 hours. Prerequisite: course 4R or equivalent. This variant of course 5 places greater emphasis on reading than the regular course. The Staff

6. Intermediate French. (5) I, II, III.

Recitation—5 hours. Prerequisite: course 5 or equivalent. Spoken French stressed through class discussion of a variety of selected readings. The Staff

7. Conversation and Reading. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 6. Introduction to the study of

French literature. Spoken French stressed through class discussion and oral reports.

The Staff

Upper Division Courses

101. Grammar, Composition, and Conversation.

(3) I.

Lecture—3 hours. Prerequisite: course 6.
The Staff

102. Grammar, Composition, and Conversation.

(3) II.

Lecture—3 hours. Prerequisite: course 101.
The Staff

103. Grammar, Composition, and Conversation.

(3) III.

Lecture—3 hours. Prerequisite: course 102.
The Staff

104. Advanced Grammar and Composition. (3) I.

Lecture—3 hours. Prerequisite: course 103.
Offered in even-numbered years. Mr. Bach

105. Advanced Grammar and Composition. (3) II.

Lecture—3 hours. Prerequisite: course 104.
Offered in odd-numbered years. Mr. Bach

107. Survey of French Culture and Institutions.

(4) III.

Lecture—3 hours. Prerequisite: course 6.
Offered in odd-numbered years. Mr. Calvin

**109A. Survey of French Literature: Middle Ages
and Renaissance. (3) I.**

Lecture—3 hours. Prerequisite: course 6.
Readings from major works; discussion of literary history and theory.
The Staff

**109B. Survey of French Literature from 1600 to
1800. (3) II.**

Lecture—3 hours. Prerequisite: course 6.
Readings from major works; literary history and theory.
The Staff

**109C. Survey of French Literature from 1800 to
Present. (3) III.**

Lecture—3 hours. Prerequisite: course 6.
Readings from major works; literary history and criticism.
The Staff

110. Advanced Composition and Translation.

(2) I, II, III.

Lecture—2 hours. Prerequisite: course 103.
This course may be repeated for credit.
The Staff

116. Literature of the Sixteenth Century. (4) III.

Lecture—3 hours. Prerequisite: course 6.
Readings in Rabelais and Montaigne. Offered in odd-numbered years.
Mr. Lindsay

117A. Theater of the Seventeenth Century. (4) I.

Lecture—3 hours. Prerequisite: course 6.
Offered in even-numbered years. Mr. Bloomberg

**117B. Novelists and Moralists of the Seventeenth
Century. (4) II.**

Lecture—3 hours. Prerequisite: course 6.
Offered in even-numbered years. Mr. Bloomberg

117C. Classicism and Baroque. (4) III.

Lecture—3 hours. Prerequisite: course 6.
Offered in even-numbered years. Mr. Bloomberg

118A. The Enlightenment. (4) I.

Lecture—3 hours. Prerequisite: course 6.
Readings from Bayle, Fontenelle, Montesquieu, Voltaire, Diderot, Rousseau, and others. Offered in odd-numbered years. Mr. Perkins

118B. Drama and Novel in the Eighteenth Century.

(4) II.

Lecture—3 hours. Prerequisite: course 6.
Plays of Marivaux and Beaumarchais; novels of Lesage, Prevost, Diderot, Voltaire, Rousseau. Offered in odd-numbered years. Mr. Perkins

118C. Diderot and the Encyclopédie. (4) III.

Lecture—3 hours. Prerequisite: course 6.
Offered in even-numbered years. Mr. Perkins

119A. The Nineteenth Century. (4) I.

Lecture—3 hours. Prerequisite: course 6.
Romanticism in the drama and novel: Hugo, Stendhal, Vigny, Musset, etc. Offered in even-numbered years. Mr. Bach

119B. The Nineteenth Century. (4) II.

Lecture—3 hours. Prerequisite: course 6.
Realism: Balzac and Flaubert. Offered in even-numbered years. Mr. Bach

119C. The Nineteenth Century. (4) III.

Lecture—3 hours. Prerequisite: course 6.
Naturalism and Symbolism: Zola, Maupassant, Mallarmé. Offered in odd-numbered years.
The Staff

120A. Twentieth Century Drama. (4) I.

Lecture—3 hours; other—1 hour. Prerequisite: course 6. Representative plays from Jarry to Giraudoux. Offered in even-numbered years.
Miss York

120B. Twentieth Century Drama. (4) II.

Lecture—3 hours; other—1 hour. Prerequisite: course 120A. Representative plays from Anouilh to Ionesco. Offered in odd-numbered years.
Miss York

130A. Lyric Poetry. (4) I.

Lecture—3 hours. Prerequisite: one upper division course in French; or consent of instructor.
Offered in even-numbered years. Mr. Lindsay

130B. Lyric Poetry. (4) II.

Lecture—3 hours. Prerequisite: one upper division course in French; or consent of instructor. Offered in even-numbered years. Mr. Lindsay

134. French Novel from Malraux to the Nouveau Roman. (4) III.

Lecture—3 hours. Prerequisite: course 6. Mr. Lindsay

140. Study of a Major Writer. (4) III.

Lecture—3 hours. Prerequisite: course 6. With the consent of the instructor, this course may be repeated for credit. The Staff

141. Gide and Proust. (4) II.

Lecture—3 hours. Prerequisite: course 6. Mr. Lindsay

150. Masterpieces of French Literature. (4) I.

Lecture—3 hours. Prerequisite: English 1B. Reading, lectures, and discussion in English. May not be counted as part of the major in French. Offered in even-numbered years.

The Staff

160. Structure of the French Language. (4) II.

Lecture—3 hours. Prerequisite: course 6; or consent of instructor. Linguistic analysis of modern French. Offered in odd-numbered years.

Mrs. Creore

194H. Special Study for Honors Students.**(5) I, II, III.**

Prerequisite: open only to honors students. Guided research leading to an honors paper. The Staff

199. Special Study for Advanced Undergraduates.**(1–5) I, II, III.**

The Staff

Graduate Courses**201A. History of the French Language. (4) I.**

Seminar—3 hours. Mr. Keith

201B. History of the French Language. (4) II.

Seminar—3 hours. Prerequisite: course 201A. Mr. Keith

202. Medieval French Literature. (4) III.

Seminar—3 hours. Mr. Keith

204. Sixteenth-Century French Literature. (4) II.

Seminar—3 hours. May be repeated for credit with consent of the instructor. The Staff

206. Seventeenth-Century French Literature. (4) II.

Seminar—3 hours. May be repeated for credit with consent of the instructor. Mr. Bloomberg

208. Eighteenth-Century French Literature. (4) III.

Seminar—3 hours. May be repeated for credit with consent of the instructor. Mr. Perkins

215. Nineteenth-Century French Literature. (4) I.

Seminar—3 hours. May be repeated for credit with consent of the instructor. Mr. Bach, Mr. Duckwortl.

220. Twentieth-Century French Literature. (4) I.

Seminar—3 hours. May be repeated for credit with consent of the instructor. Mr. Lindsay

230. Old Provençal. (4) III.

Seminar—3 hours. Prerequisite: course 201A. An introduction to Old Provençal phonology and morphology, with reading and interpretation of texts. Mr. Keith

299. Research. (2–5) I, II, III.

The Staff

Italian**Lower Division Courses**

A course may not ordinarily be taken for credit if it is a prerequisite to a course already completed. Students offering high school language preparation as a prerequisite must take a placement test.

1. Elementary Italian. (4) I.

Laboratory—2 hours; recitation—3 hours. The Staff

2. Elementary Italian. (4) II.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 1. Continuation of course 1. The Staff

3. Elementary Italian. (4) III.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 2. Continuation of course 2. The Staff

4. Intermediate Italian. (3) I

Laboratory—1 hour; recitation—3 hours. Prerequisite: course 3 or equivalent. The Staff

5. Intermediate Italian. (3) II.

Laboratory—1 hour; recitation—3 hours. Prerequisite: course 4 or equivalent. Continuation of course 4. The Staff

6. Intermediate Italian. (5) III.

Recitation—5 hours. Prerequisite: course 5. Continuation of course 5. The Staff

Upper Division Courses**101. Advanced Conversation, Composition, and Grammar. (3) I.**

Lecture—3 hours. Prerequisite: course 6 or equivalent. Mr. Bonadeo

102. Advanced Conversation, Composition, and Grammar. (3) II.

Lecture—3 hours. Prerequisite: course 101. Mr. Bonadeo

103. Advanced Conversation, Composition, and Grammar. (3) III.

Lecture—3 hours. Prerequisite: course 102.
Mr. Bonadeo

GENETICS

Sidney R. Snow, Ph.D., *Acting Chairman of the Department*
Department Office, 201 Hutchison Hall

Professors:

Robert W. Allard, Ph.D. (*Genetics and Agronomy*)
Melvin M. Green, Ph.D.
G. Ledyard Stebbins, Ph.D.

Associate Professor:

Sidney R. Snow, Ph.D.

Assistant Professor:

Harris Bernstein, Ph.D.



Professor:

Alex S. Fraser, Ph.D. (*Animal Husbandry*)

Departmental Major Adviser.—See *Schedule and Directory Listing*.

Bachelor of Science Major Program and Graduate Study (Animal Science). See page 52.

Bachelor of Science Major Program and Graduate Study (Plant Science). See page 53.

Lower Division Course

10. Heredity and Evolution. (3) II.

Lecture—3 hours. The general principles of the laws of heredity and evolution for students not specializing in biology. No credit to students who have had or are taking upper division genetics, botany, or zoology courses.

Mr. Fraser

Upper Division Courses

100. Principles of Genetics. (5) I, III.

Lecture—4 hours; discussion—1 hour. Prerequisite: introductory course in zoology, botany or biology; upper division standing. Not open for credit to students who have received credit in course 115. Introduction to genetics with some consideration of its applications in agriculture and biology.

The Staff

100L. Principles of Genetics Laboratory. (1) II, III.

Laboratory—3 hours. Prerequisite: Course 100 or 115 (may be taken concurrently). Laboratory work in basic genetics to supplement courses 100 and 115.

Mr. Bernstein

Professional Course

300. The Teaching of a Modern Foreign Language. (3) III.

Lecture—3 hours. Prerequisite: senior or graduate standing; a major or minor in a modern foreign language.

The Staff

101. Cytogenetics. (3) I.

Lecture—3 hours. Prerequisite: course 100 or 115; a course in general cytology is recommended. Chromosome morphology and behavior as related to genetics and evolution. Mr. Snow

101L. Cytogenetics Laboratory. (2) I.

Laboratory—6 hours. Prerequisite: course 101 (may be taken concurrently). Laboratory study of chromosome morphology and behavior.

Mr. Snow

103. Organic Evolution. (3) III.

Lecture—3 hours. Prerequisite: course 100 or 115. Evolutionary processes in higher organisms.

Mr. Stebbins

104. Developmental Genetics. (3) II.

Lecture—2 hours; discussion—1 hour. Prerequisite: course 100 or 115; Biochemistry 101B. The action of genes in development at the levels of the enzyme molecule, cellular organelle, tissue and organ, with examples from microorganisms, plants, and animals.

Mr. Stebbins

105. Population Genetics. (3) I.

Lecture—2 hours; laboratory—2 hours. Prerequisite: course 100 or 115. An introductory course in the analysis and interpretation of genetic systems in populations.

Mr. Fraser

***106. Advanced Genetics. (3) II.**

Lecture—3 hours. Prerequisite: course 100 or 115; Biochemistry 101B. An introduction to the nature and properties of the gene; gene mutation, the mechanism of gene action, and related topics.

Mr. Green, Mr. Bernstein

115. Human Genetics. (5) II.

Lecture—4 hours; discussion—1 hour. Prerequisite: introductory course in zoology, botany, or biology; upper division standing. Recommended: Mathematics 13 or equivalent. Not open for credit to students who have received credit in course 100. Introduction to genetics with special emphasis on man. This course will also fulfill the needs of preprofessional students and those in other areas of human biology.

Mr. Green

* Not to be given, 1966-67.

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Prerequisite: Consent of instructor, based on adequate preparation of the student in allied fields.

The Staff

Graduate Courses**206. Current Problems in Genetics.** (3) I, II, III.

Lecture—2 hours; laboratory or discussion—2 hours. Prerequisite: courses 100 or 115, consent of the instructor. Selected topics in advanced genetics. May be repeated for credit.

291. Seminar in History of Genetics. (1-3) I.

Seminar—1 hour. Prerequisite: course 100 or 115. The development of modern genetic theories beginning with Mendel. Mr. Stebbins

292. Seminar in Gene Structure and Action. (1-3) I.

Seminar—1 hour. Prerequisite: courses 106, 206 or Bacteriology 170. Topics of current interest related to the structure of genes, mutation, and the mechanism of gene action. Offered in even-numbered years. Mr. Bernstein

293. Seminar in Cytogenetics and Evolution. (1-3) II.

Seminar—1 hour. Prerequisite: course 291 (may be taken concurrently). Topics of current interest related to chromosomal changes, mutation and other genetic changes in natural populations, and the application of genetics to study of organic evolution.

294. Seminar in Breeding Systems. (1-3) III.

Seminar—1 hour. Prerequisite: course 291. Topics of current interest relating genetics to problems of animal and plant breeding.

299. Research. (1-5) I, II, III.

The Staff

GENETICS (A Graduate Group)Sidney R. Snow, Ph.D., *Acting Chairman of the Group*

Group Office, 201 Hutchison Hall

Members of the Group:**Professors:**

Hans Abplanalp, Ph.D. (*Poultry Husbandry*)

Robert W. Allard, Ph.D. (*Genetics and Agronomy*)

Vigfus S. Asmundson, Ph.D. (*Poultry Husbandry; Emeritus*)

Glen N. Davis, Ph.D. (*Vegetable Crops*)

Robert E. Feeney, Ph.D. (*Food Science and Technology*)

Alex S. Fraser, Ph.D. (*Animal Husbandry*)

Melvin M. Green, Ph.D. (*Genetics*)

Paul W. Gregory, Sc.D. (*Animal Husbandry; Emeritus*)

Claron O. Hesse, Ph.D. (*Pomology*)

Paulden F. Knowles, Ph.D. (*Agronomy*)

Robert C. Laben, Ph.D. (*Animal Husbandry*)

Harry H. Laidlaw, Jr., Ph.D. (*Entomology*)

R. Merton Love, Ph.D. (*Agronomy*)

Harold P. Olmo, Ph.D. (*Viticulture and Enology*)

Charles M. Rick, Jr., Ph.D. (*Vegetable Crops*)

Wade C. Rollins, Ph.D. (*Animal Husbandry*)

Charles W. Schaller, Ph.D. (*Agronomy*)

Francis L. Smith, Ph.D., (*Agronomy*)

Paul G. Smith, Ph.D. (*Vegetable Crops*)

Ernest H. Stanford, Ph.D. (*Agronomy*)

G. Ledyard Stebbins, Ph.D. (*Genetics*)

Clyde Stormont, Jr., Ph.D. (*Veterinary Microbiology*)

Associate Professors:

Ursula H. Abbott, Ph.D. (*Poultry Husbandry*)

G. Eric Bradford, Ph.D. (*Animal Husbandry*)

Royce S. Bringhurst, Ph.D. (*Pomology*)

Lloyd A. Lider, Ph.D. (*Viticulture and Enology*)

Sidney R. Snow, Ph.D. (*Genetics*)

Assistant Professors:

Harris Bernstein, Ph.D. (*Genetics*)

James A. Harding, Ph.D. (*Landscape Horticulture*)

Monica Riley, Ph.D. (*Bacteriology*)

Stephen L. Wolfe, Ph.D. (*Zoology*)

Lecturers:

Subodh K. Jain, Ph.D. (*Agronomy*)

Dale G. Smeltzer, Ph.D. (*Agronomy*)

J. Caswell Williams, Jr., Ph.D. (*Agronomy*)

GEOGRAPHY

Kenneth Thompson, Ph.D., *Chairman of the Department*
Department Office, 330 Voorhies Hall

Associate Professors:

^{2,3}Howard F. Gregor, Ph.D.
Kenneth Thompson, Ph.D.
Philip L. Wagner, Ph.D.

Assistant Professors:

Stephen C. Jett, Ph.D.
Roy J. Shlemon, Ph.D.

◇ ◇ ◇

Professor:

Herbert B. Schultz, Ph.D. (*Geography*;
*Associate Professor of Agricultural
Engineering*)

Assistant Professor:

David R. Lee, M.A. (*Acting*)

Lecturers:

Paul D. Marr, M.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Departmental Major Adviser.—Mr. Thompson.

Graduate Adviser.—Mr. Wagner.

Teaching Major.—Requirements for the teaching major are the same as for the undergraduate major for degree, with the addition of Geography 300.

Teaching Minor.—A minimum of 30 quarter units in Geography, including course 300.

Subject Representative: Mr. Shlemon

The Major Program

Lower Division Courses.—Required: Geography 1, 2, 3, 5; Anthropology 2.

Upper Division Courses.—Required: 36 upper division units in geography. Each program should normally include Geography 101 (Methods of Geographic Research), 105 (Cartography), and 151 (History of Geographic Thought).

Students who wish to prepare for further training or employment in the field of Urban and Regional Planning may do so by completing certain additional courses, while fulfilling the requirements for the major, in consultation with the departmental adviser.

Lower Division Courses

1. Physical Geography. (4) I, II, III.

Lecture—4 hours. Basic physical elements of the human habitat, especially climate, landforms, soils, and natural vegetation.

Mr. Shlemon, Mr. Jett

² Absent on leave, fall quarter 1966.

³ Absent on leave, winter quarter 1967.

2. Cultural Geography. (4) I, II, III.

Lecture—4 hours. Distribution and cultural differentiation of human groups. Population, technology, economy, and relation to habitat.

Mr. Jett, Mr. Lee

3. Climate and Weather. (3) II.

Lecture—3 hours. Composition and structure of atmosphere, weather elements, pressure, wind, temperature, moisture, fog, and clouds; weather maps; regional climates and world climate classification; instruments for obtaining climatological data; installation and maintenance of weather stations; evaluation of recordings.

Mr. Schultz

4. Introduction to Maps. (3) I.

Lecture—3 hours. History and principles of cartography; great map-makers; national surveys; modern trends in mapping.

Mr. Lee

5. Economic Geography. (4) I.

Lecture—3 hours; discussion—1 hour. Geographic aspects of the production, exchange, and consumption of goods.

Mr. Thompson

Upper Division Courses

101. Methods of Geographic Research. (4) III.

Lecture and Field Trip one day per week. Prerequisite: courses 1 and 2 and consent of instructor. Research methodology and field study. Systematic mapping and analysis of elements of the natural and cultural landscape.

Mr. Marr

105. Cartography. (4) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 4; or consent of instructor. Theory and construction of map projections; interpretation of maps; compilation and generalization of base-map data; symbolization and processing of map data; cartographic designing and lettering techniques; map reproduction.

Mr. Lee

106. Interpretation of Aerial Photographs. (4) III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 1; or consent of instructor. Analysis of landscape from aerial photographs: land forms; vegetation; land use; settlement; transport and communications. Preparation of contour and planimetric maps, and construction of aerial photo mosaics.

Mr. Marr

119. Arid Lands. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; or consent of instructor. Physical characteristics and human utilization of rainfall deficiency regions.

Mr. Jett

***121A. Eastern North America. (4) I.**

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Natural and economic regions of eastern United States and Canada. Mr. Gregor

121B. Western North America. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Natural and economic regions of western United States and Canada. Mr. Lee

122A. Middle America. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Environment, culture, and economy from Mexico to Panama and in the Caribbean. Mr. Wagner

122B. South America. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Environment, culture, and economy in the South American countries. Mr. Wagner

123A. Western Europe. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Geographic conditions and their relation to the economic, social and political problems of the countries of Western Europe. Mr. Thompson

***123B. Eastern Europe. (4) II.**

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Geographic conditions and their relation to the economic, social and political problems of the countries of Eastern Europe.

124. The Soviet Union. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Physical landscapes and cultural regions of the U.S.S.R.

125A. North Africa and the Near East. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Physical, cultural, and historical geography of the Arab World and its neighbors. Mr. Lee

‡125B. Sub-Saharan Africa. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1 and 2; or consent of instructor. Physical, cultural, and historical geography of Africa south of the Sahara.

131. California. (4) I, II.

Lecture—3 hours; discussion—1 hour. Regions of California: landforms, climate, and other physical characteristics; agricultural, min-

eral, and other resources; and patterns of settlement, population, transportation, and economy. Mr. Shlemon

141A. Economic Geography. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 5; or consent of instructor. Factors in economic regionalism. Analysis of major agricultural regions of the earth. Mr. Marr

141B. Economic Geography. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 5; or consent of instructor. Factors in economic regionalism. Analysis of major industrial regions of the earth. Mr. Gregor

143. Political Geography. (4) III.

Lecture—3 hours; discussion—1 hour. Areal differentiation of major natural and cultural phenomena affecting the world's political organization. Mr. Thompson

151. History of Geographic Thought. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: three upper division courses in geography. The literature of geography: objectives, subdivisions, and development of the subject. Mr. Thompson

155. Urban Geography. (4) I.

Lecture—3 hours; discussion—1 hour. Origin, development, distribution, and regional variation of the world's cities, with emphasis on an analysis of the functions and patterns of American cities. Mr. Marr

156. Regional Structure. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2. Concepts of regional structure and their application to geographic problems; nodes, linkages, circulation, and regions. Quantitative and cartographic methods of regional research.

161. Conservation of Natural Resources. (4) III.

Lecture—3 hours; discussion—1 hour. Principles of the conservation of renewable and non-renewable resources: the conservation movement. Land-use conflicts between forestry, agricultural, mining, and recreational interests, especially in the United States. Mr. Jett

162. Geography of Water Resources. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; or consent of instructor. Geographical survey of water on the land; needs and opportunities for water-resource development and conservation. Historical solutions to water needs of specific areas, and geographical problems associated with current and future water requirements. Mr. Marr

170. Cultural Ecology. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2; or Anthropology 2. Theories

* Not to be given, 1966–1967.

† Not to be given, winter quarter 1967.

of environment-man relations. Ecologic relations of gatherers, fishermen, hunters, swidden cultivators, peasants; their impact on environment; their domestic plants and animals. Mr. Wagner

199. Special Study for Advanced Undergraduates.
(2-4) I, II, III.

The Staff

Graduate Courses

250. Theory and Method in Geography. (4) I.

Lecture—2 hours; discussion—1 hour.
The Staff

291. Seminar in Cultural Geography. (4) II.

Seminar—3 hours. Mr. Wagner

292. Seminar in Physical Geography. (4) III.

Seminar—3 hours. Mr. Shlemon

293. Seminar in Economic Geography. (4) III.

Seminar—3 hours. Mr. Gregor

294. Seminar in Climatology. (4) II.

Seminar—3 hours. Mr. Schultz

299. Research (2-9) I, II, III.

The Staff

Professional Course

300. Problems in Teaching Geography. (2) II.

Lecture—2 hours. Prerequisite: course 1 or 2. Establishing, organizing, and conducting courses in geography and regional study. Designed primarily for prospective elementary and secondary school teachers of the social sciences.

Mr. Thompson

GEOLOGY

Cordell Durrell, Ph.D., *Chairman of the Department*

Department Office, 306A Physical Sciences Building

Professors:

Cordell Durrell, Ph.D.
Charles G. Higgins, Ph.D.

Associate Professors:

Donald O. Emerson, Ph.D.
James W. Valentine, Ph.D.

Assistant Professors:

Charles V. Guidotti, Ph.D.
Emile A. Pessagno, Jr., Ph.D.
Thomas W. Todd, Ph.D.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Departmental Major Adviser.—Mr. Todd

The Major Programs

High school students should note that the preparation for either degree is simplified if their high school programs include foreign language, chemistry, and four years of mathematics.

Bachelor of Science Major Program

The major program consists of 90 units of mathematical and natural science courses including:

Lower Division Courses.—Required: Chemistry 1A-1B-1C or preferably 7A-7B; Geology 1-1L, 4, 5; Mathematics 1A-1B-1C; Physics 4A-4B-4E. Recommended: Biology 1; Mathematics 13; Chemistry 5; Physics 4C-4D.

Upper Division Courses.—Required: 36 units of upper division courses in geology including Geology 102A-102B, 103A-103B, 111, 115, 116, and a summer field course as offered at

the University of California, Berkeley and Los Angeles, or, with departmental approval, its equivalent at another institution.

Bachelor of Arts Major Program

Lower Division Courses.—Required: Chemistry 1A-1B, or 7A; Geology 1-1L, 4, 5; Physics 2A-2B; Biology 1; and one of the following courses: Chemistry 1C; Mathematics 13, Physics 2C, Zoology 2.

Upper Division Courses.—Required: Geology 102A, 103A-103B, 111, 115, 116 and other upper division courses in geology and related fields to total not less than 36 units selected in accordance with a plan approved by the major adviser.

Honors and Honors Program (see page 95).—The honors program in geological sciences consists of course 194H and an honors thesis incorporating studies undertaken in course 194H.

Graduate Study.—The Department of Geology offers a program of study and research leading to the M.S. and Ph.D. degrees. For information regarding graduate study in geology, address the Graduate Adviser, Department of Geology.

Teaching Major.—Requirements for the teaching major are the same as for undergraduate major for degree (B.A. or B.S.).

Teaching Minor.—Thirty units (quarter units) to be selected with the advice of the subject representative. Eighteen of the 30 units must be at the upper division or graduate level.

Subject Representative: Mr. Todd

Lower Division Courses

1. Principles of Geology. (3) I, III.

Lecture—3 hours. Recommended: course 1L (may be taken concurrently). The processes that

¹ Absent on leave, 1966-67.

affect the earth, and the history of the earth and its inhabitants.

The Staff

11L. Principles of Geology, Laboratory. (1) I, III.

Laboratory—3 hours. Prerequisite: course 1 (may be taken concurrently). Identification of common minerals and rocks and fossils; introduction to geologic maps, structure sections, and seismograms.

The Staff

4. Crystallography. (4) II.

Lecture—2 hours; laboratory—6 hours. An introduction to morphological and x-ray crystallography.

Mr. Guidotti

5. Crystal Chemistry. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 4, Chemistry 1A. Chemistry and structure of minerals.

Mr. Guidotti

Upper Division Courses

102A. Field Geology. (3) I.

Laboratory—3 hours; field—1 day per week. Prerequisite: courses 1, 103A (may be taken concurrently). Principles and methods of geologic mapping. Preparation of geologic reports.

The Staff

102B. Field Geology. (3) III.

Laboratory—3 hours; field, 1 day per week. Prerequisite: courses 102A, 103B and 116. Continuation of course 102A.

The Staff

103A–103B. Petrology and Physical Mineralogy. (4–4) I, II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: courses 1 and 4. Physical properties of rock-forming minerals. Origins and characteristics of rocks. Laboratory study of hand specimens of rocks and minerals.

Mr. Durrell

108. Optical Mineralogy. (4) I.

Lecture—2 hours; laboratory—6 hours. Principles of optical crystallography; microscopic study of mineral fragments and thin sections.

109A. Petrology and Petrography: Igneous Rocks. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 108. Characteristics and origin of igneous rocks; laboratory study by advanced methods.

109B. Petrology and Petrography: Metamorphic Rocks. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 108. Characteristics and origins of metamorphic rocks, laboratory study by advanced methods.

Mr. Guidotti

109C. Petrology and Petrography: Sedimentary Rocks. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: courses 109A or 109B. Characteris-

tics and origin of sedimentary rocks; laboratory study by advanced methods.

Mr. Todd

111. Morphology of Fossil Invertebrates. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 115 or Biology 1; or consent of instructor. Morphology, systematics, paleoecology, and evolution of the larger invertebrates, with emphasis on the megafossil groups such as the Porifera, Coelenterata, Brachiopoda, Mollusca, Arthropoda, and Echinodermata.

112. Stratigraphy. (4) I.

Lecture—4 hours. Prerequisite: course 1. The principles of stratigraphy, sedimentation, and sedimentary tectonics.

Mr. Valentine

113. Paleoecology. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 111 or 114 or a course in invertebrate zoology or invertebrate morphology. Interpretation of relations of fossil organisms among themselves and with their ancient environments, and of their patterns of association and distribution in space and time; emphasis on the marine environment. Field trips.

Mr. Valentine

114. Micropaleontology. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 115; Biology 1; or consent of instructor. Morphology, systematic paleoecology, and phylogeny of smaller invertebrates, with emphasis on the Foraminifera, Radiolaria, Ostracoda, and Bryozoa.

115. Principles of Paleobiology. (2) I.

Lecture—2 hours. Prerequisite: course 1, or high school biology or zoology. Origin and diversification of the major phyla, with emphasis on principles of evolution, ecology, and systematics and their interrelation in producing the biotic history reflected in the fossil record.

Mr. Valentine

116. Structural Geology. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1. Deformation of the earth; causes, mechanics, and effects of crustal deformation.

Mr. Todd

117. Geomorphology. (4) II.

Lecture—3 hours; laboratory—3 hours. Sculpture of the earth's surface by natural processes.

Mr. Higgins

150. Engineering Geology. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 1A; Mathematics 1A or 16A; Physics 2A or 4A. Geologic processes; properties of geologic materials; the interpretation of field and laboratory data important to engineering problems.

Mr. Todd

152. Photogeology. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 1 or 150. Introduction to aerial photography and photogrammetry; the use of air photos in interpretation of regional geologic structure, rock types and geologic history by analysis of land forms, drainage patterns, soils, vegetation, and outcrop patterns. Offered in odd-numbered years.
Mr. Higgins

194H. Special Study for Honor Students. (3) I, II, III.

Prerequisite: open only to majors of senior standing who qualify for the honors program. Independent study of selected topics under direction of the staff. Completion will involve the writing of an honors thesis.
The Staff

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: senior standing in geology.
The Staff

199. Special Study for Advanced Undergraduates.

(1-4) I, II, III.

The Staff

Graduate Courses**213. Geomorphology. (3) III.**

Seminar—3 hours. Prerequisite: course 117. Surficial processes and the evolution of land forms. Offered in even-numbered years.
Mr. Higgins

236. Physical Geology of California. (2) I, II, III.

Seminar—2 hours. May be repeated for credit.
Mr. Durrell

GERMAN

Clifford A. Bernd, Dr. phil., *Chairman of the Department*

Department Office, 722 Sproul Hall

Associate Professors:

Clifford A. Bernd, Dr. phil.
Ulrich Gaier, Dr. phil.
Roland W. Hoermann, Ph.D.

Assistant Professors:

Wolfgang Bender, Dr. phil.
John F. Fetzer, Ph.D.
H. Guenther Nerjes, Ph.D.,

◇ ◇ ◇

Professors:

Friedrich Beissner, Dr. phil. (*Visiting*)
Wolfgang Preisendanz, Dr. phil. (*Visiting*)

Assistant Professors:

William M. Estabrook, M.A. (*Acting*)
Michael Winkler, M.A. (*Acting*)

Lecturer:

Anthony S. Kawczynski, Mag. phil.

255. Genesis of Metamorphic Rocks. (3) I.

Seminar—3 hours. Prerequisite: course 109B. Recommended: course 109C. Mr. Guidotti

257A. Sedimentary Petrology: Terrigenous Rocks. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 109C. Offered in even-numbered years.
Mr. Todd

257B. Sedimentary Petrology: Carbonate Rocks. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 109C. Offered in odd-numbered years.
Mr. Todd

260. Paleontology. (3) III.

Seminar—3 hours. Prerequisite: courses 111, 115, or graduate status in a life science. Selected problems in paleontology.
Mr. Pessagno, Mr. Valentine

280. Igneous Petrology. (3) I.

Seminar—2 hours; laboratory—3 hours. Prerequisite: course 109A. Recommended: courses 109B, 109C.

298. Group Study. (2) I, II, III.

The Staff

299. Research. (1-6) I, II, III.

The Staff

Department Major Advisers.—Mr. Gaier,
Mr. Fetzer.

Graduate Adviser.—Mr. Nerjes.

The Major Program

Lower Division Courses.—German 1, 2, 3, 11, 12, 48A, 48B, 49 or their equivalents.

Upper Division Courses.—Forty units in upper division courses, including German 101, 102, 103, 119, 190, and one course from each of the following groups:

- (a) Course 120, 121, 122
- (b) Course 123, 124, 125, 126
- (c) Course 127, 128, 129, 130
- (d) Course 131, 132, 133, 134

Four of the 40 units may be related work in other departments subject to the approval of the major adviser.

Honors and Honors Program (see page 95).—The honors program comprises two quarters of study under course 194H, which will include a research paper and a comprehensive examination.

The Master of Arts Degree

The Department offers programs of study leading to the M.A. degree. A minimum of 36 units is required. Required courses are German 202, 210. In addition, candidates for the M.A. will be expected to acquire a reading knowledge of French. Further information may be obtained by writing to the Graduate Adviser.

The Degree of Doctor of Philosophy

The Department offers programs of study and research leading to the Ph.D. degree. Detailed information may be obtained by writing to the Graduate Adviser.

Teaching Major.—Lower division requirements are the same as for the departmental major. A total of 36 upper division units is required, including courses 101, 102, 103, 119, 190, and 300.

Teaching Minor.—Six quarter courses in the lower division. Usually these will consist of German 1, 2, 3, 11, 12, and 49. A total of 18 upper division units is required, including German 101, 102, and 103.

Subject Representative: Mr. Fetzer

Lower Division Courses**1. Elementary German. (4) I, II, III.**

Recitation—3 hours; laboratory—2 hours.
Mr. Estabrook

1G. German for Graduate Students. No Credit. I.

Lecture—3 hours. A course designed to prepare students for the graduate reading examination.
Mr. Kawczynski

2. Elementary German. (4) I, II, III.

Recitation—3 hours; laboratory—2 hours.
Continuation of course 1. Mr. Kawczynski

3. Elementary German. (4) I, II, III.

Recitation—3 hours; laboratory—2 hours.
Prerequisite: course 2. Continuation of course 2.
Mr. Winkler

11. Intermediate German. (3) I, II, III.

Recitation—3 hours; laboratory—1 hour.
Prerequisite: course 3. Spoken German stressed; class discussion of modern short stories, with inductive review of grammar. Mr. Fetzer

12. Intermediate German. (3) I, II, III.

Recitation—3 hours; laboratory—1 hour.
Prerequisite: course 11. Spoken German stressed through class discussion of a variety of selected readings. A continuation of course 11.
Mr. Winkler

12R. Intermediate German—Reading. (3) I, II, III.

Lecture—3 hours. Prerequisite: course 11. Intensive emphasis on reading and translation of materials from the natural and social sciences. A continuation of course 11. Mr. Nerjes

48A. Spoken German. (2) I, II, III.

Discussion—2 hours. Prerequisite: course 12; for German majors, concurrent enrollment in course 49. Intensive conversational practice based on the everyday vocabulary of reading assignments in German newspapers and contemporary literature. Mr. Nerjes

48B. Spoken German. (2) I, II, III.

Discussion—2 hours. Prerequisite: course 12; may be taken concurrently with 48A and 49. Intensive conversational practice and discussions based on selected literary texts; oral interpretation of dramatic roles in representative dramas and one-act plays. Mr. Nerjes

49. Advanced German. (3) I, II, III.

Lecture—3 hours. Prerequisite: concurrent enrollment in 48A or 48B. Review of grammatical and stylistic principles by means of written exercises; expanding of comprehension vocabulary through rapid and extensive readings of modern prose, dramatic and verse texts. Mr. Gaier

Upper Division Courses**101. Composition and Conversation. (4) I.**

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 48A, 48B, and 49. Mr. Winkler

102. Composition and Conversation. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 49. Intermediate essay-writing; analysis of literary and journalistic styles; extension of active writing and speaking vocabulary through semantic treatment of word families. Mr. Winkler

103. Advanced Composition. (4) III.

Lecture—3 hours. Prerequisite: course 102. Advanced prose style and original composition. Mr. Winkler

104. Advanced German Grammar. (4) I.

Lecture—3 hours. Prerequisite: course 101 or 102. The morphology, syntax, and stylistics of modern written usage as demonstrated in contemporary texts. Offered in even-numbered years. Mr. Estabrook

105. History of the German Language. (4) II.

Lecture—3 hours. Prerequisite: course 102. Survey of the linguistic development from the Germanic and Old High German sound shifts; Middle High diptongization and monophthongization, Ablaut and Umlaut phenomena; "Kanzleisprache" and Luther; origins of modern comparative philology with the Grimms; elementary phonetics. Offered in odd-numbered years. Mr. Estabrook

106. Linguistic Structure of German (4) I.

Lecture—3 hours; participation in the form of assignment submitted for evaluation—1 hour.

A linguistic analysis of modern standard German including phonetics, phonemics, morphology and Syntax. Offered in even-numbered years.

Mr. Estabrook

108. Contrastive Structures of English and German. (4) II.

Lecture—3 hours; other—1 hour. Prerequisite: course 106. A contrastive study of the linguistic structures of English and German. Offered in even-numbered years. Mr. Estabrook

110. Masterpieces of German Prose from Goethe to Kafka. (3) I.

Lecture—3 hours. Study in translation of works which have helped shape the European tradition in the novel and short story or were crucial in the development of German literature. Knowledge of German not required; may not be counted as part of the major in German. Offered in even-numbered years. Mr. Bernd

111. Masterpieces of German Drama from Lessing to Brecht. (3) I.

Lecture—3 hours. Study in translation of works which have helped shape the European drama or were crucial in the development of German literature. Knowledge of German not required; may not be counted as part of the major in German. Offered in odd-numbered years.

Mr. Fetzer

112. Masterpieces of German Poetry from Walther von der Vogelweide to Rilke. (3) III.

Lecture—3 hours. Study in translation of the German Lyric genius from medieval love poetry through the classicism of Goethe and Hölderlin to the mysticism of Rilke. Knowledge of German not required; may not be counted as part of the major in German. Offered in odd-numbered years.

Mr. Gaier

114. Goethe's Faust. (4) II.

Lecture—3 hours. A detailed analysis and aesthetic critique in English of both "Parts," together with the first-draft *Urfaust*. Knowledge of German not required; German majors fulfill readings in German. Offered in even-numbered years.

Mr. Winkler

115. German Literature of the Twentieth Century. (4) II.

Lecture—3 hours. Representative readings in translation from Rilke, Kafka, Hesse, Thomas Mann, and others. Knowledge of German not required; may not be counted as part of the major in German. Offered in odd-numbered years.

Mr. Hoermann

119. Survey of German Literary Periods. (4) I, III.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. An integrated view of the

philosophical, historical, and stylistic components in the development of the German literary tradition.

Mr. Fetzer

120. The Medieval Period in German Literature. (4) III.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. The literary-philosophical profile of the "Mittelhochdeutsche Blütezeit" in terms of the significant courtly and folk epics and the "Minnesang." Readings in modern German translation. Offered in odd-numbered years.

Mr. Estabrook

121. The Renaissance and Reformation Period in German Literature. (4) II.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. The distinctive thought and literary values of the period from *Der Ackermann aus Böhmen* through the "Meistersgesang" and "Fastnachtspiel" of Hans Sachs. Offered in even-numbered years.

Mr. Gaier

122. The Baroque Period. (4) II.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. The stylistic and philosophical predicament of the Thirty-Years War era as documented in the works of Opitz and the Silesian Schools to Grimmelshausen and Gryphius. Offered in odd-numbered years.

Mr. Gaier

123. The Period of Enlightenment and Rococo in German Literature. (4) II.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. The era of eighteenth-century rationalism, from the imitative classicism of Gottsched, through the Anacreontic idylls, Wieland's epic art, and the aesthetics of Winckelmann, to the new humanism of Lessing. Offered in even-numbered years.

Mr. Nerjes

124. Sentimentality and "Sturm und Drang." (4) III.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. The styles of "Empfindsamkeit," pietistic nature mysticism, and Storm and Stress from the "Rührstück" of Gellert and Lessing, through Klopstock's dithyrambic verse forms, to the youthful naturalism of the "Geniezeit" in Herder, Goethe, and Schiller. Offered in even-numbered years.

Mr. Nerjes

125. The Classicism of Goethe. (4) III.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. Goethe's mature development beginning with the removal to Weimar: the great ballads, Roman Elegies, *Hermann und Dorothea*, and the *West-östlicher Diwan*, in his *Iphigenie* and *Tasso* dramas, and in prose selections from *Wilhelm Meisters Lehrjahre*, *Die Wahlverwandtschaften* and *Dichtung und Wahrheit*. Offered in odd-numbered years.

Mr. Fetzer

126. The Classicism of Schiller. (4) II.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. Schiller's historical idealism, beginning with the Dresden phase of his *Don Carlos*, proceeding through the aesthetic tracts and great ballads, to the master dramas of the Wallenstein trilogy, *Maria Stuart*, *Jungfrau von Orleans*, *Braut von Messina*, and *Wilhelm Tell*. Offered in even-numbered years. Mr. Nerjes.

127. The Romantic Age. (4) III.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. The Napoleonic era from the Jena school of the Schlegels, Novalis, and Schelling, through the Arnim-Brentano group in Heidelberg, to the Berlin circle including Tieck, Eichendorff, and Hoffmann; contrasting delineation through special treatment of Jean Paul, Hölderlin, and Kleist. Offered in even-numbered years. Mr. Hoermann

128. Nineteenth-Century German Realism. (4) II.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. Response to the Restoration era; irony and cynicism in Grabbe's and Büchner's dramas; Heine's "Jungdeutschland" protest; Biedermeier, withdrawal in Grillparzer Mörike, and Drosté-Hülshoff; poetic realism in Hebbel's and Ludwig's dramas and in novelistic art of Stifter, Keller, Storm, and Meyer. Offered in odd-numbered years. Mr. Bernd

129. Naturalism to Neo-Classicism in German Literature. (4) II.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. From Hauptmann and the social protest of north-German naturalism, through the Viennese psychological impressionism of Schnitzler and the neo-romanticism of Hofmannsthal and Hesse, to Rilke and the collective mysticism of the "George-Kreis." Offered in even-numbered years. Mr. Winkler

130. The Modern Period from Expressionism to the Present. (4) I.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. The moral and existential quandary from Nietzsche, Wedekind, and the wartime generation of dramatists, through the poetry of Trakl, Loerke, and Benn; novelistic mastery in Thomas Mann and Kafka, and the new theater of Brecht, Frisch, and Dürrenmatt. Offered in odd-numbered years. Mr. Hoermann

131. The German Novel. (4) III.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. Comparative stylistic study of the genre by means of representative cross-sections of such masterworks as *Parzival*, *Simplicissimus*, *Wilhelm Meister*, Keller's *Der grüne Heinrich*, Mann's *Zauberberg*, Kafka's *Schloss*, Hesse's *Glasperlenspiel*, and Frisch's *Stiller*. Offered in odd-numbered years. Mr. Nerjes

132. The German Novelle. (4) II.

Lecture—3 hours. Prerequisite: course 49 or the equivalent. Stylistic analysis of the genre from Goethe and Kleist, through the master "Novelle" of the second half of the nineteenth century, to Thomas Mann, Kafka, and the post-war generation. Offered in even-numbered years. Mr. Bernd

133. The German Drama. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 49 or the equivalent. A generic, comparative study based on representative works from the Renaissance beginnings and Gryphius, through Lessing, Kleist, Schiller, and Hebbel, to the drama of Naturalism, Expressionism, and the "Epic Theater" of Brecht. Offered in even-numbered years. Mr. Hoermann

134. German Poetry. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 49 or the equivalent. Analysis and study of representative lyric modes as deduced from the master specimens of verse throughout German literature. Offered in even-numbered years. Mr. Gaier

190. Proseminar in a Major Writer. (4) I.

Lecture—3 hours. Prerequisite: senior standing; or consent of instructor. Introduction to techniques of independent research and seminar reporting and rebuttal, by means of term projects, joint analyses, and stylistic critique. Mr. Bernd

194H. Special Study for Honors Students.

(5) I, II, III.

Prerequisite: open only to honors students. Guided research leading to an honors paper. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses**200. Gothic. (4) I.**

Seminar—3 hours. Phonology, grammar and reading of Gothic texts. Special topics including the relationship of Gothic to Indo-European and to the other Germanic languages. Knowledge of Modern German not required. Offered in even-numbered years. Mr. Estabrook

201. Old High German. (4) II.

Seminar—3 hours. A study of the beginnings of German as a written language through the reading of selected texts from the eighth through the eleventh centuries. A linguistic analysis of the dialects. Offered in even-numbered years. Mr. Estabrook

202. Middle High German. (4) III.

Seminar—3 hours. Outline of grammar; selections from Middle High German epic and lyric poetry. Offered in odd-numbered years. Mr. Estabrook

203. Old Saxon. (4) III.

Seminar—3 hours. A study of the linguistic structure and the literary significance of the language of the Old Saxon *Heliand*. Knowledge of Modern German not required. Offered in even-numbered years. Mr. Estabrook

210. Techniques of Literary Scholarship. (4) I.

Seminar—3 hours. The bibliographic, organizational, and methodological tools and resources for advanced, independent research. Mr. Bernd

250. Walther von der Vogelweide and the

"Minnesang." (4) II.

Seminar—3 hours. Offered in even-numbered years. Mr. Estabrook

251. Studies in the Works of Andreas

Gryphius. (4) II.

Seminar—3 hours. Offered in even-numbered years. Mr. Bender

252. The Writings of Lessing. (4) I.

Seminar—3 hours. Offered in odd-numbered years. Mr. Nerjes

253. Goethe. (4) III.

Seminar—3 hours. Offered in even-numbered years. Mr. Nerjes

254. Schiller. (4) II.

Seminar—3 hours. Offered in odd-numbered years. Mr. Nerjes

255. Hölderlin. (4) III.

Seminar—3 hours. Offered in odd-numbered years. Mr. Beissner

256. Studies in the Prose of Jean Paul. (4) I.

Seminar—3 hours. Offered in even-numbered years. Mr. Preisendanz

257. Heinrich von Kleist. (4) III.

Seminar—3 hours. Offered in even-numbered years. Mr. Bernd

258. The Novels of Thomas Mann. (4) II.

Seminar—3 hours. Offered in odd-numbered years. Mr. Bernd

HISTORY

Walter L. Woodfill, Ph.D., *Chairman of the Department*

Department Office, Voorhies Hall

Professors:

W. Turrentine Jackson, Ph.D.

²Kwang-Ching Liu, Ph.D.

C. Bickford O'Brien, Ph.D.

³Peter Paret, Ph.D.

James H. Shideler, Ph.D.

⁴F. Wilson Smith, Ph.D.

Walter L. Woodfill, Ph.D.

259. Studies in Kafka. (4) I.

Seminar—3 hours. Offered in odd-numbered years. Mr. Winkler

260. The Poetry of Rilke. (4) I.

Seminar—3 hours. Offered in even-numbered years. Mr. Gaier

261. Brecht and the Epic Theater. (4) III.

Seminar—3 hours. Offered in odd-numbered years. Mr. Hoermann

291. Seminar in Middle High German

Literature. (4) II.

Seminar—3 hours. Offered in odd-numbered years. Mr. Estabrook

292. Seminar in the Renaissance and Baroque

Periods. (4) I.

Seminar—3 hours. Offered in odd-numbered years. Mr. Gaier

293. Seminar in the Classical Age. (4) I.

Seminar—3 hours. Offered in even-numbered years. Mr. Nerjes

294. Seminar in the Romantic Period. (4) II.

Seminar—3 hours. Offered in even-numbered years. Mr. Hoermann

295. Seminar in Nineteenth-Century

Literature. (4) III.

Seminar—3 hours. Offered in odd-numbered years. Mr. Fetzer

296. Seminar in Twentieth-Century

Literature. (4) III.

Seminar—3 hours. Offered in even-numbered years. Mr. Winkler

298. Group Study. (1-9) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

Professional Course

300. The Teaching of a Modern Foreign Language. (3) II.

Lecture—3 hours. Prerequisite: senior or graduate standing; a major or minor in a modern foreign language. Mr. Kawczynski

Associate Professors:

¹David L. Jacobson, Ph.D.

Rollie E. Poppino, Ph.D.

Richard N. Schwab, Ph.D.

Irwin Unger, Ph.D.

²F. Roy Willis, Ph.D.

¹ Absent on leave, 1966-67.

² Absent on leave, fall quarter 1966.

³ Absent on leave, winter quarter 1967.

⁴ Absent on leave, spring quarter 1967.

Assistant Professors:

Arthur F. Corwin, Ph.D.
 Craig B. Fisher, Ph.D.
 Manfred P. Fleischer, Ph.D.
 Paul Goodman, Ph.D.
 C. Roland Marchand, Ph.D.
 *Richard Millman, Ph.D.
 Morgan B. Sherwood, Ph.D.
 *Donald C. Swain, Ph.D.

**Associate Professor:**

William J. Jones, Ph.D. (*Visiting*)

Assistant Professor:

Daniel M. Mulholland, M.A. (*Acting*)

Lecturer:

Jung-Pang Lo, Ph.D.

Associate:

John W. McDermott, Jr., M.A.T.

Letters and Science List.—All undergraduate courses in history are included in the Letters and Science List of Courses (see page 98).

Departmental Advisers.—Mr. Corwin, Mr. Goodman, Mr. Fisher, Mr. Fleischer, Mr. Jacobson, Mr. Liu, Mr. Lo, Mr. Marchand, Mr. Millman, Mr. Mulholland, Mr. Poppino, Mr. Schwab, Mr. Sherwood, Mr. Swain, Mr. Unger, Mr. Willis.

Graduate Advisers.—Mr. Liu, Mr. O'Brien, Mr. Shideler, Mr. Smith.

Introductory Courses.—Courses 4A, 4B, 4C, 17A, and 17B are open to all students.

The American History and Institutions requirement may be satisfied by any two of the following courses: History 17A, 17B, 170A, 170B, 170C, 171A, 171B, 171C, 173, 174A, 174B, 175A, 175B, 176A, 176B, 178A, 178B, 179A, 179B, 180, 183A, 183B. See also page 32.

The Major Program

Lower Division Courses.—Required: Courses 4A, 4B, 4C, 17A, 17B. It is recommended that students, in consultation with their advisers, also take at least 6 or 8 units (normally a two-quarter sequence of courses) in one of the following fields: cultural anthropology, cultural geography, principles of economics, English literature, literature of the United States, philosophy, political science, psychology, or sociology.

Upper Division Courses.—Required: Students majoring in history must complete at least 36 upper division units in history, including:

(a) A minimum of 12 units (including a two-

² Absent on leave, fall quarter 1966.

⁴ Absent on leave, spring quarter 1967.

quarter sequence of courses) in a field of concentration (for "field" see below).

(b) A minimum of 8 units each in two other fields of history. (The fields referred to are Great Britain, Europe, Russia, East Asia, Latin America, and the United States).

Honors and Honors Program (see page 95).—A student may become eligible for graduation with honors in history by enrolling in the department's honors program, and will be invited by the department to do so. This program comprises course 101A, normally taken during the junior year, and the writing of a research paper in History 101B, 199, or other approved course during the senior year. Before being admitted to the honors program, a student must complete 20 units of history, including both United States and European history (normally courses 4 and 17) with an average grade of B.

Graduate Study.—The Department of History offers programs of study and research leading to the M.A. and Ph.D. degrees in history. Detailed information may be obtained by writing to the Graduate Adviser, Department of History.

Teaching Major.—Requirements are the same as for the departmental major plus course 300.

Teaching Minor.—Thirty-two units of history, including 4A–4B–4C, 17A–17B, and 12 units of upper division course work. The 12-units of upper division work should include a two-quarter sequence.

Subject Representative: Mr. Jacobson

Lower Division Courses**4A. History of Western Civilization. (4) I.**

Lecture—3 hours; discussion—1 hour. The growth of western civilization from ancient times through the middle ages. The Staff

4B. History of Western Civilization. (4) II.

Lecture—3 hours; discussion—1 hour. The development of western civilization from the Renaissance through 1815. The Staff

4C. History of Western Civilization. (4) III.

Lecture—3 hours; discussion—1 hour. The development of western civilization in the nineteenth and twentieth centuries. The Staff

17A. History of the United States. (4) I, II.

Lecture—3 hours; discussion—1 hour. The growth of the American people from colonial times through the Civil War. The Staff

17B. History of the United States. (4) II, III.

Lecture—3 hours; discussion—1 hour. The American people from Reconstruction to the present. The Staff

Upper Division Courses**101A. Introduction to Historical Thought and Writing. (4) III.**

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. 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.

Mr. Marchand

101B. Introduction to Historical Method. (4) I., II.

Discussion—4 hours. Prerequisite: consent of instructor. The development of skills in historical research and composition through individual, guided research. An extensive paper is required.

The Staff

111A. Ancient History. (4) I.

Lecture—4 hours. History of the ancient empires of the Near East and of the Greek city-states to the fifth century B.C. Mr. Fisher

111B. Ancient History. (4) II.

Lecture—4 hours. History of Greece, the Hellenistic kingdoms, and Rome from the fifth century B.C. to the Punic Wars. Mr. Fisher

111C. Ancient History. (4) III.

Lecture—4 hours. History of Rome and its empire from the Punic Wars to Constantine.

Mr. Fisher

121A. Medieval History. (4) I.

Lecture—4 hours. European history from Constantine to the eighth century. Mr. Fisher

121B. Medieval History. (4) II.

Lecture—4 hours. European history from Charlemagne to the eleventh century.

Mr. Fisher

121C. Medieval History. (4) III.

Lecture—4 hours. European history from the Crusades to the Renaissance. Mr. Fisher

131A. Early Modern European History. (4) I.

Lecture—3 hours. Recommended: courses 4A and 4B. Western European history from about 1350 to about 1500. Mr. Fleischer

131B. Early Modern European History. (4) II.

Lecture—3 hours. Recommended: courses 4A, 4B, 131A. Western European history from about 1500 to about 1650. Mr. Fleischer

131C. Early Modern European History. (4) III.

Lecture—3 hours. Recommended: courses 4A, 4B, 131B. Western European history from about 1650 to about 1789. Mr. Fleischer

133. The Age of Reason. (4) I.

Lecture—3 hours; discussion—1 hour. A study of the relationship of ideas and institutions in European society during the late seventeenth century and the eighteenth century.

Mr. Schwab

134A. The Age of Revolution. (4) II.

Lecture—3 hours; discussion—1 hour. Ideas and institutions during the French Revolution and the Napoleonic era. Mr. Schwab

134B. The Age of Revolution. (4) III.

Lecture—3 hours; discussion—1 hour. Ideas and revolutions in Europe since 1815.

Mr. Schwab

137A. Russian History: Kievan and Muscovite Russia. (4) I.

Lecture—3 hours. Russian civilization from earliest times to the reign of Peter the Great. Mr. O'Brien

137B. Russian History: The Empire to 1856. (4) II.

Lecture—3 hours. Russian civilization from the Age of Peter the Great through the Crimean War. Mr. O'Brien

137C. Russian History: The Empire, 1856–1914. (4) I.

Lecture—3 hours. Russian civilization from the Crimean War to the outbreak of the First World War. Mr. Mulholland

137D. Russian History: Soviet Russia. (4) II.

Lecture—3 hours. Russia from the Revolution of 1917 to the Age of Stalin. Mr. Mulholland

139. Studies in Modern Russian History. (4) III.

Lectures and discussion—3 hours. Prerequisite: course in Russian history before 1917; or consent of instructor. Reading in sources and monographs on the history of Russia from the time of Troubles to the Crimean War; lectures, discussions, and reports. Mr. O'Brien

141. France since 1815. (4) I.

Lecture—3 hours. Mr. Willis

144A. History of Germany to 1815. (4) II.

Lecture—3 hours. Prerequisite: courses 4A and 4B. A history of the Germanies through the Congress of Vienna. Mr. Paret

144B. History of Germany since 1815. (4) III.

Lecture—3 hours. Prerequisite: courses 4C and 144A. The German national unification, the age of Bismarck and William II, and the wars and revolutions of the twentieth century. Mr. Paret

145A. Europe in the Nineteenth Century. (4) I.

Lecture—3 hours. A survey of the history of Europe from 1815 to 1870. Mr. Millman

145B. Europe in the Nineteenth Century. (4) II.

Lecture—3 hours. A survey of the history of Europe from 1870 to 1918. Mr. Millman

146A. Europe in the Twentieth Century. (4) II.

Lecture—3 hours. A survey of the history of Europe from 1919 to 1939. Mr. Willis

146B. Europe in the Twentieth Century. (4) III.

Lecture—3 hours. A survey of the history of Europe since 1939. Mr. Willis

***147. Ideas and Politics in Twentieth-Century Europe. (4) III.**

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 4A, 4B, and 4C; or consent of instructor. Political, military, and intellectual history of Europe from the turn of the century to the present. Extensive source readings.

Mr. Paret

148A. Diplomatic History of Modern Europe. (4) I.

Lecture—3 hours. A survey of the diplomatic relations of the European powers from the eighteenth century to the middle of the nineteenth century.

Mr. Millman

148B. Diplomatic History of Modern Europe. (4) II.

Lecture—3 hours. A survey of the diplomatic relations of the European powers from the Crimean War to 1890.

Mr. Millman

***148C. Diplomatic History of Modern Europe. (4) III.**

Lecture—3 hours. A survey of the diplomatic relations of the European powers from 1890 to the 1930's.

Mr. Millman

***149. History of Military Thought and Policy from Machiavelli to the Present. (4) I.**

Lecture—3 hours. Prerequisite: courses 4A, 4B, 4C. Recommended: additional background in history, political theory, or sociology. An analysis of military affairs and of their interaction with intellectual, social, economic, and political history since the Renaissance.

Mr. Paret

151A. History of England. (4) I.

Lecture—3 hours. Recommended: course 4A. A survey of English history to the latter part of the fifteenth century.

Mr. Woodfill

151B. History of England. (4) II.

Lecture—3 hours. Recommended: courses 4A, 4B, and 151A. A survey of English history from the latter part of the fifteenth century to the latter part of the eighteenth century.

Mr. Woodfill

151C. History of England. (4) III.

Lecture—3 hours. Recommended: courses 4B, 4C, 151A, and 151B. A survey of English history from the latter part of the eighteenth century to the present.

Mr. Woodfill

***152A. English Constitutional History. (4) II.**

Lecture—2 hours; discussion—2 hours. Recommended: course 151A. From Anglo-Saxon times to the reign of Edward IV.

***152B. English Constitutional History. (4) III.**

Lecture—2 hours; discussion—2 hours. Recommended: courses 151B or 154, 151C, and 152A. From the reign of Edward IV to the present.

* Not to be given, 1966-67.

154. Tudor and Stuart England. (4) III.

Lecture and discussion—3 hours. Prerequisite: consent of instructor. Recommended: courses 151A and 151B.

161A. Latin American History. (4) I.

Lecture—3 hours. Colonial history of Latin America.

Mr. Corwin

161B. Latin American History. (4) II.

Lecture—3 hours. The national period of Latin American history.

Mr. Corwin

162. History of Cuba and the Spanish Caribbean. (4) III.

Lecture—3 hours. The history of Cuba and the Spanish Caribbean since 1492, including discovery and settlement, slavery and the plantation economy, independence movements, and United States relations with the island republics. Emphasis on the period since 1898. Offered in odd-numbered years.

Mr. Corwin

163. History of Brazil. (4) I.

Lecture—3 hours. The history of Brazil since 1500, dealing with the colonial origins and subsequent development of political, economic, and social institutions. Emphasis on the period since independence.

Mr. Poppino

164. History of Argentina. (4) III.

Lecture—3 hours. The history of Argentina from about 1800 to the present, stressing the contributions of the colonial heritage and nineteenth-century political, economic, and social developments to the rise of Argentine nationalism. Offered in even-numbered years.

Mr. Corwin

165. Latin American Social Revolutions. (4) II.

Lecture—3 hours. Prerequisite: a reading knowledge of Spanish is recommended. Major social upheavals since 1900 in Mexico, Argentina, Brazil, Bolivia, Guatemala, and Cuba, examined as to similarities and differences in causes, course, and consequences.

Mr. Poppino

166. History of Mexico. (4) III.

Lecture—3 hours. The colonial origin and development of the Mexican nation; its political, economic, and social institutions. Emphasis on the period since 1910.

Mr. Corwin

167. Proseminar in Latin American History. (4) I, III.

Discussion—4 hours. Prerequisite: courses 161A or 161B, or the equivalent; consent of instructor. Recommended: reading knowledge of Spanish or Portuguese. Research and writing on selected topics in Latin American history.

Mr. Corwin, Mr. Poppino

168. History of Inter-American Relations. (4) III.

Lecture—3 hours. Prerequisite: a reading knowledge of Spanish or Portuguese is recom-

mended. Diplomatic history of Latin America since independence, intra-Latin American relations, relations with the U.S., participation in international organizations, and communism in Latin America.

Mr. Poppino

170A. Colonial America. (4) I.

Lecture—3 hours; discussion—1 hour. 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.

Mr. Jacobson

170B. The American Revolution. (4) II.

Lecture—3 hours. An 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.

Mr. Jacobson, Mr. Goodman

170C. The Early National Period. 1789–1815. (4) III.

Lecture—3 hours. The political and social history of the American republic from the adoption of the Constitution through the War of 1812 and its consequences.

Mr. Goodman

171A. The Jacksonian Era. (4) I.

Lecture—3 hours. The political and social history of the American Republic from the end of the War of 1812 to the Compromise of 1850.

Mr. Calhoun

171B. American Civil War. (4) I.

Lecture—3 hours. Major developments in American history from 1848 to 1865: slavery and antislavery, immigration, sectional conflict, emergence of the Republican party, the Civil War.

Mr. Unger

171C. The Emergence of Modern America. (4) II.

Lecture—3 hours. From Reconstruction to the twentieth century, including political and intellectual change, the advent of big business, the rise of organized labor, ethnic adjustments, urbanization, and movements of social unrest.

Mr. Unger

174A. Recent History of the United States. (4) I.

Lecture—3 hours; discussion—1 hour. Study of political, economic, and cultural aspects of American democracy from 1900 to 1930's.

Mr. Swain

174B. Recent History of the United States. (4) II.

Lecture—3 hours; discussion—1 hour. Study of political, economic, and cultural aspects of American democracy from the 1930's to the present.

Mr. Shideler

***175A. Intellectual History of the United States. (4) I.**

Lecture—3 hours. Prerequisite: courses 17A and 17B; or a course in American philosophy,

American political theory, American literature, or sociological theory. American social thought from colonial times to the 1860's. Emphasis upon Puritanism, the American Enlightenment, Transcendentalism, Jacksonian democracy, in the context of ideas about the nature of man and his freedom and the idea of progress.

Mr. Smith

***175B. Intellectual History of the United States. (4) II.**

Lecture—3 hours. Prerequisite: courses 17A and 17B; or a course in American philosophy, American political theory, American literature, or sociological theory. American social thought from the 1860's to the present. Emphasis upon the social relevance of philosophical and religious idealism, naturalism, and pragmatism.

Mr. Smith

176A. Social and Cultural History of the United States. (4) III.

Lecture—3 hours. A study of social and cultural forces in American society from colonial times through reconstruction and the post-Civil War industrial expansion, with emphasis on class structure, religious movements, labor systems, racial and national groups, social reform movements, changes in social values. Offered in odd-numbered years.

Mr. Marchand

176B. Social and Cultural History of the United States. (4) III.

Lecture—3 hours. A study of social and cultural forces in American society from 1880 to the present with emphasis on class structure, religious movements, labor systems, racial and national groups, social reform movements, and changes in social values. Offered in even-numbered years.

Mr. Marchand

178A. Great Issues in United States History: Ideas and Interpretations. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: junior standing; or consent of instructor. Selected topics in the political, economic, social and intellectual history of the United States. A study in historical thought and interpretation concerning the main currents of national development to 1865.

Mr. Jackson

178B. Great Issues in United States History: Ideas and Interpretations. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: junior standing; or consent of instructor. Selected topics in the political, economic, social and intellectual history of the United States. A study in historical thought and interpretation concerning the main currents of national development since 1865.

Mr. Jackson

* Not to be given, 1966–1967.

179A. Economic Growth of the United States. (4) II.

Lecture—3 hours. Development of the American economy from colonial agriculture and mercantilism to the emergence of industrial capitalism.
Mr. Unger

179B. Economic Growth of the United States. (4) III.

Lecture—3 hours. The changing nature of industrial capitalism and its effects on agriculture, labor, business, and government in the late nineteenth and twentieth centuries. Mr. Unger

***180. The Westward Movement to 1850. (4) III.**

Lecture—3 hours. The political, economic, and social significance of the westward movement from colonial times to 1850.

Mr. Sherwood

183A. The Frontier Experience: Trans-Mississippi West. (4) I.

Lecture—3 hours; discussion—1 hour. 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.
Mr. Jackson

183B. The Frontier Experience: Trans-Mississippi West. (4) II.

Lecture—3 hours; discussion—1 hour. 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.
Mr. Jackson

185. History of Science and Technology in America. (4) III.

Lecture—3 hours. A study of science and technology in America, emphasizing the development of scientific ideas and institutions.

Mr. Sherwood, Mr. Swain

188A. History of Agriculture in the United States. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: junior or senior standing. History of agricultural development to 1900 with emphasis on social and economic institutions.

Mr. Shideler

188B. History of Agriculture in the United States. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: junior or senior standing. History of agricultural changes from 1900 to the present with emphasis on the background and evolution of government policy.
Mr. Shideler

189A. History of California. (4) III.

Lecture—3 hours; discussion—1 hour. History of California to 1865. Offered in odd-numbered years.
Mr. Jackson

189B. History of California. (4) III.

Lecture—3 hours; discussion—1 hour. History of California since 1865. Offered in even-numbered years.
Mr. Jackson

***190A. East Asian Civilization. (4) I.**

Lecture—3 hours. The culture and history of East Asia to 1600. Emphasis on China and Japan; attention also to Southeast Asia. Offered in odd-numbered years.
Mr. Liu

190B. East Asian Civilization. (4) II.

Lecture—3 hours. The culture, history, and problems of East Asia since 1600. Emphasis on China and Japan; attention also to Southeast Asia. Offered in even-numbered years. Mr. Liu

191A. Imperial China. (4) I.

Lecture—3 hours; other—1 hour. The society, culture, and foreign relations of China to 1800. Offered in even-numbered years. Mr. Lo

191B. Modern China. (4) II.

Lecture—3 hours. The revolutionary transformation of China from the nineteenth century to the present. Offered in odd-numbered years.
Mr. Lo

192. Modern China and the West. (4) III.

Lecture—1½ hours; discussion—1½ hours. Prerequisite: course 190B or 191B; or consent of instructor. Readings and reports on selected topics.
Mr. Liu

193. China's Relations with Southeast Asia (4) III.

Lecture—3 hours; discussion—1 hour. China's historical relations with Southeast Asia—military, political, cultural, and economic.
Mr. Lo

194. Japan. (4) II.

Lecture—3 hours. The society, culture, and foreign relations of Japan to the present.
Mr. Lo

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: consent of instructor. The Staff Graduate Courses

201. Sources and General Literature of History.

(4) I, II, III.

Seminar—3 hours. Advanced studies in bibliography and historiography in the several fields of history, for students preparing for higher degrees in history. May be repeated for credit.
The Staff

237. Russian History. (4) I, II.

Seminar—3 hours. Prerequisite: a reading knowledge of Russian. Topics relating to the history of Muscovite and Imperial Russia before 1856.
Mr. O'Brien

* Not to be given, 1966-67.

242. History of the Enlightenment. (4) II, III.

Seminar—3 hours. Prerequisite: course 133 and a reading knowledge of French. Intellectual and social history of Europe during the Enlightenment. May be repeated for credit.

Mr. Schwab

***245. History of the Napoleonic Era. (4) I.**

Seminar—3 hours. Prerequisite: reading knowledge of French or German and consent of instructor. Political, intellectual, social, and military history of Europe from the Consulate to the Congress of Vienna.

Mr. Paret

246. Europe in the Twentieth Century. (4) II, III.

Seminar—3 hours. Political history of Europe since 1919, with particular emphasis on the post-1939 period.

Mr. Willis

***248A-248B. Modern European Diplomatic History. (4-4) II-III.**

Seminar—3 hours. Prerequisite: reading knowledge of French or German; courses 148B and 148C; or consent of instructor. Bibliography and topics in the diplomatic history of Europe from the French Revolution to the 1930's, with emphasis on the nineteenth century.

Mr. Millman

249. Military Theory, Institutions, and Policy since the Renaissance. (4) I, III.

Seminar—3 hours.

Mr. Paret

251. English History. (4) I, II, III.

Seminar—3 hours. Recommended: courses 151A, 151B, and 151C; 152A and 152B; 154. Mr. Woodfill

261. Latin American History. (4) II, III.

Seminar—3 hours. Prerequisite: two courses in Latin American history; reading knowledge of Spanish or Portuguese.

Mr. Poppino

270. Early American History. (4) II.

Seminar—3 hours.

Mr. Jacobson

272. History of the United States. 1815-1848. (4) I, II.

Seminar—3 hours.

Mr. Goodman

INTERNATIONAL AGRICULTURAL DEVELOPMENT (A Graduate Group)

Duane S. Mikkelsen, Ph.D., *Chairman of the Group*
Group Office, 109 Hunt Hall

Members of the Group:

Professors:

Norman B. Akesson, M.S. (*Agricultural Engineering*)

Floyd D. Carroll, Ph.D. (*Animal Husbandry*)

273. History of the United States, 1848-1900. (4) I, II.

Seminar—3 hours.

Mr. Unger

274. Recent History of the United States. (4) II, III.

Seminar—3 hours. Topics in twentieth century American history.

Mr. Swain

275. American Social and Intellectual History. (4) I, III.

Seminar—3 hours. Prerequisite: graduate standing. Studies in the recent historiography of American social and intellectual history.

Mr. Smith

***277. Nineteenth Century American Institutions. (4) II.**

Seminar—3 hours. Churches, schools, professions, urban growth, and social mobility in nineteenth century America.

Mr. Smith

283. History of the United States: The Frontier. (4) I.

Seminar—3 hours.

Mr. Jackson

288. History of the United States. (4) I, II.

Seminar—3 hours. Prerequisite: graduate standing. Emphasis on agricultural history and closely related topics such as exports, transportation and politics.

Mr. Shideler

291. Chinese History. (4) III.

Seminar—3 hours.

Mr. Liu

299. Research. (1-6) I, II, III.

The Staff

299D. Individual Study. (1-6) I, II, III.

The Staff

Professional Course

300. The Teaching of History in the Secondary School and the Junior College. (3) III.

Lecture—3 hours. Prerequisite: junior or senior standing with a teaching major or minor in social studies. Methods for the presentation of history at the secondary and junior college level.

Mr. McDermott

* Not to be given, 1966-1967.

Walter L. Dunkley, Ph.D. (*Food Science and Technology*)

Robert M. Hagan, Ph.D. (*Water Science and Engineering*)

Charles M. Hardin, Ph.D. (*Political Science*)

Trimble R. Hedges, Ph.D. (*Agricultural Economics*)

Fredric W. Hill, Ph.D. (*Nutrition*)
 Donald E. Jasper, D.V.M., Ph.D. (*Clinical Pathology*)
 Peter C. Kennedy, D.V.M., Ph.D. (*Pathology*)
 Lysle D. Leach, Ph.D. (*Plant Pathology*)
 Duane S. Mikkelsen, Ph.D. (*Agronomy*)
 Leonard L. Morris, Ph.D. (*Vegetable Crops*)
 Harold P. Olmo, Ph.D. (*Viticulture and Enology*)
 Pauline C. Paul, Ph.D. (*Consumer Sciences*)
 Maurice L. Peterson, Ph.D. (*Agronomy; Berkeley Campus*)
 Dewey J. Raski, Ph.D. (*Nematology*)
 J. Herbert Snyder, Ph.D. (*Agricultural Economics*)
 William A. Williams, Ph.D. (*Agronomy*)

Associate Professors:

William J. Chancellor, Ph.D. (*Agricultural Engineering*)
 Bruce Glassburner, Ph.D. (*Economics*)
 Rollie E. Poppino, Ph.D. (*History*)
 Magnar Ronning, Ph.D. (*Animal Husbandry and Nutrition*)
 Orville E. Thompson, Ph.D. (*Agricultural Education*)
 Philip L. Wagner, Ph.D. (*Geography*)
 Lynn D. Whittig, Ph.D. (*Soil Science*)

Assistant Professors:

Hiromitsu Kaneda, Ph.D. (*Economics*)
 William C. Smith, Ph.D. (*Anthropology*)

Lecturer:

Edward C. Maxie, Ph.D. (*Pomology*)

University Librarian:

J. Richard Blanchard, M.S.

Public Services:

William M. Herms

INTERNATIONAL AGRICULTURAL DEVELOPMENT

Duane S. Mikkelsen, Ph.D., *Chairman of the Committee*

Committee Office, 109 Hunt Hall

Committee in Charge:

Norman B. Akesson, M.S. (*Agricultural Engineering*)
 Floyd D. Carroll, Ph.D. (*Animal Husbandry*)
 Robert M. Hagan, Ph.D. (*Water Science and Engineering*)
 Donald E. Jasper, D.V.M., Ph.D. (*Clinical Pathology*)
 Duane S. Mikkelsen, Ph.D. (*Agronomy*)

Major Adviser.—See *Schedule and Directory Listing*.

Instruction in International Agricultural Development is not organized as a single administration unit in the University, but the relevant courses are offered by a number of departments, and are coordinated by the Committee in charge. An undergraduate major is offered in the College of Agriculture.

Upper Division Courses

101. Crop Production under Tropical Conditions. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: Botany 2. Climatic and soil adaptation; varieties and varietal improvement in an-

nual and perennial crops; pests, diseases, and their control; fertilization and other management practices.

Mr. Williams

102. Livestock and Poultry Production in Developing Areas. (4) I.

Lecture—4 hours. Prerequisite: Animal Science 10, Nutrition 103. Kinds of livestock and poultry suited to developing areas; feed-stuff resources and their utilization; ecological problems including pests, diseases and their control; management practices.

Mr. Carroll, Mr. Kratzer, Mr. Wilson

190. Proseminar in International Agriculture Development. (2) III.

Lecture—1 hour; discussion—1 hour. Prerequisite: consent of instructor. Problems of coordinating principles and information from technical agriculture and the social sciences in the context of economic development. Mr. Smith

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor.
 The Staff (Mr. Akesson in charge)

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

The Staff (Mr. Hedges in charge)

Graduate Courses**280. Social, Technological, and Other Factors in Agricultural Development.** (3) I, II, III.

Seminar—3 hours. Problem identification and analysis in agricultural development; cultural forces; political, social, and economic organization; human factors in relation to resource use

and technology, function and use of the change agent; program development, planning and execution.

The Staff I. (Mr. Hedges in charge) II. (—— in charge) III. (—— in charge)

299. Research. (1-9) I, II, III.

The Staff (Mr. Mikkelsen in charge)

INTERNATIONAL RELATIONS

Vernon J. Puryear, Ph.D., *Chairman of the Committee*
Committee Office, 257 Voorhies Hall

Committee in Charge:**Professors:**

Kwang-Ching Liu, Ph.D. (*History*)
Vernon J. Puryear, Ph.D. (*Political Science*)
Paul E. Zinner, Ph.D. (*Political Science*)

Associate Professor:

John R. Owens, Ph.D. (*Political Science*)

Assistant Professors:

Hiromitsu Kaneda, Ph.D. (*Economics*)
Elias H. Tuma, Ph.D. (*Economics*)

Major Adviser: See *Schedule and Directory*.

International relations embraces those social relationships which transcend the boundaries of national states. The major in international relations is devised to meet the needs of students interested in acquiring an understanding of the forces and influences conditioning present-day world politics and world economics, as well as the main problems and policies of organized states in their relations with one another in the twentieth century. Because these problems and policies must be dealt with and determined by governments, the major is built around courses dealing with intergovernmental diplomatic and economic relations. This major cuts across departmental lines, for foreign policies are made in relation to political, geographic, economic, and social conditions, and in the light of historical precedents.

The Major Program

Depth required in one modern foreign language, approximately 28 quarter units.

Lower Division Courses.—Required: Economics 1A, 1B; History 4A or 4B, 4C, 17A, 17B; Political Science 1A, 1B, 2, 3; approximately 28 quarter units in one modern foreign language; Economics 116 or 160, 161; Political Science 124, 128A-128B; 8 quarter units of history exclusive of United States history; 8 additional quarter units in related courses selected in consultation with the adviser.

of history exclusive of United States history; 8 additional units in related courses selected in consultation with the adviser.

Attention is directed to the following courses as useful in the study of certain aspects of this field; Agricultural Economics 125 (Comparative Agriculture); Anthropology 139 (Peoples of Africa); Economics 116 (Economic Systems); Geography 123A (Geography of Western Europe); Geography 123B (Geography of Eastern Europe); Geography 143 (Political Geography); History 146A, 146B (Europe in the Twentieth Century); History 190B (East Asian Civilization); Political Science 149 (International Communism).

The students should also acquaint himself with history of the arts, literature, and philosophy.

Teaching Major.—Required: Economics 1A-1B; History 4A or 4B, 4C, 17A-17B; Political Science 1A-1B, 2, 3; approximately 28 quarter units in one modern foreign language; Economics 116 or 160, 161; Political Science 124, 128A-128B; 8 quarter units of history exclusive of United States history; 8 additional quarter units in related courses selected in consultation with the adviser.

For the secondary credential: a *combined total of 36 quarter units of upper division work* in the fields of political science, history, including economics and at least 20 quarter units of upper division or graduate course work in either political science or history.

For the elementary credential: Since the interdepartmental major for the A.B. degree requires a combined total of 36 quarter units of upper division work in the fields of political science, history, and economics, this meets the minimum state requirement of 24 semester hours of upper division or graduate course work in two or more subjects normally taught in the public schools in the social sciences.

Subject Representative: Mr. Puryear

LAW

Edward L. Barrett, Jr., LL.B., *Dean of the School and Chairman of the Department*
Department Office, TB-113

Professors:

- Edward L. Barrett, Jr., LL.B.
- Edgar Bodenheimer, J.D., LL.B.
- Daniel J. Dykstra, LL.B., S.J.D.
- Edward H. Rabin, LL.B. (*Acting*)
- Mortimer D. Schwartz, LL.B., LL.M., M.S.
(*Law Librarian*)

Associate Professor:

- Frank B. Baldwin III, LL.B., LL.M.
(*Acting*)

Admission Requirements and Curriculum: for details consult the *Announcement of the School of Law*.

Professional Curriculum**200A–200B–200C. Introduction to the Anglo-American Legal System. (2–2–2) I–II–III.**

Lecture—2 hours. The precedent system, history of common law and equity, the forms of action, equitable remedies. Mr. Bodenheimer

201A–201B–201C. Property. (3–3–3) I–II–III.

Lecture—3 hours. The development of the law of property, including estates and other interests in land, real property marketing and

conveyancing, land-use control, and landlord-tenant problems. Mr. Rabin

202A–202B–202C. Contracts. (3–2–3) I–II–III.

Lecture—4 hours. The law of contracts, including problems of formation, interpretation, performance, enforcement, and termination.

Mr. Baldwin, Mr. Dykstra, Mr. Schwartz

203A–203B–203C. Pleading and Procedure in Civil Cases. (3–2–3) I–II–III.

Lecture—2 hours. The principles of pleading under the code system and the federal rules; modern trial practice; appellate procedure.

Mr. Baldwin

204A–204B. Torts. (4–4) I–II.

Lecture—4 hours. Intentional and unintentional invasions of interests of personality and property. Mr. Dykstra

206. Constitutional Law I. (4) III.

Lecture—4 hours. An introductory analysis of the judicial process in constitutional cases; division of powers between the national government and the states. Mr. Barrett

207. Legal Research and Writing. (2) II.

Lecture—2 hours. Small group instruction in the techniques of legal research and writing.

Mr. Schwartz

LINGUISTICS

Benjamin E. Wallacker, Ph.D., *Chairman of the Committee*

Committee Office, 331 Voorhies Hall

Committee in Charge:*Professor:*

- ¹David L. Olmsted, Ph.D. (*Anthropology*)

Associate Professors:

- Jarvis R. Bastian, Ph.D. (*Psychology*)
- Martin A. Baumhoff, Ph.D. (*Anthropology*)
- Philip L. Wagner, Ph.D. (*Geography*)
- Benjamin E. Wallacker, Ph.D. (*Oriental Languages*)

Assistant Professors:

- Ronald A. Arbini, Ph.D. (*Philosophy*)
- Jerry R. Craddock, A.B. (*Acting; Spanish and Classics*)
- Jo Ann Creore, M.A. (*Acting; French and Italian*)

¹ Absent on leave, 1966–67.

H. Phelps Gates, Jr., A.B. (*Acting; Spanish and Classics*)

Wayne C. Harsh, Ph.D. (*English*)

George H. Keith, Ph.D. (*French and Italian*)

J. Rolf Kjolseth, M.A. (*Acting; Sociology*)

Eric S. Liu, Ph.D. (*Oriental Languages*)

Sarita G. Schotta, B.A., B.M. (*Acting; English and Linguistics*)

Edward J. Tully, Jr., Ph.D. (*Mathematics*)

Stephen A. Tyler, Ph.D. (*Anthropology*)

Letters and Science List.—Course 140.
Graduate Adviser.—Mr. Wallacker

35. Introduction to Linguistics. (4) III.

Lecture—3 hours; laboratory—2 hours. Introduction to the study of language, its nature, diversity, and structure. Mrs. Creore, Mr. Liu

Upper Division Courses**140. Grammatical Analysis. (3) III.**

Lecture—3 hours. Prerequisite: Anthropology 110B. Introduction to the theory of grammatical analysis; practice in solving exercise problems.
Mrs. Schotta

199. Special Study for Advanced Undergraduates.

(1–3) I, II, III. Mr. Olmsted

Graduate Courses**202. Principles of Historical Linguistics. (3) II.**

Lecture—3 hours. Prerequisite: Anthropology 110C. Advanced treatment of the theory and method of historical linguistics, with special emphasis on Indo-European languages. Mr. Gates

210. Historical Germanic Linguistics. (4) I, II.

Seminar—3 hours. The principles and techniques of historical linguistics will be used to study the development of the Germanic languages from Proto-Indo-European through Proto-

Germanic and into early Germanic dialects such as Old Norse, Gothic, Old Saxon, and Old English.

Mrs. Schotta

215. Computational Linguistics. (2) III.

Lecture—2 hours. Prerequisite: consent of instructor. The use of electronic computers and other computational devices in linguistic analysis, mechanical translation, and lexicography.

Mr. Liu

225. Modern Linguistic Theory. (3) II.

Lecture—3 hours. Prerequisite: course 140 and Anthropology 110B. Survey of leading contributions to linguistic theory from de Saussure to the present.

Mr. Harsh

Professional Course**300. The Teaching of English as a Foreign Language. (3) II.**

Seminar—3 hours. Methods for the use of applied linguistics in the teaching of English to non-native speakers.

Mrs. Schotta

MATHEMATICS

Edward B. Roessler, *Chairman of the Department*

Department Office, 824 Sproul Hall

Professors:

Henry L. Alder, Ph.D.
George A. Baker, Ph.D.
Curtis M. Fulton, Ph.D.
Charles A. Hayes, Jr., Ph.D.
Edward B. Roessler, Ph.D.
Sherman K. Stein, Ph.D.

Associate Professors:

Hubert A. Arnold, Ph.D.
Dallas O. Banks, Ph.D.
Donald C. Benson, Ph.D.
Leon E. Borgman, Ph.D.
Albert C. Burdette, Ph.D.
Gulbank D. Chakerian, Ph.D.
Richard F. DeMar, Ph.D.
Peter W. M. John, Ph.D.
Kurt Kreith, Ph.D.
Donald A. Norton, Ph.D.
^aTakayuki Tamura, D.Sc.

Assistant Professors:

Eugene Albert, Ph.D.
Carlos Borges, Ph.D.
Doyle O. Cutler, Ph.D.
Melven R. Krom, Ph.D.
Gary J. Kurowski, Ph.D.
Robert W. Stringall, Ph.D.
Edward J. Tully, Jr., Ph.D.
Howard J. Weiner, Ph.D.

**Associate Professor:**

David G. Mead, Ph.D. (*Visiting*)

Assistant Professors:

George T. Sallee, M.S., (*Acting*)
Edward H. Theil, M.S. (*Acting*)

Lecturer:

Fred Krakowski, Ph.D.

Associate:

Shirley A. Goldman, M.S.

Letters and Science List.—All undergraduate courses in mathematics are included in the Letters and Science List of Courses. (See page 98.)

Major Subject Advisers.—Mr. Alder, Mr. Baker, Mr. Banks, Mr. Borgman, Mr. Burdette, Mr. Chakerian, Mr. DeMar, Mr. Krakowski, Mr. Kreith, Mr. Krom, Mr. Norton, Mr. Stein and Mr. Tully.

Bachelor of Arts Major Program

Lower Division Courses.—Required: course 1A, 1B, 1C (or 11A–11B), 2A, 2B, 2C.

Upper Division Courses.—Required: 36 units including courses 108A, 108B, 127A, and 150A and a course in geometry. Courses 108A–108B, although upper division courses, should be taken in the sophomore year. Students specializing in statistics may substitute course 132A for the geometry course; students specializing in numerical analysis or computer science may substitute course 128A for the geometry course.

^aAbsent on leave, winter quarter 1967.

*Absent on leave, spring quarter 1967.

Bachelor of Science Major Program

The major program consists of 90 units of mathematics and/or natural science courses including:

Lower Division Courses.—Required: courses 1A, 1B, 1C (or 11A–11B), 2A, 2B, 2C.

Upper Division Courses.—Forty-four units including courses 108A, 108B, 127A, 127B, 150A, 150B, 151A, and a course in geometry. Courses 108A–108B, although upper division courses, should be taken in the sophomore year. Students specializing in statistics may substitute course 132A for the geometry course; students specializing in numerical analysis or computer science may substitute course 128A for the geometry course.

Courses offered by other departments.—Required: at least one science course requiring a background in mathematics, from a list to be prepared by the Department of Mathematics. (Examples: Physics 4A, Agricultural Economics 106, Zoology 116A.)

A lower division course in mathematics is not acceptable as a prerequisite for another course in mathematics unless a grade of C or higher has been attained in it.

Graduate Study.—The Department of Mathematics offers programs of study and research leading to the M.A. and Ph.D. degrees in mathematics. Detailed information regarding graduate study may be obtained by writing to the Graduate Adviser, Department of Mathematics.

Qualifying Examinations.—A student entering from high school who believes that he has had the equivalent of a course offered by the Department of Mathematics (e.g., analytic geometry and calculus) may demonstrate his proficiency in this course by examination. If, in the opinion of the department, his level of achievement is sufficiently high, he will be permitted to enter the next course in the sequence. No University credit is earned by passing such an examination. Arrangements for an examination must be made with the department secretary in 822 Sproul Hall on or before the Monday of registration week.

Teaching Major.—Requirements for the teaching major are the same as for the B.S. or B.A. major.

Teaching Minor.—Thirty units of mathematics which must include: 4 units of fundamentals of mathematics (course 36A); 8 units of calculus (courses 1A–1B or 16A–16B–16C); 3 units of probability and/or statistics (courses 13, 15, or 131A); 3 units of geometry (course 37 especially recommended, 112, 113, 114, or 116).

The remainder of the 30 units are elective, except that students with a non-academic major must include 18 units in mathematics at the upper division or graduate level.

Subject Representative: Mr. Burdette.

Lower Division Courses**1A. Analytic Geometry and Calculus, First Course.**

(4) I, II, III.

Lecture—4 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry. Not open to students who have received credit for course 16A or 3A. Introduction to analytic geometry and calculus. The sequence 1A, 1B, 1C, 2A, 2B includes plane and solid analytic geometry, differentiation and integration of elementary functions, infinite series, functions of several variables, partial differentiation, multiple integration, determinants, matrices and Fourier series. The Staff

1B. Analytic Geometry and Calculus, Second Course.

(4) I, II, III.

Lecture—4 hours. Prerequisite: course 1A or 9A or 16A. Only 3 units will be allowed students who have received credit for course 9A and only 2 units will be allowed students who have received credit for 16B. Continuation of course 1A. (In the fall of 1966, course 1B will be given as a special 2-unit course meeting 2 hours a week for students who have completed 9A.) The Staff

1C. Analytic Geometry and Calculus, Third Course.

(4) II, III.

Lecture—4 hours. Prerequisite: course 1B. Continuation of course 1B. The Staff

2A. Analytic Geometry and Calculus, Fourth Course.

(4) I, III.

Lecture—4 hours. Prerequisite: course 1C or 9B or 11B. Continuation of course 1C. The Staff

2B. Analytic Geometry and Calculus, Fifth Course.

(4) I, II.

Lecture—4 hours. Prerequisite: course 2A. Only 2 units of credit for students who have credit in 9C. Continuation of course 2A. (In the fall of 1966, course 2B will be given as a special 2-unit course meeting 2 hours a week for students who have completed 9C.) The Staff

2C. Vector Analysis and Differential Equations.

(4) II, III.

Lecture—4 hours. Prerequisite: course 2B. Vector analysis, solutions of differential equations. The Staff

7. Topics in Algebra. (4) I, II.

Lecture—4 hours. Prerequisite: two years of high school algebra, plane trigonometry. Natural numbers; integers; rational, real, and complex numbers; permutations; combinations; theory of equations; matrices; determinants.

Mr. Tully, Mr. Arnold

11A. Calculus. (4) I, III.

Lecture—4 hours. Prerequisite: plane analytic geometry in addition to the prerequisites for 1A. This course together with 11B covers the material of 1A–1B–1C for students who have studied plane analytic geometry. The Staff

11B. Calculus. (4) II.

Lecture—4 hours. Prerequisite: course 11A. Continuation of course 11A. The Staff

13. Elementary Statistics. (4) I, II, III.

Lecture—4 hours. Prerequisite: two years of high school algebra. Measures of central tendency and dispersion; binomial, normal, Student-t, and chi-square distributions; testing hypotheses; non-parametric statistics; regression and correlation theory. The Staff

15. Discrete Mathematics. (3) I, II.

Lecture—3 hours. Courses 15, 16A, and 16B constitute a year sequence recommended for students in the biological, management, and social sciences. Introduction to probability, vectors, and matrices. Applications to elementary Markov chains. Mr. Albert, Mr. Alder

16A. Analytic Geometry and Calculus. (3) I, II.

Lecture—3 hours. Prerequisite: one and one-half years of high school algebra, or course 15, plane geometry, plane trigonometry. Not open for credit to students who have received credit in course 1A or 9A. A short course in analytic geometry and differential and integral calculus. Not recommended for students who may wish to major in the mathematical sciences. Courses 15, 16A, and 16B constitute a year sequence recommended for students in the biological, management, and social sciences. The Staff

16B. Analytic Geometry and Calculus. (3) I, II, III.

Lecture—3 hours. Prerequisite: course 16A or 1A. Only two units of credit will be allowed to students who have credit in course 1A. Not open for credit to students who have received credit in course 1B or course 9A. Continuation of course 16A. The Staff

16C. Analytic Geometry and Calculus. (3) III.

Lecture—3 hours. Prerequisite: course 16B or 1B. Only one unit of credit will be allowed to students who have credit in course 1B. Continuation of course 16B with special emphasis on the calculus of three dimensions including partial differentiation and total differentials; designed for students desiring to take physical chemistry. The Staff

30. Introduction to Computer Science. (4) II.

Lecture—3 hours; laboratory—2 hours. Prerequisite: two years of high school algebra. Introduction to the digital computer and its organization, coding and programming, use of compilers, flow charts, solutions of typical problems, code checking. Mr. Norton

36A. Fundamentals of Mathematics. (4) I, II, III.

Lecture—4 hours. Introduction to fundamental mathematical ideas selected from the principal areas of modern mathematics. Properties of the primes, the fundamental theorem of

arithmetic, properties of the rationals and irrationals, binary and other number systems.

Mr. Alder, Mr. Chakerian

36B. Fundamentals of Mathematics. (2) III.

Lecture—2 hours. Prerequisite: course 36A. The content will be selected from the following topics: number systems, set theory, number theory, the axiomatic method, topology, and combinatorics. Mr. Stein

37. Topics in Geometry. (4) III.

Lecture—4 hours. Topics in Euclidian geometry selected from the theory of geometric transformations, the area and dissection of plane figures, convex polyhedra, foundations of geometry. Mr. Chakerian

Upper Division Courses**105A. Applied Statistical Methods: Analysis of Variance. (4) II, III.**

Lecture—4 hours. Prerequisite: course 13. Design of experiments including randomized complete block designs, Latin squares, split-plot designs, factorial designs, and incomplete block designs. Mr. Weiner, Mr. Borgman

105B. Applied Statistical Methods: Multiple Regression. (3) III.

Lecture—3 hours. Prerequisite: course 105A. Continuation of course 105A. Multiple regression and analysis of covariance. Mr. Weiner

108A-108B. Introduction to Abstract Algebra and Analysis. (3-3) I, III; II.

Lecture—3 hours. Prerequisite: course 1C, or 11B, or 9B. Introduction to abstract mathematics, including the real number system, sets, mappings, mathematical induction, and algebraic structures. Beginning in 1967, 108B will also be offered in the fall quarter. Mr. Stein

112. Higher Geometry. (3) I.

Lecture—3 hours. Prerequisite: course 7B; or consent of instructor. Homogeneous point and line coordinates, cross ratio, one- and two-dimensional projective geometry, point and line conics. Offered in even-numbered years.

Mr. Fulton

***113. Synthetic Projective Geometry. (4) II.**

Lecture—4 hours. Prerequisite: course 7B; or consent of instructor. Duality, perspectivity, harmonic sets, projectivity, definition of conics, theorems on conics, pole and polar. Offered in even-numbered years. Mr. Chakerian

***114. The Theory of Convex Sets. (3) I.**

Lecture—3 hours. Prerequisite: courses 2B and 108B; or consent of instructor. Topics selected from the theory of convex bodies, convex functions, geometric inequalities, combinatorial geometry, and integral geometry. Offered in odd-numbered years. Mr. Chakerian

* Not to be given, 1966-1967.

***115A. The Theory of Numbers. (3) I.**

Lecture—3 hours. Prerequisite: course 108B. Divisibility and related topics, diophantine equations, selected topics from the theory of prime numbers. Offered in odd-numbered years.

Mr. Alder

***115B. The Theory of Numbers. (3) II.**

Lecture—3 hours. Prerequisite: course 108B. Euler-function, Moebius function, congruences, primitive roots, quadratic reciprocity law. Offered in even-numbered years.

Mr. Alder

***115C. The Theory of Numbers. (3) III.**

Lecture—3 hours. Prerequisite: course 108B. Continued fractions, partitions. Offered in even-numbered years.

Mr. Alder

116. Metric Differential Geometry. (4) III.

Lecture—4 hours. Prerequisite: course 2C or 109; or consent of instructor. Vector analysis, curves and surfaces in three dimensions. Offered in odd-numbered years.

Mr. Fulton

118A–118B. Introduction to Partial Differential Equations. (3–3) I–II.

Lecture—3 hours. Prerequisite: course 109. Solutions of partial differential equations of mathematical physics by separation of variables, series of orthogonal functions. Applications to boundary value problems.

Mr. Banks

119. Theory of Ordinary Differential Equations. (3) III.

Lecture—3 hours. Prerequisite: course 2C or 109. Existence and uniqueness theorems, theory of linear equations of the second and higher orders, regular singular points, Sturm-Liouville systems, Laplace transforms.

Mr. Burdette

125. Introduction to Mathematical Logic. (3) I.

Lecture—3 hours. Prerequisite: course 7B; or consent of instructor. Propositional calculus, predicate calculus, normal forms, completeness.

Mr. Krom

126. Introduction to the Theory of Sets. (3) I.

Lecture—3 hours. Prerequisite: 9B; or consent of instructor. Fundamental concepts including cardinal numbers, order types, ordinal numbers.

Mr. Stringall

127A–127B–127C. Advanced Calculus.

(4–4–4) I–II–III.

Lecture—4 hours. Prerequisite: course 109. The real number system, continuity, differentiation and integration on the real line, vector calculus and functions of several variables, theory of convergence.

Mr. Krakowski

* Not to be given, 1966–67.

128A–128B–128C. Numerical Analysis.

(4–4–4) I–II–III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 109. Recommended: course 30. Finite differences, interpolation, polynomial approximation, numerical integration and differentiation, non-linear equations, systems of linear equations, matrices and eigenvalue problems, solution of ordinary and partial differential equations.

Mr. Kurowski

129. Theory of Compilers. (4) III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 30. Theory of compilers; structure of computer languages, their limitations and ambiguities; study of a particular language.

Mr. Norton

131A–131B–131C. Introduction to Mathematical Statistics. (4–4–4) I–II–III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 9B or 16B. An introduction to the mathematical theory of probability and statistics.

Mr. John

132A–132B. Introduction to Stochastic Processes. (3–3) II–III.

Lecture—3 hours. Prerequisite: course 131A. Random walks, recurrent events, Markov chains, birth-and-death processes.

Mr. Weiner

150A–150B. Linear Algebra. (4–4) I–II.

Lecture—4 hours. Prerequisite: course 9B or consent of instructor. Introduction to vector spaces, linear transformations, and matrices.

Mr. Stein

151A. Algebra. (4) III.

Lecture—4 hours. Prerequisite: course 108 or 150A, or consent of instructor. Introduction to algebraic systems including groups, rings, and fields.

Mr. Norton

151B. Algebra. (4) I.

Lecture—4 hours. Prerequisite: course 111A or 151A. Continuation of course 151A.

Mr. Norton

168. Linear Programming and Game Theory. (3) I.

Lecture—3 hours. Prerequisite: course 7A or 9B or 41. Introduction to zero-sum, two-person games; the fundamental theory for matrix games; basic concepts of linear inequalities; the duality theorem; the simplex method.

Mr. Benson

185. Introduction to Functions of a Complex Variable. (4) I, III.

Lecture—4 hours. Prerequisite: course 2C or 109. Analytic functions, Cauchy's integral, power series, Laurent series, residue theorem, conformal mapping.

Mr. Kreith

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor.

The Staff (Mr. Roessler in charge)

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff (Mr. Roessler in charge)

Graduate Courses**201A-201B-201C. Real Analysis. (3-3-3) I-II-III.**

Lecture—3 hours. Prerequisite: course 127B. Point set topology; Lebesgue measure and integration on the real line; abstract spaces; general measure and integration. Mr. Hayes

202A-202B-202C. Functional Analysis.

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: courses 127B and 108. Hilbert spaces, spectral theorem, Banach spaces, commutative Banach algebras. Mr. Theil

205A-205B-205C. Functions of a Complex Variable.

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: course 127B. Theory of analytic functions, Cauchy integral theorem, power series, analytic continuation, conformal mapping, special functions. Mr. DeMar

215A-215B-215C. Algebraic Topology.

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: familiarity with point-set topology. Topics selected from homology and homotopy theory. Mr. Borges

216. Integral Equations. (3) III.

Lecture—3 hours. Prerequisite: courses 108 or 150B, and 127B. Volterra equations, Fredholm equations, symmetric kernels. Offered in odd-numbered years. Mr. Banks

218A-218B. Partial Differential Equations.

(3-3) I-II.

Lecture—3 hours. Prerequisite: courses 108 and 127B. Topics from the theory of first order hyperbolic and elliptic partial differential equations. Offered in even-numbered years. Mr. Kreith

***219. Ordinary Differential Equations. (3) I.**

Lecture—3 hours. Prerequisite: courses 127B and 185. Ordinary differential equations in the real and complex domains; existence and uniqueness theorems; linear systems; analysis of singular points; Sturm-Liouville theory; asymptotic expansions. Offered in odd-numbered years. Mr. Banks

220A-220B-220C. Mathematics for the Physical Sciences. (3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: courses 109 and 185 (may be taken concurrently). Topics in

ordinary and partial differential equations, boundary value problems, functions of a complex variable, matrices, and calculus of variations. Mr. Chakerian

225A-225B. Metamathematics. (3-3) II-III.

Lecture—3 hours. Prerequisite: courses 111B and either 125 or Philosophy 12; or consent of instructor. Axiomatizability, consistency, and completeness of the formalized mathematical theories; definability in formal languages; topics from the theory of models. Offered in odd-numbered years. Mr. Krom

228. Advanced Numerical Analysis of Ordinary Differential Equations. (3) I.

Lecture—3 hours. Prerequisite: course 128B. Numerical solutions of initial and boundary value problems for systems of ordinary differential equations; error analysis and stability. Offered in even-numbered years. Mr. Kurowski

231A-231B-231C. Mathematical Statistics.

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: courses 109 and 131B; or consent of instructor. A first year graduate course in theoretical statistics. Mr. Baker

232. Analysis of Variance. (3) I.

Lecture—3 hours. Prerequisite: course 131B. Estimation and testing for the general linear hypothesis, components of variance, multiple comparisons. Mr. Borgman

233A-233B. Design of Experiments. (3-3) II-III.

Lecture—3 hours. Prerequisite: course 232. Topics from balanced and partially balanced incomplete block designs, fractional factorials, and response surfaces. Mr. John

***235A-235B-235C. Analytic Probability Theory.**

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: course 127B. Measure-theoretic foundations of probability, distribution functions and characteristic functions, law of large numbers and central limit theorems, conditional probabilities, martingales. Offered in even-numbered years. Mr. Albert

***236A-236B-236C. Advanced Mathematical Statistics. (3-3-3) I-II-III.**

Lecture—3 hours. Prerequisite: courses 127B and 131C. Distribution theory, parametric and nonparametric estimation, principles of statistical tests, sequential analysis, statistical decision functions. Offered in odd-numbered years. Mr. Borgman

***237A-237B. Nonparametric Inference. (3-3) II-III.**

Lecture—3 hours. Prerequisite: course 131C. A survey of non-parametric methods in estimation and hypothesis testing.

* Not to be given, 1966-1967.

238A-238B-238C. Analysis of Stochastic Processes.

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: course 132B. The analytical theory of second-order stochastic processes, Poisson processes, birth-and-death processes, and Markov processes, including a study of statistical inference for these processes. Offered in even-numbered years. Mr. Weiner

***240A-240B-240C. Differential Geometry.**

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: course 116. Transformation of coordinates, tensor analysis, intrinsic geometry of surfaces, parallel displacement, Riemannian manifolds, the geometry of subspaces, subspaces of a flat space, application of tensor analysis to the theory of relativity. Offered in odd-numbered years. Mr. Fulton

250A-250B-250C. Algebra. (3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: graduate standing in mathematics; or consent of instructor. The theory of groups, rings, and fields. Mr. Cutler

251A-251B. Theory of Groups. (3-3) I-II.

Lecture—3 hours. Prerequisite: graduate standing in mathematics; or consent of instructor. Normal subgroups, composition series, Sylow subgroups, nilpotent groups, solvable groups, group representations, groups with operators, group extensions, free groups, ordered groups. Mr. Tamura

MICROBIOLOGY**(A Graduate Group)**

Herman J. Phaff, Ph.D., *Chairman of the Group*
Group Office, 134 Cruess Hall

Members of the Group:**Professors:**

Henry E. Adler, D.V.M., Ph.D. (*Avian Medicine*)

Raymond A. Bankowski, D.V.M., Ph.D. (*Avian Medicine*)

Hugh S. Cameron, D.V.M., Ph.D. (*Veterinary Microbiology*)

Edwin B. Collins, Ph.D. (*Food Science and Technology*)

C. C. Delwiche, Ph.D. (*Soils and Plant Nutrition*)

James R. Douglas, Ph.D. (*Veterinary Microbiology*)

John B. Enright, Ph.D. (*Public Health*)

Robert E. Hungate, Ph.D. (*Bacteriology*)

John L. Ingraham, Ph.D. (*Bacteriology*)

Allen G. Marr, Ph.D. (*Bacteriology*)

***252. Linear Algebra. (3) III.**

Lecture—3 hours. Prerequisite: graduate standing in mathematics; or consent of instructor. Vector spaces. Offered in even-numbered years. Mr. Tully

253. Theory of Binary Systems. (3) III.

Lecture—3 hours. Prerequisite: graduate standing in mathematics; or consent of instructor. Elements of semigroups, quasigroups, and groupoids. Mr. Tamura

290. Seminar. (1-6) I, II, III.

Advanced study in various fields of mathematics as follows: (a) algebra; (b) analysis; (c) geometry; (d) mathematical logic; (e) number theory; (f) topology; (g) theoretical statistics; (h) applied statistics; (i) applied mathematics. The Staff

299. Research. (2-6) I, II, III.

The Staff

Professional Courses**300A. The Teaching of Mathematics. (3) I.**

Lecture—3 hours. Prerequisite: senior or graduate standing. Methods of teaching mathematics in grades K-6. Mrs. Goldman

300B. The Teaching of Mathematics. (3) II.

Lecture—3 hours. Prerequisite: senior or graduate standing. Methods of teaching mathematics in grades 7-12. Mrs. Goldman

^a Not to be given, 1966-67.

Delbert G. McKercher, D.V.M., Ph.D.
(*Veterinary Microbiology*)

Emil M. Mrak, Ph.D. (*Food Science and Technology*)

John W. Osebold, D.V.M., Ph.D.
(*Veterinary Microbiology*)

Herman J. Phaff, Ph.D. (*Food Science and Technology and Bacteriology*)

Mortimer P. Starr, Ph.D. (*Bacteriology*)

Reese H. Vaughn, Ph.D. (*Food Science and Technology*)

Associate Professors:

Ernst L. Biberman, D.V.M., Ph.D.
(*Veterinary Microbiology*)

Victor W. Burns, Ph.D. (*Physiological Sciences*)

Roy H. Doi, Ph.D. (*Biochemistry and Biophysics*)

Martin W. Miller, Ph.D. (*Food Science and Technology*)
 Jack Preiss, Ph.D. (*Biochemistry*)
 Livio G. Raggi, D.V.M., Ph.D. (*Avian Medicine*)
 Donald M. Reynolds, Ph.D. (*Bacteriology*)
 Kenneth Wells, Ph.D. (*Botany*)

Assistant Professors:

Clifton E. Dowell, Ph.D. (*Bacteriology*)
 Ralph E. Kunkee, Ph.D. (*Viticulture and Enology*)
 Norma Lang, Ph.D. (*Botany*)
 Irwin H. Segel, Ph.D. (*Biochemistry and Biophysics*)
 George K. York II, Ph.D. (*Food Science and Technology*)

**MILITARY SCIENCE**

Orrin A. Tracy, Colonel, Infantry; *Chairman of the Department*
 Department Office, 125 Gymnasium

Professor:

Orrin A. Tracy, Colonel, Infantry

Assistant Professors:

Richard W. Pfeiffer, Captain, Infantry
 Rockwell C. Cramer, Captain, Artillery

In addition to courses offered in the Department of Military Science, upper division military science requires the completion of six units outside the department which may fulfill dual requirements for the baccalaureate degree in the Colleges as well as for the commission as a Second Lieutenant of the United States Army Reserve. One dual-credit unit must be taken in Physical Education 10 (Physical Conditioning Activities). The remaining five dual-credit units may be completed in any of the general areas of natural science, psychology, effective communication, or political science. Elected subjects must be taken while enrolled in the advanced course. In the event that a subject was required in the student's normal academic curriculum during his freshman and sophomore years, electives must be selected either from another general area or from advanced subjects in the same area. Conversely, for subjects not required in the student's academic curriculum during his freshman and sophomore years, complete freedom of selection from the four academic areas is permissible.

Lower division Military Science requires the completion of two units outside the department during the freshman year. The subject elected for ROTC credit may be one that is required in the student's normal academic curriculum during his freshman year; but it must be from one of the general subject areas mentioned above.

Lecturers:

Wendell W. Kilgore, Ph.D (*Food Science and Technology*)
 Hans P. Riemann, D.V.M., Ph.D. (*Public Health*)

Microbiology**Graduate Courses****290. Seminar (1) I, II.**

Seminar—1 hour. One seminar is offered during the fall and winter quarters. One weekly meeting is held. The Staff

299. Research. (1-6) I, II, III.

Laboratory—variable. Research under the guidance of dissertation committee. The Staff

The chairman of the department will evaluate and approve the elective subjects selected. Consideration will be given to the value of the subjects in furthering the professional qualifications of the student as a prospective commissioned officer in the United States Army.

College of Letters and Science.—The Bachelor of Arts degree requires the completion of 180 units, of which 160 units must be in courses chosen from the Letters and Science List of Courses. The 9 units of lower division military science courses are included in the list. Upper division military science courses are considered off the Letters and Science List of Courses. They must be counted in the 20-unit allowance as indicated above. The dual-credit units in general areas may be selected from the List of Courses.

College of Agriculture.—The Bachelor of Science degree in agriculture requires the completion of 180 units. All units of upper and lower division military science courses combined may be accredited toward this requirement. The dual-credit units in general areas may be selected from upper division courses required by the College of Agriculture.

College of Engineering.—Six units of military science may be accredited toward the requirement of the College of Engineering for the Bachelor of Science degree. The dual-credit units in general areas may be selected from upper division courses required by the College of Engineering.

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. Students in upper division military science may select the dual-credit units in general areas from upper division courses required by the School of Veterinary Medicine. Graduates with the D.V.M. degree may apply for direct commissions as First Lieutenant in the United States Army Veterinary Corps.

General Military Science

For the general regulations concerning enrollment and the program in Military Science, see page 255.

Military Science

The University has an Army Reserve Officers' Training Corps unit that offers courses in general military science. Enrollment in military science is on a voluntary basis. The United States Government furnishes arms, equipment, uniforms, and textbooks for the use of all students enrolled in courses of the department.

Lower Division

The lower division (basic) course is open to all first- and second-year undergraduate male students who are citizens of the United States, meet the required physical standards, and are under 23 years of age at the time of initial enrollment. The instruction is of a general type that prepares the graduate for duty with any branch of the Army upon completion of additional branch schooling.

Upper Division

Application for admission to the upper division (advanced) course may be made by students who have successfully completed the basic course or who are eligible for equivalent credit and who can complete the course prior to their 28th birthday. It is also open to veterans having over one year of military service who meet the age and physical requirements.

To be accepted in the advanced course, an applicant must pass an entrance examination, a physical examination, be selected by the Professor of Military Science and the Chancellor, and execute an agreement with the government to complete the course which includes attendance at a six-week summer camp between the junior and senior years. Students selected for the advanced course are those who have shown potentialities for leadership and command and the promise of developing into efficient officers.

During the two-year period of the advanced course, the student will be paid a nominal commutation of subsistence in an amount prescribed by the Secretary of Army (currently \$40 per month).

During their senior year, outstanding students may be designated by the Chancellor and the Professor of Military Science as Distinguished Military Students. If their high records are maintained, they may be designated, upon graduation

from the University, Distinguished Military Graduates. These cadets may then apply for direct commission in the Regular Army as Second Lieutenants.

Successful completion of the advanced ROTC course, and graduation from the University, qualifies the students for appointment as a Second Lieutenant in the United States Army Reserve.

Lower Division Courses

1A. Basic General Military Science (First Year). (1) I.

Lecture—1 hour; drill—1 hour. Prerequisite: meet enrollment criteria in General Regulations of the General Catalog. Individual weapons and marksmanship; assembly, disassembly, and functioning of the standard United States Army rifle; preliminary training in marksmanship and good shooting habits. Leadership laboratory. The Staff

1B. Basic General Military Science (First Year). (1) II.

Lecture—1 hour; drill—1 hour. Prerequisite: course 1A or the equivalent. The theory of organization of the Army; history and organization of the ROTC. United States Army and national security: organization for national defense. Leadership laboratory. The Staff

1C. Basic General Military Science (First Year). (1) III.

Lecture—1 hour; drill—1 hour. Prerequisite: course 1B or the equivalent. United States Army and national security (continued): missions and responsibilities of the Army as a part of the National Defense Team. Leadership laboratory. The Staff

20A. Basic General Military Science (Second Year). (2) I.

Lecture—2 hours; drill—1 hour. Prerequisite: course 1C. American military history: survey from origins of American Army to World War II; emphasis on factors which led to organizational, logistical, operational, and other patterns in our present Army; analysis based on the principles of war. Leadership laboratory. The Staff

20B. Basic General Military Science (Second Year). (2) II.

Lecture—2 hours; drill—1 hour. Prerequisite: course 20A. American military history (continued): World War II until the present. Counterinsurgency operations: orientation. Map and aerial photograph reading: basic principles to include terrain evaluation, marginal information, map symbols, methods of orientation, and grid references. Leadership laboratory. The Staff

20C. Basic General Military Science (Second Year). (2) III.

Lecture—2 hours; drill—1 hour. Prerequisite:

site; course 20B, or the equivalent. Map and aerial photograph reading (continued): review of military maps; elementary aerial photograph reading. Introduction to operations and basic tactics: basic military team; combat formations and patrolling; field fortifications; concealment and cover; techniques of fire; principles of combat. Leadership laboratory. The Staff

Upper Division Courses

130A. Advanced General Military Science (First Year). (2) I.

Lecture—2 hours; drill—1 hour. Prerequisite: acceptance into upper division ROTC program; completion of lower division courses, or the equivalent. Leadership: responsibilities and basic qualities of a leader; leadership objectives, traits, technique, principles; special problems of military leadership. Counterinsurgency operations: analysis of nature of the insurgency problem; role of the United States Government agencies. Leadership laboratory. The Staff

130B. Advanced General Military Science (First Year). (3) II.

Lecture—3 hours; drill—1 hour. Prerequisite: course 130A. Military teaching principles: techniques used in planning and presenting instruction; use of training aids; methods of instruction; student presentations. Branches of the Army: familiarization with their missions, functions, and career patterns. Leadership laboratory. The Staff

130C. Advanced General Military Science (First Year). (3) III.

Lecture—3 hours; drill—1 hour. Prerequisite: course 130B. Communications: means and principles of signal communications; characteristics, operation, and maintenance of communications equipment. Small unit tactics: infantry organization; fundamentals of offensive and defensive combat and their application. Summer camp orientation. Leadership laboratory. The Staff

MUSIC

¹Richard G. Swift, M.A., *Chairman of the Department*

Jerome W. Rosen, M.A., *Acting Chairman of the Department*

Department Office, Music Building

Professor:

Jerome W. Rosen, M.A.

Associate Professors:

Larry D. Austin, M.M.
Richard G. Swift, M.A.

Assistant Professors:

Sydney R. Charles, Ph.D.

¹ Absent on leave, 1966-67.

140A. Advanced General Military Science (Second Year). (3) I.

Lecture—3 hours; drill—1 hour. Prerequisite: course 130C. Operations: command and staff, military intelligence, and training management. Logistics: supply and evacuation, troop movements, and motor transportation. Leadership laboratory. The Staff

140B. Advanced General Military Science (Second Year). (3) II.

Lecture—3 hours; drill—1 hour. Prerequisite: course 140A. Army administration: personnel records; correspondence; unit funds; duties of administrative personnel; and mess management. Military justice: basic concepts of military justice under the Uniform Code of Military Justice and the Manual for Court-Martial, United States, 1951. Leadership laboratory. The Staff

140C. Advanced General Military Science (Second Year). (2) III.

Lecture—2 hours; drill—1 hour. Prerequisite: course 140B. Role of the United States in world affairs: evaluation of the principal political subdivisions of the world. Service orientation: customs of the service; responsibilities and obligations of an officer. Map review: principles and techniques of map reading. Leadership laboratory. The Staff

ROTC Summer Training for Advanced Military Students. (5).

Prerequisite: course 130C. Practical training in atomic, chemical, biological and radiological warfare; tactical, technical, and administrative duties in the field; firing individual and crew-served weapons; bivouac; individual and small-unit tactics; development of military leadership. Successful completion is a requisite for the commission.

Theodore C. Karp, Ph.D.



Lecturers:

Robert S. Bloch, M.A.
Marvin H. Tartak, M.A.
Arthur N. Woodbury, M.M.
Karlheinz Stockhausen, (Visiting)
David Tudor, (Visiting)

Associates:

John W. Baker

Stanley G. Lunetta, B.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

A student may not receive more than 12 units of credit in performance courses.

Major Subject Advisers.—Mr. Austin, Mr. Rosen, Mr. Swift.

The Major Program

Lower Division Courses.—Required: First year, Music 1A-1B, 4A-4B-4C; second year, 5A-5B-5C, 21A-21B-21C; and at least three quarters participation in lower division performance courses (41, 42, 43, 44, 46). Beginning and transfer students must take an examination in piano playing. Those showing deficiencies will be required to take Music 405. Sufficient pianistic ability to perform four-part chorales and compositions comparable in difficulty with *The Little Preludes* of Bach is prerequisite to upper division courses in the major. Undergraduate students transferring from other colleges should consult with departmental major advisers before enrolling in any music course.

Upper Division Courses.—Required: Music 104A-104B-104C and at least three quarters participation in upper division performance courses (141, 142, 143, 144, 146). In addition, at least 20 units must be selected from the following courses: 105A-105B, 106, 108, 111, 112, 114, 115, 116, 117, 118, 119, 199.

Attention is called to the requirements in foreign languages for higher degrees in music: a reading knowledge of French or German for the M.A. degree in both composition and musicology. Undergraduates contemplating advanced study in music should prepare to satisfy these requirements as they proceed to the bachelor's degree.

Individual Group Major.—Individual group majors may be established by combining the work offered in this department with courses in allied fields. The major subject adviser should be consulted for details.

Graduate Study.—The Department of Music offers programs of study and research leading to the M.A. degree in composition or musicology. Detailed information regarding graduate study may be obtained from the Graduate Adviser for Music, Mr. Karp.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major. In addition, teaching methods courses (Music 329A, 329B, 329C) are required.

Teaching Minor.—Required: Music 1A-1B (or 27A-27B), Music 4A-4B-4C; Music 5A-5B; Music 108; and either Music 112A or 112B. In addition, students are advised to enroll in at least two quarters of performance courses. Students must consult with the subject representative.

Subject Representative: Mrs. Charles.

Lower Division Courses**1A-1B. Masterworks of Musical Literature.**

(2-2) I-II.

Lecture—3 hours. Prerequisite: ability to read music; non-majors must obtain consent of the instructor. Introduction to styles and forms of music with guided listening to individual works. Mr. Rosen, Mr. Tartak

4A-4B-4C. Elementary Theory. (4-4-4) I-II-III.

Lecture—4 hours. Fundamentals of music; ear-training; beginning tonal counterpoint and harmony. Mr. Bloch

5A-5B-5C. Intermediate Theory. (4-4-4) I-II-III.

Lecturer—4 hours. Prerequisite: course 4C. Intermediate tonal counterpoint and harmony. Mr. Austin

10. Basic Musicianship. (2) I, II, III.

Lecture—3 hours. Fundamentals of music, singing, ear-training, and conducting for the general student with emphasis upon classroom procedures for the primary grades.

Mr. Woodbury, Mr. Lunetta

21A-21B-21C. History and Literature of Music.

(4-4-4) I-II-III.

Lecture—4 hours; laboratory—1 hour. Prerequisite: course 1B. The history of music from antiquity to the present. Mrs. Charles

27A. Introduction to Musical Literature. (4) I, II, III.

Lecture—3 hours; discussion—1 hour. Lectures, guided listening and readings designed to furnish the student with an understanding of basic music concepts. Intended primarily for non-majors.

Mr. Woodbury, Mr. Tartak, Mr. Karp

27B. Introduction to Musical Literature. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 27A, or consent of the instructor. A survey of the history of musical styles from antiquity to the present. Lectures, guided listening and readings. Intended primarily for non-majors.

Mr. Woodbury

41. University Symphony. (2) I, II, III.

Rehearsal—3 hours. Prerequisite: (open to any student in the University whose technical proficiency meets the requirements of concert performance.) Rehearsal and performance of symphonic music. May be repeated twice for credit.

Mr. Bloch

42. Repertory Band. (2) I, II.

Rehearsal—2 hours. Prerequisite: consent of the instructor; (open to any student in the University whose technical proficiency meets the requirements of concert performance.) Rehearsal and performance of music for wind ensembles. May be repeated twice for credit.

Mr. Austin

43. University Concert Band. (2) II, III.

Rehearsals—4 hours. Prerequisite: (open to any student in the University whose technical proficiency meets the requirements of concert performance.) Rehearsal and performance of music for band. May be repeated twice for credit.

Mr. Woodbury

44. University Chorus. (2) I, II, III.

Rehearsals—4 hours. Rehearsal and performance of choral music. May be repeated twice for credit.

Mr. Rosen

46. Chamber Music Ensemble. (2) I, II, III.

Rehearsal—2 hours. Prerequisite: (open to any student in the University with sufficient technical ability to take part in ensemble music for strings, wind instruments, piano and harpsichord.) May be repeated twice for credit.

The Staff (Mr. Bloch in charge)

Upper Division Courses**104A-104B-104C. Advanced Theory.**

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: course 5C. Modal counterpoint; tonal counterpoint (canon, inventions, and chorale preludes); homophonic forms, beginning with phrase and period structure.

Mr. Karp

105A-105B. Principles of Composition. (3-3) I-II.

Lecture—3 hours. Prerequisite: course 104C. Elementary assignments in free composition.

Mr. Rosen

106. Fugue. (3) III.

Lecture—3 hours. Prerequisite: course 104C.

Mr. Karp

108. Instrumentation. (2) III.

Lecture—2 hours. Prerequisite: course 5C. A study of instruments of the orchestra, analysis of scores, and scoring for various instrumental combinations.

Mr. Austin

110. Advanced Musicianship. (2) I, II, III.

Lecture—3 hours. Prerequisite: course 10. Harmonization of simple melodies at the keyboard, ear-training, conducting, introduction to instruments, and musical literature for the general student with emphasis upon classroom teaching in the primary grades.

Mr. Woodbury, Mr. Lunetta, Mrs. Charles

111. Choral Conducting. (2) III.

Lecture—2 hours. Prerequisite: course 5C. A study of the principles and techniques of conducting choral ensembles.

Mr. Rosen

112. Instrumental Conducting. (2) II.

Lecture—2 hours. Prerequisite: course 108. A study of the principles and techniques of conducting instrumental ensembles.

Mr. Woodbury

114. Music of the Middle Ages. (4) I.

Lecture—3 hours; discussion—1 hour. Pre-

requisite: course 21C. Studies in the music and styles of the middle ages.

Mr. Karp

115. Music of the Renaissance. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C. Studies in the music and styles of the period from 1430-1600.

Mrs. Charles

116. Music of the Baroque Period. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C. Studies in the music and styles of the period from Monteverdi to Handel and J. S. Bach.

Mr. Tartak

117. Music of the Classic Period. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C. Studies in the music and styles of the eighteenth century.

Mrs. Charles

118. Music of the Romantic Period. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C. Studies in the music and styles of the nineteenth century.

Mr. Tartak

119. Music of the Twentieth Century. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C. Studies in the music and styles of the twentieth century.

Mr. Tartak

127A. Musical Literature: The Opera. (3) I.

Lecture—3 hours. Prerequisite: course 27B, or consent of the instructor. A study of selected operas such as Monteverdi's *Orfeo*, Mozart's *Don Giovanni*, Wagner's *Tristan und Isolde*, Verdi's *Otello*, Debussy's *Pélleas et Mélisande*, and Berg's *Wozzeck*. Intended primarily for non-majors.

Mr. Tartak

127B. Musical Literature: The Symphony. (3) III.

Lecture—3 hours. Prerequisite: course 27B or consent of the instructor. A study of selected symphonies by composers such as Haydn, Mozart, Beethoven, Schubert, Brahms, and Stravinsky, emphasizing form and style. Intended primarily for non-majors.

Mr. Woodbury

141. Advanced University Symphony. (2) I, II, III.

Rehearsal—3 hours. Prerequisite: (open to any student in the University whose technical proficiency meets the requirements of concert performance). Rehearsal and performance of symphonic music. May be repeated twice for credit.

Mr. Bloch

142. Advanced Repertory Band. (2) I, II.

Rehearsal—2 hours. Prerequisite: consent of the instructor; (open to any student in the University whose technical proficiency meets the requirements of concert performance.) Rehearsal and performance of music for wind ensembles. May be repeated twice for credit.

Mr. Austin

143. Advanced University Concert Band. (2) II, III.

Rehearsal—4 hours. Prerequisite: (open to any student in the University whose technical proficiency meets the requirements of concert performance.) Rehearsal and performance of music for band. May be repeated twice for credit.

Mr. Woodbury

144. Advanced University Chorus. (2) I, II, III.

Rehearsal—4 hours. Rehearsal and performance of choral music. May be repeated twice for credit.

Mr. Rosen

146. Advanced Chamber Music Ensemble.

(2) I, II, III.

Rehearsal—2 hours. Prerequisite: (open to any student in the University with sufficient technical ability to take part in ensemble music for strings, wind instruments, piano and harpsichord). May be repeated twice for credit.

The Staff (Mr. Bloch in charge)

198. Directed Group Study. (1-5) II.

Prerequisite: consent of the instructor.

The Staff

199. Special Study for Advanced Undergraduates.

(2-4) I, II, III.

The Staff

Graduate Courses**200A-200B-200C. Introduction to Musicology.**

(3-3-3) I, II, III.

Seminar—3 hours. Bibliography, individual research problems, and a class problem.

Mrs. Charles

203A-203B-203C. Composition. (3-3-3) I, II, III.

Seminar—3 hours. Prerequisite: course 105B. Technical projects and free composition.

Mr. Stockhausen, Mr. Austin

210A-210B-210C. History of Notation.

(3-3-3) I, II, III.

Seminar—3 hours.

Mr. Karp

NEMATOLOGYMerlin W. Allen, Ph.D., *Chairman of the Department*

Department Office, 223 Hoagland Hall

Professors:

Merlin W. Allen, Ph.D.

Dewey J. Raski, Ph.D.

**Lecturers:**

Bert Lear, Ph.D.

Benjamin F. Lownsbery, Ph.D.

Armand R. Maggenti, Ph.D.

David R. Viglierchio, Ph.D.

240A-240B-240C. Techniques of Analysis.

(3-3-3) I, II, III.

Seminar—3 hours. Analysis and analytical techniques as applied to music of all historical style periods.

Mr. Karp, Mr. Tartak

291A-291B-291C. Seminar: Topics in Music History.

(3-3-3) I, II, III.

Seminar—3 hours. Studies in selected areas of music history and theory.

Mrs. Charles

299. Individual Study. (2-5) I, II, III.

Special studies and projects in musical composition or music history.

The Staff

Teaching Methods Courses**Instrumental Methods**

The courses in this series consider methods of teaching orchestra and band instruments, and include repertory and program planning for secondary schools. Each course may be repeated once for credit.

321. Stringed Instruments. (2) I.

Discussion—2 hours. Prerequisite: course 4C.

322. Brass Instruments. (2) II.

Discussion—2 hours. Prerequisite: course 4C.

Mr. Woodbury

323. Woodwind Instruments. (2) III.

Discussion—2 hours. Prerequisite: course 4C.

Mr. Woodbury

Professional Courses**405A-405B. Elementary Piano. (2-2) I, II.**

Discussion—2 hours. Prerequisite: (open to music majors and candidates for the general secondary credential with a minor in music.)

Mr. Baker

Upper Division Courses**100. General Plant Nematology. (5) I.**

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biology 1 or 10. An introduction to the classification, morphology, biology, and control of the nematodes attacking cultivated crops.

Mr. Raski

110. Introduction to Nematology. (2) II.

Lecture—2 hours. The relationship of nematodes to man's environment. Classification, morphology, ecology, distribution, and impor-

tance of nematodes occurring in water and soil and as parasites of plants and invertebrate animals.

Mr. Allen

130. Principles of Nematode Control. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 100. Recommended: Chemistry 8; Mathematics 13. Principles and techniques used for derivation of data and their interpretation as the basis for control of plant parasitic nematodes. The biological, physical, and chemical factors influencing nematodes and their control are studied in laboratory and greenhouse. Some field trips required.

Mr. Lear

Graduate Courses

220. Principles and Techniques of Nematode Taxonomy and Morphology. (4) I.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 100. Analysis and evaluation of the techniques used in the collection, extrac-

tion, and preparation of specimens, free-hand and histologic sections; presentation of illustrative material.

Mr. Maggenti

222. Nematode Pathogenicity to Plants. (3) I.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 100. Investigations of problems in proving nematode pathogenicity; the role of nematodes in plant disease.

Mr. Lownsbery

***225. Nematode Taxonomy and Comparative Morphology. (6) II.**

Lecture—3 hours; laboratory—9 hours. Prerequisite: course 220. The taxonomy, morphology, and comparative morphology of soil, freshwater, and marine nematodes.

Mr. Allen

290. Seminar. (1) I, II, III.

Seminar—1 hour.

The Staff

299. Research. (1-6) I, II, III.

The Staff

* Not to be given, 1966-67.

NUTRITION (A Graduate Group)

Magnar Ronning, Ph.D., Chairman of the Group
Group Office, 234 Animal Science Building

Members of the Group:

Professors:

- Arthur L. Black, Ph.D. (*Physiological Sciences*)
- Floyd D. Carroll, Ph.D. (*Animal Husbandry*)
- Perry T. Cupps, Ph.D. (*Animal Husbandry*)
- Walter L. Dunkley, Ph.D. (*Food Science and Technology*)
- Gladys J. Everson, Ph.D. (*Nutrition*)
- Robert E. Feeney, Ph.D. (*Food Science and Technology*)
- C. Richard Grau, Ph.D., (*Poultry Husbandry and Nutrition*)
- Hubert Heitman, Jr., Ph.D. (*Animal Husbandry*)
- Fredric W. Hill, Ph.D. (*Nutrition*)
- Lucille S. Hurley, Ph.D. (*Nutrition*)
- Max Kleiber, Sc.D. (*Animal Husbandry; Emeritus*)
- F. Howard Kratzer, Ph.D. (*Poultry Husbandry*)
- Samuel Lepkovsky, Ph.D. (*Poultry Husbandry and Nutrition; Berkeley Campus*)
- Glen P. Lofgreen, Ph.D. (*Animal Husbandry*)
- James H. Meyer, Ph.D. (*Animal Husbandry*)

Leon H. Schmidt, Ph.D. (*Physiological Sciences*)

George F. Stewart, Ph.D. (*Food Science and Technology*)

Aloys L. Tappel, Ph.D. (*Food Science and Technology and Nutrition*)

William C. Weir, Ph.D. (*Animal Husbandry*)

Associate Professors:

William N. Garrett, Ph.D. (*Animal Husbandry*)

Jiro J. Kaneko, Ph.D. (*Clinical Pathology*)

Daniel W. Peterson, Ph.D. (*Poultry Husbandry*)

Magnar Ronning, Ph.D. (*Animal Husbandry and Nutrition*)

Assistant Professors:

Ransom L. Baldwin, Jr., Ph.D. (*Animal Husbandry*)

Richard A. Freedland, Ph.D. (*Physiological Sciences*)

Betty E. Haskell, Ph.D. (*Nutrition*)

Harold F. Hintz, Ph.D. (*Animal Husbandry and Nutrition*)

Warren G. Kinzey, Ph.D. (*Anthropology and Zoology*)

Quentin R. Rogers, Ph.D. (*Physiological Sciences*)

Barry W. Wilson, Ph.D. (*Poultry Husbandry*)
 Frances J. Zeman, Ph.D. (*Nutrition*)

Lecturers:

Rocco J. Della Rosa, Ph.D. (*Physiological Sciences*)

ORIENTAL LANGUAGES (Department of Anthropology)

Department Office, 331 Voorhies Hall

Associate Professor:

Benjamin E. Wallacker, Ph.D.

Assistant Professors:

Eric S. Liu, Ph.D.
 Bezalel Porten, Ph.D.
 Stephen A. Tyler, Ph.D.

**Lecturer:**

Olof G. Lidin, B.L., M.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Lower Division Courses

1C-2C-3C. Elementary Modern Chinese. (4-4-4) I-II-III.

Lecture—3 hours; laboratory—2 hours. Introduction to the standard or "National Language" (Kuo Yü) of China. Mr. Liu

4C-5C-6C. Intermediate Modern Chinese. (4-4-4) I-II-III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 3C. A continuation of 3C. Mr. Liu

1H-2H-3H. Elementary Hebrew. (4-4-4) I-II-III.

Lecture—3 hours; laboratory—2 hours. Mr. Porten

4H-5H-6H. Intermediate Hebrew. (4-4-4) I-II-III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 3H. Mr. Porten

1J-2J-3J. Elementary Modern Japanese. (4-4-4) I-II-III.

Lecture—3 hours; laboratory—3 hours. Mr. Lidin

4J-5J-6J. Intermediate Modern Japanese. (4-4-4) I-II-III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 3J. A continuation of 3J. Mr. Lidin

Marvin Goldman, Ph.D. (*Physiological Sciences*)
 Leo C. Norris, Ph.D. (*Poultry Husbandry*)

Assistant Research Nutritionist:

Pran N. Vohra, Ph.D.

1T. Elementary Telugu. (4) I.

Lecture—3 hours; laboratory—2 hours. Offered in odd-numbered years. Mr. Tyler

Upper Division Courses

100A. Languages of Eastern Asia. (4) I.

Lecture—3 hours; discussion—1 hour. A survey course on the nature and distribution of the main languages of Eastern Asia. Mr. Wallacker

100B. Languages of Eastern Asia. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. A survey course on the nature and distribution of the main languages of Eastern Asia. Mr. Wallacker

*112. Chinese Literature in Translation. (4) I.

Lecture—3 hours; discussion—1 hour. No knowledge of Chinese is required. Representative works—including classics, histories, belles-lettres, and fiction—in English translation. Mr. Wallacker

123A. Chinese Grammar. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1C; or consent of instructor. Mr. Liu

123B. Chinese Grammar. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 123A. Mr. Liu

132A. History of Japanese Literature. (4) I.

Lecture—3 hours; discussion—1 hour. From the beginning to modern times, with emphasis on Chinese, Buddhist, and Western influences. Mr. Lidin

132B. History of Japanese Literature. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 132A. From the beginning to modern times, with emphasis on Chinese, Buddhist, and Western influences. Mr. Lidin

*142. Civilization of Eastern Asia: Japan. (4) I.

Lecture—3 hours; discussion—1 hour. A broad survey of Japanese civilization dealing

* Not to be given, 1966-1967.

with cultural, literary, religious, and social developments.
Mr. Lidin

146. The Dravidian Languages. (4) I.

Lecture—3 hours; discussion—1 hour. Analysis of the structures and distribution of Dravidian languages. Offered in even-numbered years.
Mr. Tyler

150A. Ancient Israel. (4) I.

Lecture—3 hours; discussion—1 hour. The culture of Israel as reflected in the Bible and archaeological discoveries. Patriarchal period to the Judges.
Mr. Porten

150B. Ancient Israel. (4) II.

Lecture—3 hours; discussion—1 hour. The culture of Israel as reflected in the Bible and archaeological discoveries. Monarchy to Restoration.
Mr. Porten

***151A. Ancient Jewish Civilization. (4) I.**

Lecture—3 hours; discussion—1 hour. The culture of the Jews in Palestine and the Diaspora as reflected in the Apocrypha and Pseudepigrapha; Josephus; Dead Sea Scrolls; Philo; Tannaitic and classical sources; archaeological discoveries. Alexander to Herod. Mr. Porten

***151B. Ancient Jewish Civilization. (4) II.**

Lecture—3 hours; discussion—1 hour. The culture of the Jews in Palestine and the Diaspora as reflected in the Apocrypha and Pseudepigrapha; Josephus; Dead Sea Scrolls; Philo; Tannaitic and classical sources; archaeological discoveries. Procurators to demise of Patriarchate.
Mr. Porten

199. Special Study for Advanced Undergraduates.

(1-3) I, II, III.

The Staff

• Not to be given, 1966-1967.

PATHOLOGY

Donald R. Cordy, D.V.M., Ph.D., *Chairman of the Department*

Department Office, 1221 Haring Hall

Professors:

Donald R. Cordy, D.V.M., Ph.D.
Peter C. Kennedy, D.V.M., Ph.D.
^{2,3}Jack E. Moulton, D.V.M., Ph.D.

Associate Professor:

Donald L. Dungworth, B.V.Sc., Ph.D.

◇ ◇ ◇

Assistant Professor:

William P. C. Richards, M.V.Sc. (*Acting*)

Upper Division Courses

122A. Veterinary Pathology. (5) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of instructor. The fundamental degenerative, vascular, and inflammatory processes, disturbances of cell growth, including oncology.
Mr. Cordy

122B. Veterinary Pathology. (5) II.

Lecture—4 hours; laboratory—3 hours. Prerequisite: course 122A. Special pathology of organ systems and related communicable diseases.
Mr. Kennedy

122C. Veterinary Pathology. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 122A. Special pathology of organ systems and related communicable diseases.
Mr. Dungworth

Graduate Courses

250A-250B-250C. Necropsy Laboratory. (1) I, II, III.

Laboratory—33 hours. Prerequisite: course 122A-122B-122C. Supervised experience in necropsy diagnosis, including techniques and interpretation. May be repeated for credit. Student in D.V.M. program required to take 2 units.
The Staff

280. Advanced Pathology. (4) III.

Lecture—2 hours; discussion—2 hours. Prerequisite: course 122A-122B-122C. Selected topics in the pathology of non-neoplastic diseases. Mechanisms of disease and patterns of reaction are stressed. Offered in odd-numbered years.
Mr. Cordy, Mr. Kennedy

281. Necropsy and Surgical Pathology.

(1-4) I, II, III.

Discussion—1 hour; laboratory—32 hours. Prerequisite: course 250C. Responsible diagnostic casework. Performance of necropsies; slide reading and case reporting.
The Staff

***282. Tumor Pathology. (4) I.**

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 122A-122B-122C. The histogenesis, incidence, geographical distribution, etiology, transmission, immunity, host response, gross and microscopic structure, and metastasis of the neoplasms of domestic animals. Offered in even-numbered years.
Mr. Dungworth, Mr. Moulton

²Absent on leave, fall quarter 1966.

³Absent on leave, winter quarter 1967.

• Not to be given, 1966-67.

290. Seminar in Veterinary Pathology. (1) I, II, III.

Seminar—1 hour. The Staff

291. Histopathology Conference. (1) I, II, III.

Discussion—1 hour. Prerequisite: course 250C. Discussion of selected cases based on records and slides. Defense of diagnosis.

The Staff

298. Group Study. (1-4) I, II, III.

Prerequisite: course 122A-122B-122C. Group Study of advanced topics in pathology.

The Staff

299. Research in Veterinary Pathology.

(1-9) I, II, III, S

The Staff

PHILOSOPHY

*_____, Ph.D., Chairman of the Department**Marjorie Grene, Ph.D., Chairman of the Department***Professors:**Arthur Child, Ph.D.
Neal W. Gilbert, Ph.D.
Marjorie Grene, Ph.D.**Associate Professor:**

William H. Bossart, Ph.D.

Assistant Professors:Ronald A. Arbini, Ph.D.
^aJohn F. Malcolm, Ph.D.**Associate Professor:**

Shia Moser, Ph.D.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).*Department Major Adviser.*—Mr. Arbini.**The Major Program**

Lower Division Courses.—Required: courses 12 and 20A-20B-20C.

Upper Division Courses.—Required: 36 units of upper division courses in philosophy, selected with the approval of the departmental major adviser.

Graduate Study.—The Department of Philosophy offers a program of study leading to the M.A. degree. A minimum of 36 units is required, at least 18 of which must be chosen from courses in the 200 series. Courses 201, 202, and 214 are required. Candidates for the M.A. must pass an examination in one foreign language, usually French or German. In addition, there are written examinations in the history of philosophy and in two fields. More detailed information may be obtained by writing to the Graduate Adviser, Mr. Bossart.*Teaching Major.*—Requirements for the teaching major are the same as for the departmental major.*Teaching Minor.*—Philosophy is acceptable as a minor subject for students planning to earn a secondary or junior college credential. The minor consists of any 30 units in philosophy

(lower-division courses may be counted), chosen in consultation with the Teaching Minor Adviser.

Teaching Minor Adviser.—Mr. Gilbert.**Lower Division Courses****6. Introduction to Philosophy. (4) I, II, III.**

Lecture—4 hours. Political, aesthetic, religious, metaphysical, and other concerns of philosophy, as exemplified in major works from various periods.

The Staff

6F. Freshman Seminar in Philosophy. (4) I, II.

Seminar—4 hours. Prerequisite: consent of instructor. An intensive introduction to philosophical inquiry. Open only to freshmen with strong interest or background in philosophy, by consent of the department.

The Staff

12. Introduction to Logic. (4) I, II, III.

Lecture—3 hours; discussion—1 hour. Principles of inference and definition for symbolic deductive systems; sentential connectives, quantifiers, classes, and relations. Applications of such systems in mathematics, science, and ordinary language.

The Staff

20A. History of Philosophy. (4) I, III.

Lecture—4 hours. A survey of Greek philosophy from the Pre-Socratics to Plotinus, with particular attention to Plato, Aristotle, Epicurus, the Stoics, and Scepticism.

The Staff

20B. History of Philosophy. (4) II.

Lecture—4 hours. Recommended: course 20A. The history of philosophy from Augustine to the late Middle Ages. Thinkers to be treated include Anselm, Peter Abelard, Thomas Aquinas, Duns Scotus, William of Ockham, Roger Bacon, Nicholas of Autrecourt, and Jean Buridan; emphasis on epistemology and metaphysics.

The Staff

20C. History of Philosophy. (4) I, II, III.

Lecture—4 hours. The development of early modern philosophy. Readings from Descartes, Hobbes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.

The Staff

^a Absent on leave, winter quarter 1967.

Upper Division Courses**101. Metaphysics. (4) III.**

Lecture and discussion—3 hours. Recommended: courses 20A, 20B, 20C, or 151. A critical analysis of various theories of being. Offered in odd-numbered years. Mr. Child

102. Theory of Knowledge. (4) I.

Lecture and discussion—3 hours. Philosophical problems of perception and thought, memory and preognition, imagination, truth and error, belief and knowledge. Types of epistemology. Offered in odd-numbered years. Mr. Child

103. Philosophy of Mind. (4) III.

Lecture and discussion—3 hours. 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. Offered in even-numbered years. Mr. Arbini

105. Philosophy of Religion. (4) I.

Lecture and discussion—3 hours. Nature of religion; its relations to mortality and institutions; sources, status, and kinds of religious knowledge; existence and nature of God; man's relations to the divine; significance of death; concepts of survival; relations of church and state. Mr. Child

107A. Philosophy of the Mathematical and Physical Sciences. (4) I.

Lecture-discussion—3 hours. Introduction to the nature of scientific laws, theories, explanations, and models. Problems of causality, induction and probability. Offered in odd-numbered years. Mr. Arbini

107B. Philosophy of the Biological Sciences. (4) II.

Lecture-discussion—3 hours. The relation of the biological to the physical sciences; the nature of theories, explanations, and models in biology and psychology. Problems of taxonomy, ethology, and evolutionary theory. Offered in even-numbered years. Mrs. Grene

107C. Philosophy of the Social Sciences. (4) III.

Lecture-discussion—3 hours. The nature of laws and explanations in the social sciences; their relation to mathematics and the physical sciences; the role of value judgments in the social sciences; theories of historical knowledge; theoretical problems of data-processing. Offered in even-numbered years.

114. Ethics. (4) III.

Seminar—4 hours. Recommended: course 6 or 6F. Principles of intelligent conduct: their status and nature; how they are discovered, known, and proved; their relationships to the principles of art, science, and logic. Mr. Gilbert

117. Political Philosophy. (4) II.

Lecture and discussion—3 hours. Recommended: course 6 or 6F. Intensive examination of such central concepts of political thought such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility. Offered in even-numbered years.

120. Philosophy of Education. (4) III.

Lecture and discussion—3 hours. Critical examination of some classical and contemporary philosophies of education; analysis of the normative assumptions embodied in such fundamental concepts as aim, growth, function, education, skill, or habit. Offered in even-numbered years.

123. Aesthetics. (4) II.

Lecture and discussion—3 hours. Recommended: a course in art or music, and a course in philosophy. Nature of art, or artistic creation, of the work of art, and of aesthetic experience; nature and validity of criticism; relations of art to its environment. Mr. Bossart

131. Philosophy of Logic. (4) III.

Lecture and discussion—4 hours. Prerequisite: course 12; or Mathematics 125. The nature of an axiomatic system: its formal development and the derivation of such properties as completeness and consistency. Philosophical interpretation of Gödel's Theorem. Discussion of such topics as necessity and possibility, descriptions, theory of types, and intuitionism. Mr. Arbini

***132. History of Logic. (4) III.**

Lecture and discussion—3 hours. Prerequisite: course 12; or Mathematics 125. Recommended: course 131. Aristotle's *Organon*; Stoic logic; medieval Terminist logic; Leibniz's universal calculus; the logical contributions of Boole, De Morgan, and Peirce; and Frege's general logic. The initiation of contemporary logic by Peano, and by Whitehead and Russell.

137. Philosophy of Language. (4) II.

Lecture and discussion—3 hours. Recommended: course 20C or 156. Problems that arise from the consideration of natural and formalized languages. Such authors as Aristotle, Wittgenstein, Austin, Carnap, Quine, and Ziff, and their contributions to semantic analysis. Offered in odd-numbered years. Mr. Arbini

146. Renaissance Philosophy. (4) III.

Lecture and discussion—3 hours. Renaissance conceptions of man, as found in the writings of Valla, Ficino, Pico, Pomponazzi, Erasmus, Vives, and Montaigne. Some reference to current religious and social developments. Offered in even-numbered years. Mr. Gilbert

* Not to be given, 1966-1967.

151. Philosophy of the Nineteenth Century. (4) II.

Lecture and discussion—3 hours. Recommended: courses 20A, 20B, or 20C. The idealism of Hegel, his contemporaries and his successors; Marxism; the positivism of Comte and Mill; the irrationalism of Kierkegaard and Nietzsche. Offered in even-numbered years.

Mr. Bossart

155. American Philosophy. (4) I.

Lecture—3 hours; discussion—1 hour. Recommended: course 6 or 6F. Study of such American thinkers as Peirce, James, Royce, Dewey, Santayana, Whitehead, and C. I. Lewis. Offered in odd-numbered years.

156. Contemporary British Philosophy. (4) II.

Lecture and discussion—3 hours. Recommended: course 20C or 151. Interpretation and analysis of the most influential work of Bertrand Russell, G. E. Moore, Wittgenstein, J. L. Austin, and G. Ryle. Offered in odd-numbered years.

Mr. Arbini

157A. Contemporary European Philosophy. (4) I.

Lecture and discussion—3 hours. Recommended: course 20C, 151, or 175. A study of contemporary directions in European philosophy, with particular attention to the development of phenomenology and *Existenzphilosophie* in Germany. Readings in Husserl, Heidegger, Jaspers, and related philosophers. Offered in odd-numbered years.

Mr. Bossart

157B. Contemporary European Philosophy. (4) II.

Lecture and discussion—3 hours. A study of contemporary directions in European philosophy, paying particular attention to the development of phenomenology and existentialism in France. Readings in Sartre, Marcel, Merleau-Ponty, and related philosophers. Offered in even-numbered years.

Mrs. Grene

161. Plato. (4) I.

Lecture and discussion—3 hours. Themes from the thought of Plato, especially as treated in the *Phaedrus*, *Parmenides*, *Theaetetus*, *Sophist*, *Statesman*, *Philebus*, and *Timaeus*. Offered in odd-numbered years.

Mr. Malcolm

162. Aristotle. (4) I.

Lecture and discussion—3 hours. Prerequisite: course 20A; or consent of instructor. Critical examination of the *Organon* and the *Metaphysics*, with particular attention to Aristotle's doctrines of form and matter, causation, substance, definition, and his theory of scientific demonstration; the categories. Offered in odd-numbered years.

Mr. Malcolm

169. Spinoza. (4) I.

Lecture and discussion—3 hours. Recommended: course 20C. Studies in the *Ethics* and the *Treatise on the Improvement of the Understanding*. Offered in even-numbered years.

Mrs. Grene

170. Leibniz. (4) I.

Lecture and discussion—3 hours. Recommended: course 20C. Readings in the works of Leibniz, including his *Discourse on Metaphysics*, *Monadology*, *New Essays on the Human Understanding*, the *Principles of Nature and Grace*, the correspondence with Clarke, and other writings. Offered in odd-numbered years.

Mr. Gilbert

***172. Locke. (4) III.**

Lecture and discussion—3 hours. *An Essay Concerning Human Understanding*. Offered in odd-numbered years.

Mr. Child

174. Hume. (4) I.

Lecture and discussion—3 hours. *A Treatise of Human Nature*; some reference to the *Enquiries*. Offered in odd-numbered years.

Mrs. Grene

175. Kant. (4) II.

Lecture and discussion—3 hours. Recommended: course 20C. A critical analysis of the *Critique of Pure Reason*. Offered in odd-numbered years.

Mr. Bossart

183. Russell. (4) III.

Lecture and discussion—3 hours. Recommended: course 12 or Mathematics 125. Critical appraisal of Bertrand Russell's empiricism as represented by such works as "On Denoting" (1905), *Our Knowledge of the External World* (1914), *The Philosophy of Logical Atomism* (1918), *Analysis of Mind* (1921), and *Human Knowledge* (1948). Offered in even-numbered years.

Mr. Arbini

185. Founders of Modern Thought. (4) III.

Lecture and discussion—3 hours. Not open to philosophy majors or students who have had course 20C. A survey of modern philosophy from Descartes to Kant, with major emphasis upon problems still current today.

The Staff

198. Directed Group Study. (1-5) I, II, III.

The Staff

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Prerequisite: consent of instructor. The Staff

Graduate Courses

Graduate courses 201, 202, and 214 are offered every year, by different instructors, and may be repeated for credit with permission of the Graduate Adviser. The other graduate courses will be varied from year to year; for details the latest catalog should be consulted.

201. Metaphysics. (4) I.

Seminar—4 hours.

Mr. Bossart

202. Theory of Knowledge. (4) III.

Seminar—4 hours.

Mrs. Grene

* Not to be given, 1966-67.

209. Theory of History. (4) II.

Seminar—4 hours. Offered in odd-numbered years.
Mr. Child

214. Ethics. (4) II.

Seminar—3 hours.
Mr. Mosher

261. Plato. (4) III.

Seminar—4 hours. The later dialogues. Offered in odd-numbered years.
Mr. Malcolm

268. Descartes. (4) I.

Seminar—4 hours. Analysis of the *Meditations on First Philosophy*, *The Principles of Philosophy*, and *The Passions of the Soul*. Offered in even-numbered years.

298. Group Study. (1-9) I, II, III.

The Staff

299. Research. (1-12) I, II, III.

The Staff

PHYSICAL EDUCATION

Charles R. Kovacic, *Chairman of the Department*

Department Office, 264 Gymnasium

Professor:

Charles R. Kovacic, Ed.D.

Associate Professors:

William L. Lakie, Ed.D.

²Willard S. Lotter, Ed.D.

Everett D. Ryan, Ed.D.

¹Marya Welch, Ed.D.

Assistant Professors:

William C. Adams, Ph.D.

Edmund M. Bernauer, Ph.D.

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Intercollegiate Athletics Director and Supervisor of Physical Education:

Vernard B. Hickey, A.B.

Lecturer and Supervisor of Physical Education:

George A. Stromgren, M.S.

Supervisor:

Herbert A. Schmalenberger, M.A.

Associate Supervisors:

Robert R. Brooks, M.A.

Robert I. Hamilton, M.S.

Barbara J. Heller, Ed.D.

Assistant Supervisors:

Carl E. J. Carlson, M.A.

Ramona J. Finnila, B.S.

Jerry W. Hinsdale, A.B.

Judith L. Meyers, M.A.

John W. Pappa, M.A.

Phillip S. Swimley, M.A.

The incidental fee payable by all students at the time of registration, entitles students to the use of gymnasium, swimming pool, shower, towels, lockers, tennis courts, and the athletic fields. Certain equipment for games and sports

¹Absent on leave 1966-1967.

²Absent on leave, fall quarter 1966.

is available for exercise and recreation, either with or without instruction. Courses may be elected with or without academic credit. Lockers will be turned in on the last day of class, before the final examination period.

Fines are imposed for each formal transaction necessitated by failure of the student to comply with the regulations of the department.

Major Advisers.—Mr. Adams, Mr. Bernauer, Miss Heller, Mr. Kovacic, Mr. Lakie, Mr. Ryan, Miss Welch.

The Major Program

Students will specialize in one of two areas: biological aspects or psychological aspects of physical education.

Lower Division Courses.—Required of all students: Biology 1, Chemistry 1A, Mathematics 13, Physical Education 45, Physics 2A, Physiology 1, Psychology 1A, Zoology 25. Students interested in the biological aspects of physical education will be required to take Chemistry 8 and Zoology 2.

Upper Division Courses.—Required of all students: Physical Education 103A-103B, 104, 110, 120, and 135. Required of students in the biological area: Animal Science; Physiology 110A-110B and a minimum of 6 units selected from the following: Zoology 100, 100L, 106A, 106B, and Animal Physiology 102. Required of students in the psychological area: Psychology 112 and three courses selected from one of the following groups: a) Psychology 108, 130, 134, 147; b) Psychology 145, Sociology 152, 160.

Students who are preparing for careers as teachers will, in consultation with their adviser, elect additional physical education courses that satisfy requirements for the teaching credential.

Lower Division Courses**1. Physical Education for Men. (½) I, II, III.**

Laboratory—2 hours. Sections in archery, badminton, dance (social, folk and square), baseball, basketball, boxing, football, golf, handball, soccer, tennis, touch football, track,

trampolining, tumbling, wrestling, volleyball, swimming, lifesaving, and water sports. Men qualified for athletics may enroll in any sport pursued at Davis, such as baseball, basketball, football and receive credit. This course may be repeated for credit not to exceed a total of 6 units.

The Staff (Mr. Kovacic in charge)

5. First Aid. (2) I, II, III.

Lecture—2 hours. Standard course. Upon successful completion of the course the Red Cross Certificate is awarded.

Mr. Stromgren, Mr. Pappa

10. Professional Physical Education Activities

(Men). (1) I, II, III.

Lecture—1 hour; laboratory—2 hours. Fundamental knowledges and skills in swimming, basketball, football, track, baseball, tennis, golf, combative sports, developmental activities, court sports, tumbling and gymnastics.

The Staff (Mr. Kovacic in charge)

22. Professional Physical Education Activities

(Women). (1) I, II, III.

Lecture—1 hour; laboratory—2 hours. Fundamental skills in aquatics (swimming—beginning, intermediate, advanced, synchronized; diving; lifesaving; water safety); archery; badminton; basketball; dance (folk and square, modern, social); tennis; track; tumbling; gymnastics; volleyball.

The Staff (Mr. Kovacic in charge)

25. The Theory of Lifesaving and Water Safety.

(1) I, II, III.

Lecture—1 hour; laboratory—2 hours. Pre-requisite: course 1 or 26 and a course in intermediate swimming. Basic skills in swimming and small craft safety. Life saving procedures and techniques for which Red Cross Senior Lifesaving Certificate will be awarded upon successful completion of necessary requirements.

Mr. Hinsdale

26. Physical Education for Women. (½) I, II, III.

Laboratory—2 hours. Sections in archery, badminton, dance (modern, social, folk, and square), golf, tennis, trampolining, tumbling, volleyball, swimming, lifesaving, and swimming formations. This course may be repeated for credit not to exceed a total of 6 units.

The Staff (Mr. Kovacic in charge)

27. Organization and Teaching of Recreational and Competitive Swimming and Diving Skills.

(1) I, II, III.

Lecture—1 hour; laboratory—2 hours. Pre-requisite: Red Cross Lifesaving Certificate and Advanced Swimming and Diving. Organization and teaching of swimming and lifesaving skills. (Red Cross Water Safety instructors certificate awarded upon successful completion of neces-

sary requirements.) Organization of competitive swimming and diving programs and coaching techniques.

Mr. Hinsdale

35. Rhythmic Form and Analysis. (1) I.

Lecture—1 hour; laboratory—2 hours. The fundamentals of rhythmic form, the use of rhythm as the basic element in activity and its application to physical education. A workshop class in the function of rhythm, form, and analysis.

Mrs. Finnila

36A-36B. Dance History and Practice. (3-3) I-II.

Lecture—2 hours; laboratory—3 hours. Pre-requisite: body mechanics section of course 26 (may be taken concurrently). A survey of the dance from its origins in prehistoric and antique ceremonial to 1900. A study of the materials, growth, and function of dance in society. Practice primarily in dance forms which developed out of Renaissance foundations.

Mrs. Finnila

37A-37B. Contemporary Dance Theory and Practice. (3-3) I-II.

Lecture—2 hours; laboratory—3 hours. Pre-requisite: course 36B. A study of the perspectives and practices of contemporary American art dance; traditional forms and twentieth-century innovation. A comparative study of selected theories and practices in America, Europe, and the Orient.

Mrs. Finnila

44. Principles of Healthful Living. (2) II.

Lecture—2 hours. Use of scientific information, proper attitudes, knowledge, and health practices in daily living.

Miss Heller

45. Foundations of Physical Education. (4) I.

Lecture—4 hours. Survey of the mode, development, expressive form, and objective of human movement.

Mr. Adams

Upper Division Courses

103A. Analysis of Human Movement. (4) I.

Lecture—3 hours; laboratory—3 hours. Pre-requisite: Physics 2A; Physiology 2; Zoology 25. Anatomical and physiological concepts and physical laws as applied to human movement.

Mr. Kovacic

103B. Analysis of Human Movement. (4) II.

Lecture—3 hours; laboratory—3 hours. Pre-requisite: course 103A; Chemistry 1A. Physical, anatomical, and physiological basis of human form and movement.

Mr. Kovacic, Mr. Bernauer

104. Physiology of Muscular Activity. (4) III.

Lecture—3 hours; laboratory—3 hours. Pre-requisite: course 103B; Biology 1. Circulatory-respiratory and metabolic response to exercise in man under various physiological and ambient conditions.

Mr. Bernauer

110. Psychosocial Factors in Motor Performance.

(4) II.

Lecture—3 hours. Prerequisite: Psychology 1A. Analysis of various psychological and social factors affecting the development and use of motor skills.

Mr. Ryan

120. Sports in American Society. (4) II.

Lecture—4 hours. Prerequisite: History 17A. The interrelationships of sports with other aspects of society, including the family, church, school and government; consideration of the manner in which sports may be used to contribute to human welfare in our advanced technological society.

Mr. Lakie

130. Principles and Theory of Physical Education.

(4) III.

Lecture—4 hours. A critical analysis of the assumptions underlying the physical education program.

Mr. Lakie

135. Research Design and Instrumentation in Physical Education. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 13. Methods, techniques, and design of experimental research in physical education.

Mr. Bernauer

140. Recreation in the Community. (3) II.

Lecture—3 hours. The nature, scope and significance of recreation with its implications for leisure. The development, organization, and purpose of public and voluntary agencies which serve the recreational needs of the community.

Mr. Schmalenberger

145. School Health Education. (3) III.

Lecture—3 hours. Prerequisite: course 44; or consent of instructor. A study of the school health program as an integral part of the

school curriculum; the underlying principles and functions of health instruction, health service, healthful school living and the contributing community health agencies.

Miss Heller

171. Conditioning of Athletes and Care of Injuries (Men). (3) I.

Lecture—2 hours; laboratory—1 hour. Prerequisite: course 5; Physiology 2; or Zoology 25. Modern principles and practices in conditioning and care of athletes. Prevention and care of athletic injuries; therapeutic exercises applied to athletic injuries; training room equipment, protective devices, and supplies.

Mr. Stromgren

180. Physical Education in the Secondary School.

(3) I.

Lecture—3 hours. An analysis and study of the principles and methods basic to physical education in the secondary school.

Miss Heller, Mr. Schmalenberger

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: consent of department.
The Staff (Mr. Kovacic in charge)

Professional Course**380A-380B. Methods of Physical Education in the Secondary School. (3-3) II-III.**

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 180 and demonstrated competence in selected skills. The methods of teaching group and individual activities in the secondary school; program planning; class management; organization of the intramural and extra-mural programs.

Miss Heller, Mr. Schmalenberger

PHYSICAL SCIENCESWilliam W. True, Ph.D., *Chairman of the Committee*

Committee Office, 103 Physical Science

Committee in Charge:**Associate Professors:**Peter W. M. John, Ph.D. (*Mathematics*)William W. True, Ph.D. (*Physics*)James W. Valentine, Ph.D. (*Geology*)**Assistant Professors:**Franklin P. Brady, Ph.D. (*Physics*)James H. Swinehart, Ph.D. (*Chemistry*)**Major Adviser: See Schedule and Directory.**

The major in physical sciences is designed primarily for students who wish to obtain a general secondary credential. The lower division

course requirements are similar to those of the major in chemistry or physics. This major may lead to the Bachelor of Arts or the Bachelor of Science degree.

Preparation for the Major

Required: Chemistry 1A, 1B, 1C or 1A, 7A, 7B; Physics 4A, 4C, 4D, 4E; Geology 1, 1L or 150; Mathematics 1A, 1B, 1C. Recommended: Chemistry 5; Physics 4B; Geology 4; Mathematics 2A, 2B. The choice of recommended courses will be governed by the field of specialization within the major.

The Major Program

A total of 36 units of upper division courses

in the physical sciences, of which not less than 23 units must be taken in a single subject, e.g., chemistry, physics, or geology.

Teaching Major.—Requirements for the teaching major are the same as for the undergraduate major.

PHYSICS

James E. Draper, Ph.D., *Chairman of the Department*
Department Office, 109 Physical Science

Professors:

James E. Draper, Ph.D.
Milton E. Gardner, Ph.D.
John A. Jungerman, Ph.D.
William J. Knox, Ph.D.
Charles C. Patten, Ph.D.

Associate Professors:

Kenneth R. Creider, Ph.D.
Douglas W. McColm, Ph.D.
William W. True, Ph.D.

Assistant Professors:

Franklin P. Brady, Ph.D.
Glen W. Erickson, Ph.D.
Claude Carrod, Ph.D.
James P. Hurley, Ph.D.
Olaf S. Leifson, Ph.D.
James A. McCray, Ph.D.



Lecturers:

A. Ross Barnett, Ph.D.
Lindsay R. Dodd, Ph.D.
Neal F. Peek, Ph.D.
Arthur Springer, Ph.D.
George L. Strobel, Ph.D.
Natalie R. Leonard, B.A., (*Astronomy*)

Letters and Science List.—All undergraduate courses in physics are included in the Letters and Science List of Courses (see page 98).

Major Subject Advisers.—Mr. Brady, Mr. Erickson, Mr. Gardner, Mr. Hurley.

Bachelor of Arts Major Program

Lower Division Courses.—Required: Physics 4A, 4B, 4C, 4D, 4E, Chemistry 1A, Mathematics 1A, 1B, 1C, 2A, 2B, 2C. Recommended: A reading knowledge of French, German, or Russian.

Upper Division Courses.—Required: Physics 104A, 104B, 105A, 105B, 108, 110A, 110B, 112A, 115A, either 116A and 122 (1 unit) or 122 (2 units); 129A or 140; and additional units in upper division physics or mathematics to make a total of at least 36 units.

Bachelor of Science Major Program

Lower Division Courses.—Required: Physics 4A, 4B, 4C, 4D, 4E, Chemistry 1A and either

Teaching Minor.—The teaching minor must take at least 30 quarter units in two of the physical science fields with at least 18 units in one of these two fields. The program must have the approval of the subject representative.

Subject Representative: Mr. True, Physics.

1B-1C or 7A-7B, Mathematics 1A, 1B, 1C, 2A, 2B, 2C. Recommended: A reading knowledge of two of the following languages: French, German, or Russian.

Upper Division Courses.—Required: Physics 104A, 104B, 105A, 105B, 108, 110A, 110B, 112C, 112A, 112B, 115A, 115B, 116A, 122, 129A, 140. Recommended: Mathematics 185.

Honors and Honors Program.—The honors program in physics consists of 4 units of course 194H, open to seniors who qualify for the honors program. Students may be graduated with honors in physics on completion of the required major and this program.

Graduate Study.—The Department of Physics offers programs of study and research leading to the M.A. and Ph.D. degrees.

Lower Division Courses

Physics 4A, 4B, 4C, 4D, and 4E are for students whose major is physics and for students preparing for applications of physics in Engineering and Chemistry.

All students planning to take lower division courses (except course 10) should have completed trigonometry.

Upper Division Courses

Courses 4A, 4B, 4C, 4D, 4E, or their equivalent, and differential and integral calculus are prerequisite to all upper division courses except course 107; in addition, Mathematics 2C or its equivalent is recommended.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major for degree (A.B. or B.S.).

Teaching Minor.—The teaching minor must take Physics 4A, 4B, 4C, 4D, 4E, and any other upper division physics courses necessary to complete 30 quarter units.

Subject Representative: Mr. Gardner.

Astronomy

Lower Division Course

1. Introduction to General Astronomy. (4) III.

Lecture—4 hours. An introduction to some of the fundamental principles of astronomy and

a survey of recent developments. Not intended for advanced physical science majors.

Mrs. Leonard

Physics

Lower Division Courses

2A. General Physics Lecture. (3) I, II, III.

Lecture—3 hours. Mechanics; introduction to electricity and magnetism.

I. Mr. Garrod, II. Mr. Patten, III. Mr. Peek

2B. General Physics Lecture. (3) II, III.

Lecture—3 hours. Prerequisite: course 2A. Electricity and magnetism, heat, kinetic theory, and thermodynamics.

II. Mr. Garrod, III. Mr. Brady

2C. General Physics Lectures. (3) I, III.

Lecture—3 hours. Prerequisite: course 2A. Wave motion, optics, modern physics.

I. ———, III. Mr. Garrod

3A. General Physics Laboratory. (1) I, II, III.

Laboratory—3 hours. Prerequisite: course 2A (may be taken concurrently). Mechanics, introduction to electricity and magnetism. Experimental work planned to accompany the lectures in course 2A. Recommended for all students who elect course 2A.

I. Mr. Garrod, II. Mr. Patten, III. Mr. Peek

3B. General Physics Laboratory. (1) II, III.

Laboratory—3 hours. Prerequisite: course 2B (may be taken concurrently). Electricity and magnetism, heat, kinetic theory, and thermodynamics. Experimental work planned to accompany the lectures in course 2B. Recommended for all students who elect course 2B.

II. Mr. Garrod, III. Mr. Brady

3C. General Physics Laboratory. (1) I, III.

Laboratory—3 hours. Prerequisite: course 2C (may be taken concurrently). Wave motion, optics, modern physics. Experimental work planned to accompany the lectures in course 2C. Recommended for all students who elect course 2C.

I. ———, III. Mr. Garrod

4A. General Physics. (4) II, III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 1B (may be taken concurrently). Mechanics.

II. Mr. Gardner, III. ———

4B. General Physics. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 4A; Mathematics 1C (may be taken concurrently). Properties of matter, special relativity, heat, kinetic theory, and thermodynamics.

Mr. Gardner

4C. General Physics. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 4A; Mathematics 1C. Electricity and magnetism.

Mr. Gardner

4D. General Physics. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 4C. A.C. circuitry, wave motion, and sound.

Mr. Leifson

4E. General Physics. (4) II, III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 4D. Optics and modern physics.

II. ———, III. Mr. Greider

10. Basic Concepts of Physics. (4) I.

Lecture—3 hours; discussion—1 hour. Development of the principles of physics, classical and modern, with emphasis on concepts rather than applications. Includes lecture-demonstrations and problem assignments. Not open to students who have received credit for any of courses 2A, 2B, 2C, 4A, 4B, 4C, 4D, 4E, or equivalent.

Upper Division Courses

104A-104B. Introduction to Methods of

Mathematical Physics. (3-3) I-II.

Lecture—3 hours. Prerequisite: course 4C; mathematics 2C. Elements of vector and tensor analysis, matrix methods, boundary value problems, integral transforms with applications to physics.

Mr. Erickson

105A-105B-105C. Analytical Mechanics.

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: course 4A; Mathematics 2C. Principles and applications of Newtonian mechanics.

Mr. McCray

107. Introduction to Electronics. (3) I.

Lecture—3 hours. Prerequisite: course 2B. Elementary principles of single-phase alternating-current circuits, characteristics of thermionic tubes and a study of simple electronic circuits.

Mr. Gardner

108. Physical Optics. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 4E; Mathematics 2C. The phenomena of diffraction, interference, and polarization of light, and their applications.

Mr. Gardner

110A-110B-110C. Electricity and Magnetism.

(3-3-3) I-II-III.

Lecture—3 hours. Prerequisite: course 4D; Mathematics 2C. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves.

Mr. Patten

112A-112B. Thermodynamics and Statistical

Physics. (3-3) II-III.

Lecture—3 hours. Prerequisite: course 4B; Mathematics 2C. Thermodynamics, kinetic theory, and introduction to statistical mechanics.

Mr. Knox

115A-115B. Introduction to Quantum Mechanics.
(3-3) I-II.

Lecture—3 hours. Prerequisite: courses 4E, 104B, 105B. The classical background, basic ideas, and methods of quantum mechanics, with applications to atomic physics. Mr. Brady

116A. Electronic Instrumentation. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 4D; Mathematics 2C. Recommended: course 104B and partial differential equations and Laplace transforms. An experimental and theoretical study of important electronic circuits commonly used in physics.

Mr. McCray

116B. Electronic Instrumentation. (2) II.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 116A. Continuation of course 116A with special emphasis on recent developments in semiconductor circuitry. Mr. McCray

121. Introduction to Atomic Structure. (3) III.

Lecture—3 hours. Prerequisite: course 4E; Mathematics 1C. Introduction to atomic physics, treating cathode and positive rays, the electron, thermionic emission, the photoelectric effect, the structure of the atom, and the interpretation of spectra and x-rays.

Mr. Patten

122. Advanced Physics Laboratory. (1-2) II, III.

Laboratory—3-6 hours. Prerequisite: courses 2C and 3C. Experimental techniques and measurements in atomic, nuclear, and solid-state physics. May be repeated for credit not to exceed a total of 3 units.

II. Mr. Leifson, III. Mr. McColm

129A. Nuclear Physics. (3) II.

Lecture—3 hours. Prerequisite: course 4E; Mathematics 2C. Survey of basic nuclear properties and concepts requiring only rudimentary knowledge of quantum mechanics.

129B. Nuclear Physics. (3) III.

Lecture—3 hours. Prerequisite: courses 115B, 129A. Continuation of course 129A.

140. Introduction to Solid-State Physics. (4) III.

Lecture—4 hours. Prerequisite: course 115A. A survey of the properties of solids. Types of crystals, mechanical properties, lattice vibrations; thermal, electrical, and magnetic properties of metals and non-metals; band theory of solids; semiconductors; ferromagnetism; superconductivity; lattice defects. Mr. Leifson

194H. Special Study for Honors Students.
(4) I, II, III.

Prerequisite: open only to seniors who qualify for the honors program. Independent research and/or reading on selected topics. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses**205A-205B. Theoretical Mechanics. (3-3) I, II.**

Lecture—3 hours. Prerequisite: course 105C. I. The generalized methods of Lagrange and Hamilton. II. Hamilton and Jacobi theory; the formulation of quantum mechanics.

Mr. McColm

210A. Theory of Electricity and Magnetism. (3) III.

Lecture—3 hours. Prerequisite: course 110C; a course in differential equations. Classical description of static electromagnetic fields with emphasis on boundary value problems.

Mr. McColm

***210B. Theory of Electricity and Magnetism. (3) I.**

Lecture—3 hours. Prerequisite: course 210A. Maxwell's equations, conservation laws, plane waves.

***210C. Theory of Electricity and Magnetism. (3) II.**

Lecture—3 hours. Prerequisite: course 210B. Special theory of relativity, covariant formulation of electromagnetic theory, radiating systems, and electron theory.

215A. Quantum Mechanics. (3) I.

Lecture—3 hours. Prerequisite: course 115B. Non-relativistic quantum mechanics. Formal development and interpretation of quantum mechanics, including the Schrödinger wave equation, matrix mechanics, and use of state vectors in describing a dynamical system.

215B. Quantum Mechanics. (3) II.

Lecture—3 hours. Prerequisite: course 215A. Wave packets, Wentzel-Kramers-Brillouin approximation, and perturbation methods applied to atomic, nuclear, molecular, and solid-state problems.

215C. Quantum Mechanics. (3) III.

Lecture—3 hours. Prerequisite: course 215B. Scattering theory, radiation theory, and a brief introduction to relativistic quantum mechanics and the Dirac equation.

219A. Statistical Mechanics. (3) I.

Lecture—3 hours. Prerequisite: courses 112 and 115B. Foundations of classical and quantum statistical mechanics.

Mr. Hurley

219B. Statistical Mechanics. (3) II.

Lecture—3 hours. Prerequisite: course 219A. Applications to properties of solids, real gases, nuclear matter, fluctuations about the equilibrium state.

Mr. Hurley

* Not to be given, 1966-1967.

224A. Nuclear Physics. (3) I.

Lecture—3 hours. Prerequisite: course 215B. Comprehensive study of the nucleon-nucleon interaction including the deuteron, nucleon-nucleon scattering, polarization, determination of real parameters of S-matrix, and related topics.

Mr. Draper

224B. Nuclear Physics. (3) II.

Lecture—3 hours. Prerequisite: course 224A. Study of nuclear models, including shell model, collective model, unified model. Energy level spectra, static momenta, and electromagnetic transition rates.

Mr. Draper

224C. Nuclear Physics. (3) III.

Lecture—3 hours. Prerequisite: course 224B. Study of nuclear scattering and reactions including the optical model and direct interactions. Beta decay and an introduction to weak interactions.

Mr. Draper

229A. Advanced Nuclear Theory. (3) I.

Lecture—3 hours. Prerequisite: course 224C. Advanced topics in nuclear theory: theory of nuclear matter, nuclear models containing pairing and correlation forces, quasiparticle description, unification of independent particle and collective models.

Mr. Greider

229B. Advanced Nuclear Theory. (3) II.

Lecture—3 hours. Prerequisite: course 229A. Advanced topics in nuclear theory: weak interactions, strong interactions, meson field theory, dispersion relations, particle physics.

Mr. Greider

230A. Quantum Theory of Fields. (3) I.

Lecture—3 hours. Prerequisite: course 215C. Relativistic quantum mechanics of particles; techniques and applications of second quantization; Feynman diagrams; renormalization.

Mr. Erickson

230B. Quantum Theory of Fields. (3) II.

Lecture—3 hours. Prerequisite: course 230A. Continuation of 230B, with selected advanced topics, such as S-matrix theory, dispersion relations, axiomatic formulations. Mr. Erickson

239A. Quantum Many-Body Systems. (3) III.

Lecture—3 hours. Prerequisite: courses 215C and 219B. The quantum theory of many-particle systems. Theoretical analysis of superfluids, superconductors, and nuclear matter. Mr. Garrod

***239B. Quantum Many-Body Systems. (3) I.**

Lecture—3 hours. Prerequisite: course 239A. Perturbation and variation techniques in many-particle systems. Band theory of solids, electron-phonon interactions, and other topics.

Mr. Garrod

242A. Plasma Physics. (3) III.

Lecture—3 hours. Prerequisite: course 210C. Recommended: course 219. Motion of charged particles in electromagnetic fields, macroscopic equations, and plasma oscillations. Offered in odd-numbered years.

Mr. Hurley

***242B. Plasma Physics. (3) I.**

Lecture—3 hours. Prerequisite: course 242A. Boundary layer problems, diffusion and stability. Offered in odd-numbered years.

Mr. Hurley

290. Seminar. (1-3) I, II, III.

Seminar—1-3 hours.

I. Mr. Liefson, II. Mr. McColm, III. Mr. Knox

291. Seminar in Nuclear Physics. (1-2) I, II, III.

I. Mr. Knox, II. Mr. Draper, III. Mr. Brady

292. Seminar in Theoretical Physics. (1-2) I, II, III.

I. Mr. Hurley, II. Mr. Garrod, III. Mr. Erickson

299. Research. (1-12) I, II, III.

The Staff

* No enrollment 1966-67 because of quarter system transition.

PHYSIOLOGICAL SCIENCES

Arthur L. Black, Ph.D., *Acting Chairman of the Department*
Department Office, 2165 Haring Hall

Professors:

- Arthur L. Black, Ph.D.
- Leo K. Bustad, D.V.M., Ph.D.
- Louis W. Holm, Ph.D.
- Stuart A. Peoples, M.D.
- Leon H. Schmidt, Ph.D.

Associate Professors:

- Victor W. Burns, Ph.D.
- ¹Richard A. Freedland, Ph.D.
- Douglas G. Stuart, Ph.D.

¹ Absent on leave, 1966-67.

Assistant Professors:

- Harold R. Parker, D.V.M., Ph.D.
- Quinton R. Rogers, Ph.D.
- Norman W. Scholes, Ph.D.

**Lecturers:**

- Allen C. Andersen, V.M.D., Ph.D.
- Gaylor M. Conzelman, Ph.D.
- Rocco J. Della Rosa, Ph.D.
- Marvin Goldman, Ph.D.
- Ethelda N. Sassenrath, Ph.D.

Upper Division Courses**101A-101B. Physiological Chemistry. (4-3) I, II.**

Lecture—4-3 hours. Prerequisite: quantitative and organic chemistry. Recommended: a course in physiology (may be taken concurrently). Chemical and physical properties of substances comprising the animal body, with major emphasis on the changes during metabolism and factors influencing these reactions. Biochemistry of the endocrine glands and other specialized tissues and body fluids; energy metabolism and nutrition.

Mr. Black, Mr. Freedland, Mr. Rogers

102A-102B. Physiological Chemistry Laboratory. (1-2) I-II.

Laboratory—3 hours. Prerequisite: course 101A-101B (should be taken concurrently). Laboratory practice to illustrate the chemical and physical properties of important constituents of animal cells including enzymes; blood and urine analysis; animal experiments on intermediary metabolism using isotopes.

Mr. Black, Mr. Rogers

123. Comparative Pharmacology. (4) III, I.**

Lecture—2 hours; laboratory—6 hours. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of the instructor. The action of drugs on the physiological mechanism of domestic animals.

Mr. Peoples, Mr. Scholes

124 Comparative Pharmacology. (4) I, II##.

Lecture—4 hours; laboratory—3 hours. Prerequisite: course 123 or consent of the instructor. The effect of drugs on organ systems of domestic animals and their application to the treatment of disease. Laboratory exercises to illustrate the principles of therapeutics and toxicology. Mr. Peoples, Mr. Scholes, Mr. Schmidt

140A. Mammalian Physiology. (5) II.

Lecture—5 hours. Prerequisite: Biology 1; Zoology 2; Physics 2B, 2C; Chemistry 1C and 8. A comprehensive survey of mammalian physiology.

Mr. Holm, Mr. Parker, Mr. Stuart, Mr. Bustad

140B. Mammalian Physiology. (5) III.

Lecture—5 hours. Prerequisite: Biology 1; Zoology 2; Physics 2B, 2C; Chemistry 1C and 8. A comprehensive survey of mammalian physiology.

Mr. Holm, Mr. Parker, Mr. Stuart, Mr. Bustad

141A. Laboratory in Mammalian Physiology. (1) II.

Laboratory—3 hours. Prerequisite: course 140A (may be taken concurrently). Laboratory exercises designed to illustrate physiological in-

1967 only.

** 1966 only.

teractions among systems in a variety of mammalian forms.

Mr. Holm, Mr. Parker, Mr. Stuart, Mr. Bustad

141B. Laboratory in Mammalian Physiology. (2) III.

Laboratory—6 hours. Prerequisite: course 140B (may be taken concurrently). Laboratory exercises designed to illustrate physiological interactions among systems in a variety of mammalian forms.

Mr. Holm, Mr. Parker, Mr. Stuart, Mr. Bustad

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Laboratory—3-15 hours.

The Staff

Graduate Courses**205. Intermediary Metabolism of Animals. (5) III.**

Lecture—5 hours. Prerequisite: Biochemistry and physiology or consent of the instructor. Survey of metabolism, emphasizing studies on intact animals. Pathways and control in biosynthesis and degradation of major tissue constituents including carbohydrates, amino acids, proteins, lipids, nucleotides and porphyrins. Dynamics of animal metabolism including pools and turnover rates.

Mr. Black, Mr. Rogers

225. Fundamentals of Radiation Biology. (5) I.

Lecture—5 hours. Prerequisite: one year of physics, introductory biochemistry, introductory physiology. Recommended: first course in analytical geometry and calculus. A survey of effects of ionizing radiations on biological systems, with emphasis upon mammals. Special problems of radiological physics, radiation chemistry, physiology, pathology, and radioactivity in the biosphere are studied.

Mr. Bustad, Mr. Goldman, Mr. Della Rosa

243A-243B. Use of Isotopes as Tracers in Biological Research. (2-2) I, II.

Lecture—2 hours. Prerequisite: biochemistry or physiological chemistry, elementary physics and calculus or permission of instructor. Discussion of the properties of isotopes and their use as tracers in biological systems.

Mr. Burns

243L. Laboratory in Use of Isotopes as Tracers in Biological Research. (2) II.

Laboratory—6 hours. Prerequisite: courses 243A and 243B concurrently and consent of the instructor. Study of radioisotope properties, uses, and measurement methods relevant to the biological sciences.

Mr. Burns

265. Experimental Physiology. (3) I.

Laboratory—6 hours. Prerequisite: consent of the instructor. Selected lectures and experiments on the physiology of the nervous system, neutral regulation, cardiac function and rumen function. Preparation and study of certain endocrine deficiencies and excesses.

Mr. Holm

290. Seminar. (1) I, II, III.

Seminar—1 hour.

The Staff

299. Research. (1-12) I, II, III.

Laboratory—3-36 hours.

The Staff

PLANT PHYSIOLOGY (A Graduate Group)

C. Ralph Stocking, Ph.D., *Chairman of the Group*
 Group Office, 279 Robbins Hall

Members of the Group:*Professors:*

- Frederick T. Addicott, Ph.D. (*Agronomy*)
 Maynard A. Amerine, Ph.D. (*Viticulture and Enology*)
 Royce S. Bringhurst, Ph.D. (*Pomology*)
 Dillon S. Brown, Ph.D. (*Pomology*)
 Clinton O. Chichester, Ph.D. (*Food Science and Technology*)
 Lawrence L. Claypool, Ph.D. (*Pomology*)
 Eric E. Conn, Ph.D. (*Biochemistry and Biophysics*)
 John P. Conrad, Ph.D. (*Agronomy; Emeritus*)
 James A. Cook, Ph.D. (*Viticulture and Enology*)
 Alden S. Crafts, Ph.D. (*Botany, Emeritus*)
 Julian C. Crane, Ph.D. (*Pomology*)
 Herbert B. Currier, Ph.D. (*Botany*)
 Luther D. Davis, Ph.D., LL.D. (*Pomology; Emeritus*)
 James E. DeVay, Ph.D. (*Plant Pathology*)
 Lloyd D. Doneen, Ph.D. (*Water Science and Engineering*)
 Emanuel Epstein, Ph.D. (*Soils and Plant Nutrition*)
 William H. Griggs, Ph.D. (*Pomology*)
 Robert M. Hagan, Ph.D. (*Water Science and Engineering*)
 James F. Harrington, Ph.D. (*Vegetable Crops*)
 Richard W. Harris, Ph.D. (*Landscape Horticulture*)
 Hudson T. Hartmann, Ph.D. (*Pomology*)
 Delbert W. Henderson, Ph.D. (*Water Science and Engineering*)
 James E. Knott, Ph.D., Sc.D., (hon.c.) (*Vegetable Crops; Emeritus*)
 Harry C. Kohl, Jr., Ph.D. (*Landscape Horticulture*)
 Horton M. Laude, Ph.D. (*Agronomy*)
 Oscar A. Lorenz, Ph.D. (*Vegetable Crops*)
 John H. MacGillivray, Ph.D. (*Vegetable Crops*)
 Ben A. Madson, B.S.A. (*Agronomy; Emeritus*)
 Edward C. Maxie, Ph.D. (*Pomology*)
 Duane S. Mikkelsen, Ph.D. (*Agronomy*)

- Leonard L. Morris, Ph.D. (*Vegetable Crops*)
 Klayton E. Nelson, Ph.D. (*Viticulture and Enology*)
 Edgar P. Painter, Ph.D. (*Chemistry*)
 Maurice L. Peterson, Ph.D. (*Agronomy; Berkeley Campus*)
 Harlan K. Pratt, Ph.D. (*Vegetable Crops*)
 E. Louis Proebsting, Ph.D. (*Pomology; Emeritus*)
 Victor V. Rendig, Ph.D. (*Soils and Plant Nutrition*)
 C. Ralph Stocking, Ph.D. (*Botany*)
 Perry R. Stout, Ph.D. (*Soils and Plant Nutrition*)
 Paul K. Stumpf, Ph.D. (*Biochemistry and Biophysics*)
 Warren P. Tufts, Ph.D. (*Pomology; Emeritus*)
 Robert J. Weaver, Ph.D. (*Viticulture and Enology*)
 William A. Williams, Ph.D. (*Agronomy*)
 Frederick P. Zscheile, Jr., Ph.D. (*Agronomy*)

Associate Professors:

- Floyd M. Ashton, Ph.D. (*Botany*)
 Richard A. Bernhard, Ph.D. (*Food Science and Technology*)
 Paul A. Castelfranco, Ph.D. (*Botany*)
 Chester L. Foy, Ph.D. (*Botany*)
 Ray C. Huffaker, Ph.D. (*Agronomy*)
 Dale E. Kester, Ph.D. (*Pomology*)
 Hendrik J. Ketellapper, Ph.D., (Botany)
 John C. Lingle, Ph.D. (*Vegetable Crops*)
 Robert S. Loomis, Ph.D. (*Agronomy*)
 John H. Madison, Ph.D. (*Landscape Horticulture*)
 Jack Major, Ph.D. (*Botany*)
 Roy M. Sachs, Ph.D. (*Landscape Horticulture*)

Assistant Professors:

- Bruce A. Bonner, Ph.D. (*Botany*)
 Theodore C. Hsiao, Ph.D. (*Water Science and Engineering*)
 Andrew T. Leiser, Ph.D. (*Landscape Horticulture*)

Lecturers:

- David E. Bayer, Ph.D. (*Botany*)

Peter B. Catlin, Ph.D. (*Pomology*)
 Donald G. Crosby, Ph.D. (*Food Science and Technology*)
 Frederick D. Howard, Ph.D. (*Vegetable Crops*)
 W. Mark Kliewer, Ph.D. (*Viticulture and Enology*)
 Oliver A. Leonard, Ph.D. (*Botany*)
 Omund Lilleland, Ph.D. (*Pomology*)
 Charles A. Raguse, Ph.D. (*Agronomy*)

Lawrence Rappaport, Ph.D. (*Vegetable Crops*)
 Roger J. Romani, Ph.D. (*Pomology*)
 Kay Ryugo, Ph.D. (*Pomology*)
 Donald E. Seamen, Ph.D. (*Botany*)
 Noel F. Sommer, Ph.D. (*Pomology*)
 Kiyoto Uriu, Ph.D. (*Pomology*)
 C. H. E. Werkhoven, Ph.D. (*Agronomy*)
 Masatoshi Yamaguchi, Ph.D. (*Vegetable Crops*)

PLANT SCIENCES

Dillon S. Brown, Ph.D., *Chairman of the Committee*
 Committee Office, 1043 Wickson Hall

Committee in Charge:

Floyd M. Ashton, Ph.D. (*Botany*)
 Dillon S. Brown, Ph.D. (*Pomology*)
 James A. Cook, Ph.D. (*Viticulture*)
 Richard W. Harris, Ph.D. (*Landscape Horticulture*)
 Lysle D. Leach, Ph.D. (*Plant Pathology*)

Oscar A. Lorenz, Ph.D. (*Vegetable Crops*)
 R. Merton Love, Ph.D. (*Agronomy*)
 Sidney R. Snow, Ph.D. (*Genetics*)

Departmental Major Advisers.—See *Schedule and Directory Listing.*
Bachelor of Science Major Program and Graduate Study. See pages 47 and 50.

Participating Departments:

AGRONOMY

R. Merton Love, Ph.D., *Chairman of the Department*
 Department Office, 131 Hunt Hall

Professors:

Fredrick T. Addicott, Ph.D.
 Robert W. Allard, Ph.D. (*Agronomy and Genetics*)
 John P. Conrad, Ph.D. (*Emeritus*)
 Paulden F. Knowles, Ph.D.
 Horton M. Laude, Ph.D.
 R. Merton Love, Ph.D.
 Ben A. Madson, B.S.A. (*Emeritus*)
 Duane S. Mikkelsen, Ph.D.
 Maurice L. Peterson, Ph.D.
 Charles W. Schaller, Ph.D.
 Francis L. Smith, Ph.D.
 Ernest H. Stanford, Ph.D.
 William A. Williams, Ph.D.

Frederick P. Zscheile, Jr., Ph.D.

Associate Professors:

Ray C. Huffaker, Ph.D.
 Robert S. Loomis, Ph.D.
 Franklin C. Raney, Ph.D. (*Agronomy*)



Lecturers:

Beecher Crampton, M.S.
 Subodh K. Jain, Ph.D.
 Charles A. Raguse, Ph.D.
 Dale G. Smeltzer, Ph.D.
 C. H. E. Werkhoven, Ph.D.
 J. Caswell Williams, Jr., Ph.D.

LANDSCAPE HORTICULTURE

Richard W. Harris, Ph.D., *Chairman of the Department*
 Department Office, 106 Landscape Horticulture Building

Professors:

Richard W. Harris, Ph.D.
 Harry C. Kohl, Jr., Ph.D.

Associate Professors:

John H. Madison, Ph.D.
 Roy M. Sachs, Ph.D.

Assistant Professors:

James A. Harding, Ph.D.
 Andrew T. Leiser, Ph.D.
 Jack L. Paul, Ph.D.

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Lecturers:

Robert D. Danielson, M.S.
 Leonard H. McVicar
 Roy W. Potter, M.C.P.

PLANT PATHOLOGY*Lysle D. Leach, Ph.D., Chairman of the Department*

Department Office, 350 Hutchison Hall

Professors:

James E. DeVay, Ph.D.
 W. Harley English, Ph.D.
 Raymond G. Grogan, Ph.D.
 William B. Hewitt, Ph.D.
 Byron R. Houston, Ph.D.
 Lysle D. Leach, Ph.D.
 George Nyland, Ph.D.
 Edward E. Wilson, Ph.D.

Robert N. Campbell, Ph.D.

Tsune Kosuge, Ph.D.
 Joseph M. Ogawa, Ph.D.
 Thomas A. Shalla, Ph.D.

Assistant Professor:

Donald E. Mathre, Ph.D.

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Lecturer:

Robert J. Shepherd, Ph.D.

Associate Professors:

Edward E. Butler, Ph.D.

POMOLOGY*Dillon S. Brown, Ph.D., Chairman of the Department*

Department Office, 1043 Wickson Hall

Professors:

Frank W. Allen, M.S. (*Emeritus*)
 Royce S. Bringhurst, Ph.D.
 Dillon S. Brown, Ph.D.
 Lawrence L. Claypool, Ph.D.
 Julian C. Crane, Ph.D.
 Luther D. Davis, Ph.D., LL.D. (*Emeritus*)
 William H. Griggs, Ph.D.
 Carl J. Hansen, M.S.
 Hudson T. Hartmann, Ph.D.
 Claron O. Hesse, Ph.D.
 Edward C. Maxie, Ph.D.
 E. Louis Proebsting, Ph.D. (*Emeritus*)
 Warren P. Tufts, Ph.D. (*Emeritus*)

Associate Professor:

Dale E. Kester, Ph.D.

◊ ◊ ◊

Lecturers:

Muriel V. Bradley, Ph.D.
 Peter B. Catlin, Ph.D.
 Paul E. Hansche, Ph.D.
 Allan A. Hewitt, Ph.D.
 Omund Lilleland, Ph.D.
 Roger J. Romani, Ph.D.
 Kay Ryugo, Ph.D.
 Eugene F. Serr, Jr., B.S. (*Emeritus*)
 Noel F. Sommer, Ph.D.
 Kiyoto Uriu, Ph.D.

VEGETABLE CROPS*Oscar A. Lorenz, Ph.D., Chairman of the Department*

Department Office, 150 Hunt Hall

Professors:

Glen N. Davis, Ph.D.
 James F. Harrington, Ph.D.
 Oscar A. Lorenz, Ph.D.
 John H. MacGillivray, Ph.D.
 Leonard L. Morris, Ph.D.

Harlan K. Pratt, Ph.D.

Charles M. Rick, Jr., Ph.D.
 Paul G. Smith, Ph.D.
 James E. Knott, Ph.D., Sc.D., (hon.c.)
 (*Emeritus*)

Associate Professors:

John C. Lingle, Ph.D.
Arthur R. Spurr, Ph.D.

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Lecturers:

William J. Flocker, Ph.D.
Frederick D. Howard, Ph.D.
Lawrence Rappaport, Ph.D.
Masatoshi Yamaguchi, Ph.D.

VITICULTURE AND ENOLOGY

James A. Cook, Ph.D., *Chairman of the Department*

Department Office, 1023 Wickson Hall

Professors:

Maynard A. Amerine, Ph.D.
Harold W. Berg, M.S.
James A. Cook, Ph.D.
James F. Guymon, Ph.D.
Klayton E. Nelson, Ph.D.
Harold P. Olmo, Ph.D.
Robert J. Weaver, Ph.D.
A. Dinsmoor Webb, Ph.D.
Albert J. Winkler, Ph.D., LL.D. (*Emeritus*)

Associate Professor:

Lloyd A. Lider, Ph.D.

Assistant Professor:

Ralph E. Kunkee, Ph.D.

◇ ◇ ◇

Professors:

Frederick T. Addicott, Ph.D. (*Agronomy*)
George L. Marsh, M.S. (*Food Science and Technology*)

Lecturers:

W. Mark Kliewer, Ph.D.
Cornelius S. Ough, B.S.
Vernon L. Singleton, Ph.D.

Plant Science**Lower Division Courses****1. Plants and Man. (3) II.**

Lecture—3 hours. Plants as a basic resource for food, fiber, shelter, and recreation; their use and effect on man, past, present, and future.

Mr. Williams, Mr. Smeltzer

2. Production of Cultivated Plants. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 1. Principles of crop improvement, propagation, production, processing, storage, and marketing; conservation and utilization of land and water resources.

Mr. Flocker, Mr. Lider

Upper Division Courses**101. Ecology of Cultivated Plants. (3) II.**

Lecture—3 hours. Prerequisite: course 2; Botany 111; Soil and Water Science 2. Plant

population dynamics in cultivated ecosystems; the response of plant communities to light, temperature, soil, water, and air-pollution.

Mr. Loomis, Mr. Kohl, Mr. Mikkelsen

102. Physiology of Cultivated Plants. (3) III.

Lecture—3 hours. Prerequisite: Botany 111. Recommended: course 101. The plant as a dynamic unit; physiological processes in the vegetative growth, development, flowering and fruiting of cultivated plants.

Mr. Sachs, Mr. Maxie, Mr. Rappaport

113. Plant Breeding. (3) II.

Lecture—3 hours. Prerequisite: Genetics 100. The principles of plant breeding.

Mr. Knowles, Mr. Hansche

116. Principles of Plant Nutrition. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: Botany 2; Chemistry 5. Evolution and scope of plant nutrition; essential and other elements; mechanisms of absorption and translocation; mineral metabolism; deficiencies and toxicities; genetic and ecological aspects of plant nutrition; relation to animal nutrition; experimental techniques, including solution culture and radioactive tracing.

Mr. Epstein

120. Introduction to Weed Science. (2) II.

Lecture—2 hours. Prerequisite: Botany 2; Chemistry 8. A general course covering the principles underlying the control of weeds.

Mr. Ashton

Agronomy**Lower Division Course****2. Forage Crops. (3) III.**

Lecture—2 hours; laboratory—3 hours. Adaptation, establishment, management, and utilization of forage plants as irrigated pasture, range, hay, and silage; aspects of forage quality which affect feeding value to livestock. Field trips will be arranged to observe developments in irrigated pasture management and range improvement.

Mr. Raguse, Mr. Love

Upper Division Courses**100. Principles of Agronomy. (3) I.**

Lecture—3 hours. Prerequisite: Plant Science 1 and 2; Soil and Water Science 2; or consent

of instructor. Fundamentals of field crop production, processing, and utilization. Demonstrations will supplement the lectures.

Mr. F. L. Smith

111. Small Grains, Corn, Sorghum and Beans. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100; or consent of instructor. Adaptation, distribution, culture, utilization, processing, and factors determining quality of wheat, oats, barley, rye, rice, corn, sorghum, and field beans.

Mr. Schaller

112. Forage Crop Ecology. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100; or consent of instructor. Crop ecological principles in the establishment and management of such forages as irrigated pasture, hay, range, and silage, aspects of forage quality which affect feeding value to livestock. Multiple use capabilities of grasslands are stressed.

Mr. Raney

113. Cotton, Sugar Beets, and Miscellaneous Crops. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100; or consent of instructor. Adaptation, distribution, culture, utilization, processing, and other factors determining quality of cotton and other fiber crops, sugar crops, oil crops, and miscellaneous crops.

Mr. Mikkelsen

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to majors who are honors students of senior standing. Independent study, research and/or reading on selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis.

The Staff

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of the instructor.

The Staff

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Prerequisite: 6 upper division units of agronomy.

The Staff

Graduate Courses

205. Design of Field Experiments. (3) I.

Lecture—3 hours. Prerequisite: Mathematics 105A. The planning and analysis of field and related experiments with emphasis on the biological interpretation of results.

Mr. J. C. Williams

206. Chemical and Physical Methods in Biological Research. (4) II.

Lecture—2 hours; laboratory—6 hours. Pre-

requisite: Chemistry 5 and 9. Advanced laboratory techniques and instrumental methods of analytical chemistry in biological research. Includes an introduction to laboratory research methods, preparation of samples, principles and operation of research instruments, and laboratory practice in methods of plant analysis.

Mr. Zscheile, Mr. Huffaker

221. Advanced Plant Breeding. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Science 113. Advanced topics in plant breeding. Genetic diversity and centers of origin of cultivated plants, mating systems in plants, polyploidy, host-pathogen relationships, role of mutagenesis in plant breeding, and other topics of current interest.

Mr. Stanford

222. Quantitative Genetics and Plant Improvement. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Science 113; Genetics 105; or consent of instructor. The genetic forces affecting populations. Formulation of breeding plans based on principles of population and quantitative genetics. Offered in even-numbered years.

Mr. Allard

231. Advanced Topics in the Ecology of Crop Plant Communities. (3) II.

Lecture—3 hours. Prerequisite: Plant Science 101; or consent of instructor. Analytical models and quantitative description of the structure and dynamics of field crop communities in relation to interplant competition, population functions and environmental adaptation.

Mr. Laude

***232. Advanced Topics in the Physiology of Crop Plants. (3) I.**

Lecture—3 hours. Prerequisite: Plant Science 102; or consent of instructor. Physiological aspects of vegetative and reproductive growth of field crop plants in relation to their field behavior.

Mr. Huffaker

290. Seminar. (1) I, II, III.

Seminar—1 hour.

Mr. Knowles

298. Group Study. (1-3) I, II, III.

Directed study in the areas of plant physiology, plant genetics, plant bio-chemistry, agricultural chemistry, or soil-plant relationships of field crops or range and pasture plants.

The Staff

299. Research. (1-9) I, II, III.

Original research involving plant physiology, plant genetics, plant bio-chemistry, agricultural chemistry, or soil-plant relationships of field crops or range and pasture plants.

The Staff

* Not to be given, 1966-1967.

Landscape Horticulture

Lower Division Courses

1. Introduction to Landscape Design. (3) I.

Lecture—3 hours. Design principles and criteria used in analyzing, evaluating, and developing the visual and functional aspects of landscaped areas.

Mr. Danielson

1L. Introduction to Landscape Design Laboratory. (2) I.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 1 (may be taken concurrently). Practice in analysis and design with reference to landscape problems.

Mr. Danielson

2. Elements of Landscape Design. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 1 and 1L. Analysis and solution of typical site problems related to land development.

Mr. Danielson

5A-5B-5C. Introduction to Ornamental Plants. (2-2-2) I-II-III.

Lecture—1 hour; laboratory—3 hours. Prerequisite: Botany 2. The identification, ecology, and uses of the more important ornamental plants (trees, shrubs, ground covers, annuals, perennials, turfgrasses, and greenhouse plants). Field trips will be made.

Mr. Harding, Mr. Leiser

10. Landscape Horticulture for the Home and Community. (3) I.

Lecture—2 hours; laboratory—3 hours. The influences of climate, soil, and cultural practices on the growing of turf, flowers, and herbaceous and woody plants in the landscape.

Mr. Harris

49. Orientation in Landscape Horticulture. (No credit) SS

Prerequisite: consent of instructor. Field trips to observe and study the opportunities for careers in the management of parks, golf courses, and public grounds; arboriculture; landscape construction and contracting; nursery production and management; commercial floriculture; teaching, research, and extension.

Mr. Harris

Upper Division Courses

104. Principles of Landscape Construction. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1; Engineering 1. The analysis and solution of construction problems as they relate to design and site development. Emphasis on physical structures rather than plant materials. Offered in odd-numbered years.

Mr. Danielson

105A-105B-105C. Taxonomy and Ecology of Ornamental Plants. (2-2-2) I-II-III.

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 5C; or consent of instructor. The taxonomy, ecology, and uses of woody and herbaceous plants (trees, shrubs, turf, annuals, perennials, and greenhouse). Special emphasis will be on identification of plants of special importance in Western and Southern United States and on the solution of problems of horticultural nomenclature.

Mr. Leiser, Mr. Harding

105D. Spring Field Course. (2) SS

Prerequisite: course 105B; or consent of instructor. The taxonomy, ecology, and uses of desert, tropical and semi-tropical landscape plants. Field study of landscape plantings, plant survey practices, and preparation of field reports.

Mr. Leiser, Mr. Harding

121. Analysis of Horticultural Problems. (3) III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: Botany 111. Principles and methods of analyzing responses of ornamental plants to environment and cultural practices.

Mr. Paul

125. Floriculture and Nursery Management. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Science 101. Practices and principles in planning, establishing and maintaining crops. Several field trips required.

Mr. Kohl, Mr. Sachs

128. Advanced Landscape Horticulture. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Plant Science 101. Practices and principles in planning, establishing, and maintaining plantings in the landscape with emphasis on trees and turf. Several field trips required.

Mr. Harris, Mr. Madison

194H. Special Study for Honors Students. (1-5) I, II, III.

Prerequisite: open only to majors who are honors students of senior standing. 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.

Mr. Harris

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: 3 units of upper division work in landscape horticulture; consent of instructor. Selected problems in floriculture, nursery management, and landscape horticulture. The Staff

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Prerequisite: 3 units of upper division work in landscape horticulture; consent of instructor.

The Staff

§§ To be given between the winter and spring quarters of even-numbered years.

Graduate Courses**290. Seminar. (1) I, II, III.**

Seminar—1 hour. Selected topics in floriculture, nursery management, and landscape horticulture.

The Staff

298. Group Study. (1–6) I, II, III.

Group study on advanced topics in floriculture, nursery management, and landscape horticulture,

Mr. Sachs

299. Research. (1–6) I, II, III.

Prerequisite: graduate standing. Research in floriculture, nursery management, and landscape horticulture. The Staff (Mr. Madison in charge)

Landscape Horticulture— Park Administration

Upper Division Courses**100. City and Regional Aesthetics. (3) III.**

Lecture—3 hours. Perception of the city and regional physical environmental components in concept and actuality. Influence of utopian ideas, analysis of existing solutions, and consideration of alternative approaches. Mr. Danielson

110. Introduction to City Planning. (4) I.

Lecture—4 hours. City planning as it has evolved in response to physical, social, and economic problems; major concepts and procedures used by city planners and local governments to improve the urban environment. Mr. Potter

134. Park and Recreation Area Planning. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 1. Principles, standards, and procedures in planning and design of areas for park recreation use.

Mr. Danielson

***140. Park Administration. (3) III.**

Lecture—3 hours. Prerequisite: consent of instructor. The acquisition, development, and management of parks, street tree plantings, and other landscaped areas.

Mr. McVicar

194H. Special Study for Honors Students.

(1–5) I, II, III.

Prerequisite: open only to majors who are honors students of senior standing. 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.

Mr. Danielson

198. Directed Group Study. (1–5) I, II, III.

Prerequisite: consent of instructor.

Mr. Danielson

* Not to be given, 1966–67.

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

Prerequisite: 3 units of upper division work in park administration; consent of instructor.

The Staff

Plant Pathology**Upper Division Courses****120. Introduction to Plant Pathology. (4) I.**

Lecture—2 hours; laboratory—6 hours. Prerequisite: Botany 2. Recommended: Bacteriology 2. A general course on the nature, cause, and control of plant diseases.

Mr. Mathre

122. Diagnostic Techniques. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 120. Elementary diagnostic techniques used in the study of plant diseases and their causal agents.

Mr. Nyland

125. Diagnosis and Control of Plant Diseases.

(5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 120. A course in clinical plant pathology with major emphasis given to the diagnosis and control of diseases affecting fruits, vegetables, field crops, and ornamentals. Frequent field trips are required to study naturally occurring diseases.

Mr. English

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

The Staff

Graduate Courses**202A–202B. Research Techniques in Plant Pathology. (3–3) II–III.**

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 120. Principles and practices of advanced techniques used in plant pathological research.

II. Mr. Nyland

III. Mr. Nyland, Mr. Shallal

202C. Research Techniques and Instrumentation.

(3) I.

Lecture—1 hour; laboratory—6 hours. Prerequisite: course 202B; Chemistry 5. Laboratory methods and techniques in plant pathology with emphasis upon instrumentation.

Mr. Kosuge

205. Advanced Study of Field and Vegetable Crop Diseases. (5) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 202A; Botany 119A. A clinical study of the factors affecting disease development and severity with emphasis on ecology and the techniques involved in diagnosis. Frequent field trips are required.

Mr. Campbell, Mr. Houston

206. Advanced Study of Fruit and Nut Diseases.

(4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 202A; Botany 119A. A clinical study of the factors affecting initiation, development, and control of selected fungus, bacterial, and virus diseases of perennial fruit and nut plants. Frequent field trips are required.

Mr. Ogawa

208. Principles of Plant Disease Control. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 120. Economic importance of diseases; evaluation of losses; control by exclusion, eradication, immunization, therapy, and protection. Classes of fungicides and bactericides: their application, depositional characteristics, phytotoxicity, regulation, assay methods, and mechanisms of action.

Mr. Wilson, Mr. Leach

210. Physiology of Plant Pathogens. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 202C; Biochemistry 101B. A study of the fundamental concepts and current information on the physiology of plant pathogens and host parasite relationships.

Mr. DeVay

224. Pathogenic Fungi. (4) III.

Lecture—2 hours; laboratory—6 hours. Prerequisite: Botany 119B. Morphology and taxonomy of plant pathogenic fungi.

Mr. Butler

226. Plant Virology. (5) II.

Lecture—2 hours; laboratory—9 hours. Prerequisite: course 202C. Viruses as causal agents of plant diseases; chemical and physical properties of viruses; methods of transmission; procedures for assay and diagnosis; multiplication of viruses; pathological cytology and anatomy; application of equipment and techniques used in research.

Mr. Shalla, Mr. Shepherd

235A-235B. Advanced Plant Pathology. (3-3) I-II.

Lecture—3 hours. Prerequisite: consent of instructor. A study of the factors influencing pathogenicity and of the reaction of host plants to disease.

I. Mr. Hewitt, II. Mr. Grogan

290. Seminar. (1) I, II, III.

Seminar—1 hour. Mr. Grogan, Mr. Hewitt

291. Seminar in Host-Parasite Physiology.

(1) I, II, III.

Seminar—1 hour. Prerequisite: course 120.

Mr. DeVay, Mr. Kosuge

298. Special Group Study. (1-4) I, II, III.

The Staff

299. Research. (1-9) I, II, III.

The Staff

Pomology**Lower Division Courses****3. Citrus and Other Subtropical Fruits. (3) III.**

Lecture—3 hours. The production of the subtropical fruits including avocados, dates, olives, and citrus with special emphasis on citrus. A study of the fundamental information relating to orchard management as applied to these fruits.

Mr. Hesse

9. Principles of Plant Propagation. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Botany 2. Principles of propagating horticultural plants with special emphasis on anatomical and physiological relationships.

Mr. Hartmann

Upper Division Courses**100A. Principles of Pomology. (3) I.**

Lecture—2 hours; laboratory—3 hours. Prerequisite: Botany 2. Origin, history, distribution, and adaptation of fruit and nut plants; their structure and function in relation to environment and cultural practices.

Mr. Kester

100B. Principles of Pomology. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Botany 2. Development of the vegetative structure of fruit and nut plants; the physiological responses to environment and cultural modification.

Mr. Crane

100C. Principles of Pomology. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Botany 2. Flowering and fruiting; the nature and development of buds, flowers, and fruits in relation to the culture of fruit and nut plants and to their environment.

Mr. Griggs

112. Post-Harvest Physiology and Handling of Fruits. (3) I.

Lecture—3 hours. Prerequisite: course 100C; Botany 111. Fundamentals of fruit-handling operations, cooling, storage, and transportation; emphasis on physiological principles underlying fruit maturity and post-harvest practices.

Mr. Claypool

112L. Post-Harvest Physiology and Handling of Fruits Laboratory. (1) I.

Laboratory—3 hours. Prerequisite: course 112, should be taken concurrently. Application and demonstration of principles underlying fruit maturity and post-harvest practices.

Mr. Claypool

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor.

The Staff (Mr. Hesse in charge)

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses**201. Biochemistry and Physiology of Fruits. (3) III.**

Lecture—3 hours. Prerequisite: Biochemistry 101B; Botany 111; or consent of instructor. Biochemical and physiological phenomena of growth, maturation, ripening, and senescence of fruit. (Open to qualified undergraduates.)

Mr. Maxie

210. Fruit Morphology. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: Botany 2. The development of flower, fruit, and seed structures of representative fruit types.

Miss Bradley

216. Physiology of Fruit Plants. (4) II.

Lecture—4 hours. Prerequisite: courses 100A, 100B, 100C; Botany 111. Physiological processes in the growth and development of fruit plants; metabolic relationships; influence of environment and culture.

The Staff (Mr. Uriu in charge)

290. Seminar. (1) I, II, III.

Seminar—1 hour.

The Staff (Mr. Catlin in charge)

291. Seminar in Post-Harvest Physiology.

(1) I, II, III.

Seminar—1 hour. Prerequisite: consent of instructor. Selected topics in the field of post-harvest physiology of fruits and vegetables. Conducted jointly with Vegetable Crops 291.

Mr. Maxie

299. Research. (1-6) I, II, III, S.

The Staff

Vegetable Crops**Upper Division Courses****100. Principles of Vegetable Crops. (3) I.**

Lecture—3 hours. Prerequisite: Plant Science 1 and 2; or consent of instructor. The vegetable industry. Fundamentals of vegetable crop production, handling, processing and utilization. Demonstrations will supplement the lecture.

Mr. Lorenz

101. Major Vegetable Crops. (4) II.

Lecture—4 hours. Prerequisite: Plant Science 1 and 2; or consent of instructor. Recommended: course 100. Adaptation, growth habits and methods of culture and handling of the principal vegetable crops. The application of experimental evidence to production problems is stressed.

Mr. Lingle

105. Systematic Olericulture. (2) I.

Laboratory—6 hours. Prerequisite: Botany 2. Origin, history, types, classification, nomenclature, and adaptation of the more important American vegetable varieties; minor vegetable crops; trends in development of new varieties. One or more field trips.

Mr. Smith

112. Post-Harvest Physiology of Vegetables (and Fruits). (3) I.

Lecture—3 hours. Prerequisite: Botany 111; or consent of instructor. Physiological processes contributing to the deterioration and quality of harvested vegetables (and fruits) and their relation to practices involved in harvesting, packing, transportation, storage, and marketing.

Mr. Morris

112L. Post-Harvest Physiology of Vegetable Laboratory. (1) I.

Laboratory—3 hours. Prerequisite: course 112, or consent of instructor. Demonstrations and experiments selected to follow subject matter of course 112.

Mr. Morris

118. Seed Physiology and Production. (3) II.

Lecture—3 hours. Prerequisite: Botany 111. Physiological factors affecting induction of seed-ing, seed development, viability and longevity of seed. Principles of seed production. One or more field trips.

Mr. Harrington

150. Vegetables as World Food Crops. (3) II.

Lecture—3 hours. Prerequisite: Botany 2; or consent of instructor. A technical course concerned with historical and current aspects of production and use of vegetables as human food; ecology, economics, geography, human cultural patterns, dietary preferences, nutritional values, and use of microclimates related to commercial and subsistence production.

190. Proseminar. (1) II.

Discussion—1 hour. Prerequisite: consent of instructor. Current problems and research in vegetable production.

Mr. Lorenz

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor.

The Staff (Mr. Davis in charge)

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: consent of instructor. The Staff

Graduate Courses**220. Vegetable Genetics and Improvement. (4) I.**

Lecture—3 hours; laboratory—3 hours. Prerequisite: Genetics 100. Recommended: course 105; Plant Science 113. Breeding systems of vegetable species as affected by self-incompatibility, flower structure, pollen vectors, and other reproductive factors. Problems of chromosome number and structure, heterosis, pest resistance, and species hybrids peculiar to vegetable improvement.

Mr. Rick

221. Vegetable Physiology. (3) III.

Lecture—3 hours. Prerequisite: Botany 111. Physiological principles involved in the production of vegetable crop species.

Mr. Pratt

221L. Vegetable Physiology Laboratory. (1) III.

Laboratory—3 hours. Prerequisite: course 221 concurrently; or consent of instructor. Demonstrations and experiments selected to follow subject matter of course 221. Mr. Pratt

290. Seminar. (1) I, II, III.

Discussion—1 hour.

The Staff (Mr. Spurr in charge)

291. Seminar in Postharvest Physiology. (1) I, II, III.

Discussion—1 hour. Prerequisite: consent of instructor. An intensive study of selected topics in the field of postharvest physiology of fruits and vegetables. This seminar will be conducted jointly with Pomology 291.

The Staff (Mr. Pratt in charge)

298. Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. Current concepts, techniques, and procedures applicable to research and to the production of vegetables.

The Staff (Mr. Yamaguchi in charge)

299. Research. (1-9) I, II, III.

The Staff

Viticulture and Enology**Lower Division Course****3. Introduction to Wine Making. (3) II.**

Lecture—3 hours. An introduction to wine technology, including history, fermentation, production practices, wine types, and the wine industry of California and other wine producing areas. Mr. Singleton, Mr. Amerine

Upper Division Courses**105. Systematic Viticulture Including Fruit****Maturation and Handling. (4) I.**

Lecture—2 hours; laboratory—6 hours. Prerequisite: Plant Science 2; or consent of instructor. Botanical classification of the grape—the principal varieties, rootstocks, and species; environmental factors affecting maturity and quality of the fruit for raisins, wine and table grapes; harvesting, handling, and marketing of table grapes; raisin making; costs and returns.

Mr. Nelson, Mr. Lider

116A. General Viticulture. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Plant Science 2; or consent of instructor. Principles underlying pruning, training, grafting, and propagation of vines; environmental and economic factors affecting choice of vineyard type and location; establishment of vineyards. Mr. Cook, Mr. Lider

116B. General Viticulture. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 116A. Economics and scientific principles of recommended vineyard management practices including irrigation, mineral and

carbohydrate nutrition, flower development and fruit set, virus and fungal diseases, and insect control. Mr. Cook, Mr. Lider

124. Enology: Wine Production. (3) I.

Lecture—1 hour; laboratory—6 hours. Prerequisite: Bacteriology 2; Chemistry 5, 8. Recommended: Chemistry 9, 109A-109B; Food Science and Technology 107; Plant Science 2; and course 3. The principles and practice of making the various standard types of wines, with special reference to the grape varieties used and the methods of vinification required for each. Mr. Webb

125. Principles of Sensory and Chemical Analysis of Wines; Wine Types. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: Bacteriology 2; Chemistry 5, 8. Recommended: Chemistry 9, 109A-109B; Food Science and Technology 107; Plant Science 2; and courses 3, 124. Principles of sensory and chemical examination of wines; wine regions of the world; principles of production of sparkling wines and vermouth. Mr. Amerine

126. Enology: Wine Processing. (3) III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: Bacteriology 2; Chemistry 5, 8. Recommended: Chemistry 9, 109A-109B; Food Science and Technology 107; Plant Science 2; and courses 3, 124, 125. Principles and theory of non-bacterial disorders: metal, tartrate, protein, color, oxidative and their control by clarification, refrigeration, filtration and ion-exchange. Mr. Berg

140. Distillation Principles and Brandy Technology. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 5, 8. Recommended: Chemistry 109B; Food Science and Technology 110A. Principles of distillation including engineering aspects and problems with emphasis upon the alcohol-water system and distillation of wines; brandy types, sensory and chemical analysis and production factors. Offered in odd-numbered years. Mr. Guymon

190. Proseminar in Viticulture. (1) I.

Lecture—1 hour. Prerequisite: consent of instructor. Reports and discussions of recent advances in viticulture. Mr. Olmo

191. Proseminar in Enology. (1) II.

Lecture—1 hour. Prerequisite: consent of instructor. Reports and discussion of recent advances in enology. Mr. Amerine, Mr. Webb

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses**208. Plant Hormones and Regulators. (3) I.**

Lecture—3 hours. Prerequisite: Botany 111; Chemistry 8; or consent of instructor. Open to qualified upper division students. History, occurrence, extraction, measurement, chemical nature, developmental and physiological effects, role, and theories of action of plant hormones and growth regulators; methods of application of growth regulators and factors altering effectiveness; application in the control of plant and fruit responses. Mr. Weaver, Mr. Addicott

208L. Plant Hormones and Regulators Laboratory. (1) I.

Laboratory—3 hours. Prerequisite: course 208 (may be taken concurrently); or consent of instructor. Experiments in plant hormones and regulators using various bioassay methods for auxins, gibberellins, and kinins; preparation

and testing of gibberellic acid; extraction and identification of naturally occurring plant hormones.

Mr. Weaver, Mr. Addicott

217. Microbiology of Wine Production. (3) II.

Lecture—1 hour; laboratory—6 hours. Prerequisite: Bacteriology 2, and an upper division course in Bacteriology or Food Science 104B; Chemistry 5, 8. Recommended: course 3 or 124, 125, 126. Open to properly qualified undergraduates with consent of instructor. Nature, development, physiology, biochemistry, and control of yeasts and bacteria involved in the making, aging, and spoilage of wines. Mr. Kunkee

290. Seminar. (1) II.

Seminar—1 hour. Prerequisite: consent of instructor.

Mr. Webb

299. Research. (1-6) I, II, III.

The Staff

POLITICAL SCIENCE

—, *Chairman of the Department*

Department Office, 227 Voorhies Hall

Professors:

- Richard W. Gable, Ph.D.
- Charles M. Hardin, Ph.D.
- ^{6,7}Clyde E. Jacobs, Ph.D.
- Lloyd D. Musolf, Ph.D.
- Vernon J. Puryear, Ph.D.
- Paul E. Zinner, Ph.D.

Associate Professors:

- ^{6,7}John R. Owens, Ph.D.
- Donald S. Rothchild, Ph.D.
- Marvin Zetterbaum, Ph.D.

Assistant Professors:

- Gerald Friedberg, Ph.D.
- Alexander J. Groth, Ph.D.
- Alvin D. Sokolow, Ph.D.

**Assistant Professors:**

- Edmund Costantini, M.A. (*Acting*)
- Joyce K. Kallgren, M.A. (*Acting*)
- Dennis A. Livingston, A.B. (*Acting*)
- Louis F. Weschler, M.A. (*Acting*)

Lecturers:

- Christopher A. Leu, M.A.
- Louis S. Loeb, Ph.D.
- Matthew F. Stoltz, M.A.

⁶ Sabbatical leave in residence, fall quarter 1966.
⁷ Sabbatical leave in residence, winter quarter 1967.

¹ Absent on leave, 1966-67.
² Absent on leave, fall quarter 1966.

Associate:

Nancy W. Percy, M.A.

Letters and Science List.—All undergraduate courses in Political Science are included in the Letters and Science List of Courses. (See page 98.)

Department Major Advisers.—Mr. Costantini, Mr. Friedberg, Mr. Gable, Mr. Groth, Mr. Hardin, Mrs. Kallgren, Mr. Livingston, Mr. Musolf, Mr. Puryear, Mr. Sokolow, Mr. Weschler, Mr. Zetterbaum, Mr. Zinner.

Graduate Adviser.—Mr. Puryear, Mr. Zinner.

The American History and Institutions Requirement may be satisfied by any two of the following courses: 1A, 1B, 100, 102, 105, 106, 113, 128A, 163, 164, 166. See also page 32.

The Major Program

Lower Division Courses.—Required: courses 1A, 1B, 2, 3, and two of the following: History 4A, 4B, 4C.

Upper Division Courses.—Required: 40 units as follows:

(a) 28 units in Political Science with a minimum of two courses in each of three fields, which must be selected from *two* of the following groups:

Group A

Political Theory (courses 110-119).

Group B

American Government (courses 102-109).
Political Parties (courses 160-169).

Public Law (courses 150-159).
Public Administration (courses 180-189).

Group C

Comparative Governments (courses 140-149, 170-179).
International Relations (courses 120-139).

(b) 12 additional units in Political Science or related subjects.

Political Science students *must* maintain at least a grade C average in the major.

Graduate Study.—The Department offers programs of graduate study leading to the M.A. and Ph.D. degrees. Information concerning admission to these programs and requirements for completion is available in the department office.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major.

Teaching Minor.—Thirty units of political science to be selected in consultation with the subject representative.

Subject Representative: _____

Lower Division Courses

1A. American Government. (4) I, II, III.

Lecture—3 hours; discussion—1 hour. National, state, and local government in the United States. The Staff

1B. American Government. (4) I, II, III.

Lecture—2 hours; discussion—2 hours. National, state, and local government in the United States. The Staff

2. Introduction to Government: Comparative Government. (4) I, II, III.

Lecture—3 hours; discussion—1 hour. Constitutional principles, governmental institutions, and political problems of selected European governments. The Staff

3. International Relations. (4) I, II, III.

Lecture—3 hours; discussion—1 hour. Rise and development of the Western State systems; problems of nationalism and imperialism, particularly in connection with the peace settlement following World War II. The Staff

Upper Division Courses

100. American National Government. (4) I, III.

Lecture—3 hours; discussion—1 hour. Prerequisite: not open to students having credit for course 1A or 1B. Presidential leadership; executive-legislative relationships; the development of effective and accountable administration; defense and foreign policy; and government and science. The Staff

102. State Government. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: not open to students who have credit

in course 104. The comparative study of the government and politics of American states, including their constitutional frameworks, their participation in the federal system, the dynamics of governmental institutions, and the behavior of parties and interest groups. Mr. Sokolow

103. Local Government. (4) II.

Lecture—3 hours; discussion—1 hour. American local governments—cities, counties, and special districts—as legal, administrative, and political units; community politics and the "metropolitan condition." Mr. Sokolow

104. California State and Local Government. (3) III.

Lecture and discussion—3 hours. California's constitution, party system, legislature, executive agencies, administration, courts, major public programs and problems; state-local relations; county, city, school and special district governments. _____

105. The Legislative Process. (4) II.

Lecture—3 hours; discussion—1 hour. An analysis of the 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. Mr. Costantini

106. The Presidency. (4) I.

Lecture—3 hours; discussion—1 hour. The office, powers, and role of the President of the United States. Mr. Hardin

***108. Metropolitan and Regional Problems. (4) III.**

Lecture—3 hours; discussion—1 hour. The organization, functions, and politics of government in the metropolitan and regional setting; special emphasis on the emerging forces and problems related to urbanization and regional growth. Mr. Weschler

***109. Community Political Systems. (3) III.**

Lecture—2 hours; discussion—1 hour. The local community as a network of power relations. Analysis of variations in political systems according to types of communities, and of the behavior of power elites, interest groups, and political parties in relation to decision-making by local governments. Mr. Sokolow

***110. Contemporary Political Science. (4) I.**

Lecture and discussion—4 hours. History, nature, and methodology of the discipline; the problems, schools of thought, and trends within the field at present. To be offered in even-numbered years. Mr. Friedberg

111. Systematic Political Science. (4) II.

Lecture and discussion—4 hours. Philosophical basis of modern political science; major

* Not to be given, 1966-67.

specific approaches; selected concepts relevant to modern political concerns; and research design and execution.

Mr. Friedberg

112. Contemporary Democratic Theory. (4) II.

Lecture—3 hours; discussion—1 hour. The major contemporary attempts to reformulate traditional democratic theory; attempts to replace traditional theory by conceptual models derived from modern social science findings.

Mr. Zetterbaum

113. The American Political Experience. (4) III.

Lecture and discussion—4 hours. Origins and nature of American political thought and practice from medieval background to the present. Study of America in comparative context to develop a comprehensive understanding of the unique character and limits of our heritage.

Mr. Friedberg

114. Politics and Political Man in Political Theory.

(4) III.

Lecture—3 hours; discussion—1 hour. The defense and criticism of political life: an investigation of those political writers who have defended political life and political man against their critics.

Mr. Stoltz

115. Basic Problems of Political Theory. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: 4 units of political theory; or consent of instructor. An inquiry into the possibility of an objective theoretical understanding of the political sphere not modeled on modern natural science, together with a critique from the perspectives of scientism, historicism, and analytic philosophy.

Mr. Zetterbaum

117A. Marxism. (4) I.

Lecture and discussion—4 hours. Historical background and context of Marxism. Exploration of Marx's writings toward understanding his significance in the nineteenth century and his relevance today. Offered in odd-numbered years.

Mr. Friedberg

117B. Contemporary Marxism. (4) II.

Lecture and discussion—4 hours. Marxism after Marx to the present, with reference to Engels, Kautsky, Bernstein, Lenin, and contemporary figures and movements. Special attention to Marxism in America. Communism and democratic socialism as legacies of Marx related to contemporary problems. To be offered in even-numbered years.

Mr. Friedberg

118A. History of Political Theory. (4) I.

Lecture—3 hours. Critical analyses of the works of major political philosophers. Classical

and medieval political philosophy—Plato, Aristotle, Cicero, St. Thomas. Mr. Zetterbaum

118B. History of Political Theory. (4) II.

Lecture—3 hours. Critical analyses of the works of major political philosophers. Modern political philosophy—Machiavelli, Hobbes, Locke, Rousseau, Burke, Nietzsche.

Mr. Zetterbaum

119. Modern Political Thought. (4) II.

Lecture and discussion—4 hours. The search for community from Marx to the present. Communism, fascism, capitalism, socialism, irrationalism, immoralism, and existentialism as responses to the decline of liberalism and the nature of modern problems.

Mr. Friedberg

120. Science and International Relations. (4) II.

Lecture—4 hours. The impact of science and technology upon the international legal and political order.

Mr. Livingston

*122A. International Law. (4) II.

Lecture—4 hours. Sources and theories of international law. The relation of international law to municipal law. Territory, sovereign immunity, responsibility, recognition, and succession in the law of nations.

122B. International Law. (4) III.

Lecture—4 hours. Neutrality, belligerency, and war in the international community. Pacific settlement of disputes.

Mr. Livingston

124. International Organization. (4) I.

Lecture—4 hours. The preservation of world peace through collective security arrangements. Analysis of the conditions under which international organizations can or cannot preserve peace, through examination of the record of the United Nations, League of Nations, and more restricted security organizations.

Mr. Livingston

128A. Recent American Foreign Policy. (4) I.

Lecture—4 hours. Abandonment of isolation and assumption of leadership during the First World War. Return to isolationist policies in the twenties. The neutrality acts of the thirties. The second World War and reversal of the policy of isolation.

Mr. Puryear

128B. The Conduct of American Foreign Relations.

(4) III.

Lecture—3 hours; discussion—1 hour. Diplomacy and the conduct and control of foreign relations. The Department of State and the Foreign Service. Case studies in recent diplomacy to illustrate policy formation and execution. Some comparative materials will be introduced but emphasis will be placed upon the United States.

* Not to be given, 1966-67.

131. Soviet Foreign Policy. (4) II.

Lecture—3 hours; discussion—1 hour. The conduct of Soviet foreign relations in contemporary world affairs; ideology and power as mainsprings of policy; foreign policy as an instrument of revolution; the role of diplomacy, economic aid and nuclear armaments.

Mr. Zinner

132. The Role of the United States in the Far East. (4) I.

Lecture—4 hours. Prerequisite: course 3 is recommended. A survey of the role the United States has played in the Far East through an examination of such topics as America's participation in Asiatic westernization, United States Far Eastern policy, Oriental attitudes toward the United States. An evaluation of present problems.

Mrs. Kallgren

133. International Relations in the Far East. (4) III.

Lecture—4 hours. Prerequisite: course 3 is recommended. Contemporary developments in the Far East, and selected issues of world significance.

Mrs. Kallgren

134. International Relations in Africa. (4) II.

Lecture—3 hours; discussion—1 hour. Inter-African state relations, pan-Africanism, regional integration, policies toward South Africa, and relations between African and major non-African powers.

Mr. Leu

***137. Nationalism and Imperialism. (4) III.**

Lecture—4 hours. Prerequisite: course 3 is recommended. The theory of nation building illustrated by Western and non-Western experience.

Mrs. Kallgren

***139. International Relations in Western Europe. (4) II.**

Lecture—4 hours. Study of the emerging unity in Western Europe and its implications for the North Atlantic area.

140. Democracy and Dictatorship. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Analytical study of differences and similarities in the political process under democratic and dictatorial government. To be offered in odd-numbered years.

Mr. Zinner

141. Soviet and East European Governments. (4) I.

Lecture—3 hours; discussion—1 hour. The governmental systems of the Soviet Union and the East European satellites; background seizure of power, techniques of totalitarian control.

Mr. Zinner

142. Revolution and Political Change. (4) III.

Lecture—4 hours. The attributes, problems, means, and impact of political change through

* Not to be given, 1966–67.

evolution and revolution in the twentieth century. Emphasis upon movements and systems representative of communism, fascism, and nationalism.

Mr. Groth

143. Government and Politics of Overseas Economic Development. (4) III.

Lecture—3 hours; discussion—1 hour. Analysis of programs aimed at economic development with special reference to agriculture in selected Latin American and South Asian countries. To be offered in odd-numbered years. Mr. Hardin

144. Government in Great Britain and the British Commonwealth. (4) III.

Lecture—3 hours; discussion—1 hour. The democratic process in Britain; party politics; the cabinet system; the colonies; the evolution of the British Commonwealth.

Mr. Groth

145. Government and Politics in Emergent Nations. (4) III.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Conceptual study of problems of political organization and procedure in the context of rapid change engendered by social revolution in "emergent countries" and liberation from colonial oppression. To be offered in even-numbered years.

Mr. Zinner

146A. African Governments and Politics. (4) II.

Lecture—4 hours. An analysis of political systems in Africa south of the Sahara.

Mr. Leu

146B. African Governments and Politics. (4) III.

Lecture—4 hours. A continuation of course 146A.

Mr. Leu

147A. Western European Government: France and Italy. (4) I.

Lecture—4 hours. The evolution and contemporary nature of French and Italian political institutions.

Mr. Groth

147B. Western European Government: Germany. (4) II.

Lecture—4 hours. Comparative study of the politics and institutions of constitutional and totalitarian government in Germany since 1930. Current problems of a divided Germany.

Mr. Groth

148A. Government and Politics in East Asia. (4) I.

Lecture—4 hours. The structure and evolution of political institutions in China, Japan, and Korea. Emphasis upon such topics as nationalism, political modernization, and ideology up to World War II.

Mrs. Kallgren

148B. Government and Politics in East Asia. (4) II.

Lecture—4 hours. The structure and evolution of political institutions in China, Japan, and Korea since World War II, with emphasis upon political modernization, ideology, and nationalism.

Mrs. Kallgren

149. International Communism. (4) III.

Lecture—3 hours; discussion—1 hour. The international communist movement; Leninist organizational precepts; relations among Communist parties (the Comintern and Cominform); centralized direction vs. local autonomy; problems of leadership and social composition; the Communist parties as adjuncts of Soviet foreign policy.

Mr. Zinner

150. Jurisprudence. (4) I.

Lecture—4 hours. An analysis of the nature and functions of law. Particular attention will be directed to law as an instrument of social control and the relationship between law and morality.

Mr. Stoltz

151. Civil Rights and the Constitution. (4) III.

Lecture—4 hours. Prerequisite: course 1A. The constitutional rights and political possibilities of minority groups. Citizenship in the American federal system. To be offered in alternate years.

Mr. Jacobs

156. Administrative Law. (4) I.

Lecture—3 hours; discussion—1 hour. The political-legal factors in the decision-making processes of administrative legislation, adjudication and discretion; legal controls as an aspect of administrative responsibility; relationships of substance and procedure in regulatory action.

Mr. Musolf

157A. American Constitutional Law. (4) I.

Lecture—1 hour; discussion—3 hours. Prerequisite: courses 1A and 1B; or consent of instructor. Judicial review, jurisdiction of the federal courts, interstate and foreign commerce, and taxation.

Mr. Loeb

157B. American Constitutional Law. (4) II.

Lecture—1 hour; discussion—3 hours. Prerequisite: course 157A. The Bill of Rights of the Federal Constitution.

Mr. Loeb

159. Judicial Behavior. (3) III.

Lecture and discussion—3 hours. Prerequisite: course 1A. 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.

Mr. Loeb

***161. Political Behavior. (4) II.**

Lecture—3 hours; conference—1 hour. Prerequisite: course 1A. The individual and group aspects of partisan behavior; political socialization, partisanship and political participation, voting behavior and group influence processes.

Mr. Owens

163. Political Parties. (4) I.

Lecture—3 hours; discussion—1 hour. An analysis of the structure and operations of the

party system in the United States; party functions and organization, nomination processes, campaigns and elections, party trends and reforms

Miss Cohen

164. Group Politics. (4) II.

Lecture—3 hours; discussion—1 hour. An analysis of class, sectional, ethnic, religious, economic, and other interests in relation to constitutional government. The problem of balancing liberty and order and of reconciling claims of diversity with those of uniformity. Mr. Hardin

165. Public Opinion and Propaganda. (5) III.

Lecture—4 hours. Prerequisite: course 1A. The nature and function of public opinion; the formation of opinion with emphasis on the role of propaganda; the distribution of political attitudes among the public; the impact of public opinion.

Mr. Costantini

166. Public Policy and the Government Process.

(4) II.

Lecture—3 hours; discussion—1 hour. An examination of the processes of formulating public policy. Methods of policy making by executive, legislative, judicial, and party agencies illustrated with case studies from agriculture, labor, civil rights, and other areas. Mr. Weschler

168. Policy and Politics in Agriculture and Water.

(4) III.

Lecture—3 hours; discussion—1 hour. Agricultural and water policies and their political implications, with chief emphasis upon the United States and with special attention to water policies in California.

Mr. Hardin

170. Federalism and Regionalism. (4) I.

Lecture—3 hours; discussion—1 hour. An examination of the means and motives of regional integration as well as the problems involved in operating and maintaining federations. Classical federal experience and experiments in developing countries will be considered.

Mr. Leu

175. Government and the Economy. (4) II.

Lecture—3 hours; discussion—1 hour. The legal and political environment of economic controls; types and techniques of regulating and assisting various sectors of the economy; policy alternatives and administrative processes; the search for the public interest.

Mr. Gable

181. Elements of Public Administration. (4) I.

Lecture—3 hours; discussion—1 hour. The role of public administration in modern government; the nature of administrative agencies; human behavior in the administrative process; executive leadership and decision making; bureaucracy and bureaucratic accountability in a democratic society.

* Not to be given, 1966–1967.

183. Administrative Behavior. (4) II.

Lecture—4 hours. The implications for American public administration of evolving concepts about behavior in organizations.

Mr. Musolf

185. Comparative Administration. (4) III.

Lecture—3 hours; discussion—1 hour. Theories and models of comparison; the ecology of administrative systems; functional processes of administration in developed and developing nations; role of bureaucracy in development and nation-building.

Mr. Gable

194H. Special Study for Honors Students.

(2-4) I, II, III.

Prerequisite: honors status. The Staff

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses**213. Modern Political Thought. (4) III.**

Seminar—3 hours. Mr. Friedberg

218. Political Theory. (4) I.

Seminar—3 hours. Mr. Zetterbaum

223. International Relations. (4) II.

Seminar—3 hours. Mr. Puryear

224. International Organization. (4) II.

Seminar—3 hours. Mr. Livingston

230. American Foreign Policy. (4) III.

Seminar—3 hours. Mr. Puryear

241A-241B. Soviet and East European Governments. (4-4) I, II.

Seminar—3 hours. Mr. Zinner

***246. Government in Africa. (4) II.**

Seminar—3 hours. Mr. Rothchild

***247A. Western European Governments. (4) I.**

Seminar—3 hours. Contemporary problems, with emphasis on France and Italy. Mr. Groth

* Not to be given, 1966-1967.

***247B. Western European Governments. (4) III.**

Seminar—3 hours. Prerequisite: consent of instructor. Contemporary problems, with emphasis on Germany.

248. The Far East. (4) III.

Seminar—3 hours. Selected contemporary problems of government and international relations in the Far East.

Mrs. Kallgren

261. Political Behavior. (4) III.

Seminar—3 hours.

Mr. Owens

280. Public Administration. (4) III.

Seminar—3 hours. An examination of American administrative values.

Mr. Musolf

285. Modernization and Administration in Transitional Societies. (4) II.

Seminar—3 hours. Nature of traditional and transitional societies; theories and processes of modernization; role of bureaucracy in development; problems of national integration and maintaining stability; role and administration of foreign assistance to development. Offered in odd-numbered years.

Mr. Gable

291. Seminar in American Constitutional Law. (4) III.

Seminar—3 hours. Prerequisite: course 157B; or consent of instructor. To be offered in alternate years.

Mr. Jacobs

295. Political Parties. (4) II.

Seminar—3 hours.

Mr. Hardin

296. State and Local Government. (4) I.

Seminar—3 hours.

Mr. Sokolow

298. Group Study. (1-9) 1, II, III.

Group Study—2-4 hours. Selected topics in political science.

The Staff

299. Research. (1-12) I, II, III.

The Staff

299D. Directed Reading. (1-6) I, II, III.

The Staff

Professional Course**400. Field Work in Political Science. (1-4) I, II, III.**

Directed study and internship in a government agency, office, or political party. May be repeated twice for credit.

The Staff

PSYCHOLOGY

Stanley Coopersmith, Ph.D., Chairman of the Department

Robert Sommer, Ph.D., Acting Chairman of the Department

Department Office, 356 Voorhies Hall

Professor:

William F. Dukes, Ph.D.

Associate Professors:

Jarvis R. Bastian, Ph.D.

¹ Absent on leave, 1966-67.

Stanley Coopersmith, Ph.D.

Thomas Natsoulas, Ph.D.

Robert Sommer, Ph.D.

Assistant Professors:

Gordon H. Berman, Ph.D.

Jay S. Caldwell, Ph.D.
 Benjamin L. Hart, Ph.D., D.V.M.
(Psychology and Anatomy)
 Rudolf Kalin, Ph.D.
 Dale F. Lott, Ph.D.
 Theodore E. Parks, Ph.D.

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Assistant Professors:

Robert M. Murphey, B.S. (*Acting*)
 Edward D. Turner, A.B. (*Acting*)

Lecturers:

Richard A. Cahoon, Ph.D.
 Herbert O. Dörken, Ph.D.
 Sumner B. Morris, Ed.D.
 Morris H. Woskow, Ph.D. (*Psychology and Food Science and Technology*)

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Departmental Major Advisers.—Mr. Bastian, Mr. Berman, Mr. Caldwell, Mr. Kalin, Mr. Lott, Mr. Murphey, Mr. Natsoulas, Mr. Parks, Mr. Sommer, Mr. Turner.

The Major Program

Lower Division Courses.—Required: Psychology 1A, 1B, 1C, 3; 8 units of biological science which must include Biology 1 or Physiology 1, the remaining units to be chosen from Anthropology 1, Zoology 2, 10, 25, and Physiology 1L; 8 units of sociology and/or cultural anthropology.

Upper Division Courses.—Required: 36 units of advanced work in psychology (courses numbered above 99) including: course 196 (to be taken during the senior year); course 106; three courses from one of the following groups and two courses from the other:

- (Group A) 108, 130, 131, 132, 134, 150.
 (Group B) 112, 145, 147A, 168.

Before graduation the student must complete 8 units of philosophy. These may be taken at any time during the four years and may be either lower or upper division courses.

Honors and Honors Program (see page 95).—The honors program comprises course 194H, which includes an honors thesis, to be taken normally during the senior year.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major.

Teaching Minor.—Thirty units in psychology.
Subject Representative: Mr. Turner.

Lower Division Courses

1A. Introduction to Psychology: General Processes.
 (4) I, II, III.

Lecture—4 hours. Sensation, perception, learning, memory, motivation, and emotion.

The Staff

1B. Introduction to Psychology: Biological Bases of Behavior. (3) I, II, III.

Lecture—3 hours. Prerequisite: course 1A. An analysis of behavior in terms of its evolutionary, genetic, and physiological determinants.

The Staff

1C. Introduction to Psychology: Personality and Social Psychology. (3) I, II, III.

Lecture—3 hours. Prerequisite: course 1A. The normal and abnormal personality. The influence of social factors on the individual.

The Staff

***2A. Introduction to Psychology: General Processes.**
 (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Honors section of course 1A.

***2B. Introduction to Psychology: Biological Bases of Behavior.** (3) II.

Lecture—3 hours. Prerequisite: course 1A and consent of instructor. Honors section of course 1B.

***2C. Introduction to Psychology: Personality and Social Psychology.** (3) III.

Lecture—3 hours. Prerequisite: course 1A and consent of instructor. Honors section of course 1C.

3. Quantitative Description of Behavior.
 (4) I, II, III.

Lecture—4 hours. Prerequisite: course 1A; two years of high school algebra or the equivalent. Not open for credit to students who have received credit for a course in statistics. Principles and problems of measurements; inference and prediction from psychological data. Primarily for psychology majors.

33. Personal and Social Adjustment. (4) I, II, III.

Lecture—4 hours. Prerequisite: course 1A. The dynamics of normal personality development. Family relationships, social adjustment, and self-evaluation are emphasized. Primarily for students who will not major in psychology.

Upper Division Courses

106. Experimental Psychology. (6) I, II, III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: courses 1B, 1C, 3. Laboratory investigation of selected problems, including the design, execution, and formal reporting of experiments.

Mr. Caldwell

• Not to be given, 1966-67.

107. Advanced Statistical Methods in Psychology.

(4) III.

Lecture—4 hours. Prerequisite: course 3. Application of hypothesis-testing techniques to specific problems of psychological research and related behavioral research areas.

108. Physiological Psychology. (5) I, III.

Lecture—3 hours; laboratory—4 hours. Prerequisite: course 1B; or course 1A and upper division standing in a biological science. An analysis of some of the contributions of neuroanatomy, neurophysiology, and neurochemistry to a mechanistic understanding of human and animal behavior. A reductionistic approach within a behavioristic framework. Mr. Hart

112. Developmental Psychology. (4) I, II, III.

Lecture—4 hours. Prerequisite: course 1A; not open for credit to students who have received credit for Home Economics 131. An ontogenetic account of human behavior through adolescence with emphasis on motor skills, mental abilities, motivation, and social interaction.

120. History of Psychology. (4) III.

Lecture—4 hours. Prerequisite: course 1A and senior standing. The historical development of psychological theories and research.

129. Sensory Processes. (4) III.

Lecture—3 hours; laboratory—2 hours. Prerequisite: course 1B; upper division standing in psychology; or consent of instructor. The sensory capabilities of man and animals. Behavioral evidence for sensory capacity and relationships to the structure and function of the sense organs.

Mr. Woskow

130. Learning. (4) I, III.

Lecture—3 hours; laboratory—2 hours. Consideration of major theories of learning and memory, with critical examination of relevant experimental data.

Mr. Parks

131. Perception. (3) I, II.

Lecture—3 hours. Prerequisite: course 1A. The cognitive organizations related to measurable physical energy changes mediated through sensory channels. The perception of objects, space, motion, events.

131L. Laboratory in Perception. (2) I, II, III.

Laboratory—4 hours. Prerequisite: course 131 completed or in progress. Experimental work in perceiving.

132. Language and Cognition. (4) I.

Lecture—4 hours. Prerequisite: course 1A and 6 units of upper division work in psychology. Psychological examination of linguistic actions, their development and role in human conduct; analysis of their contribution to perception and thought.

Mr. Bastian

134. Motivation. (4) I, III.

Lecture—4 hours. Prerequisite: course 1A. Factors activating and directing behavior; contemporary theories of motives; pertinent data from laboratory, clinic, and field observation.

135. Psychology of Consciousness. (3) I.

Lecture—3 hours. Prerequisite: course 1A. Consideration of major theories of consciousness, with critical examination of relevant experimental, clinical, and field data. Mr. Natsoulas

145. Social Psychology. (4) I, II, III.

Lecture—4 hours. Prerequisite: course 1A. 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.

Mr. Sommer

147A. Personality Theory and Assessment. (4) I.

Lecture—4 hours. Prerequisite: course 1A and 6 units upper division work in psychology. A systematic consideration of contemporary theories of personality.

Mr. Kalin

147B. Personality Theory and Assessment. (4) II.

Lecture—2 hours; laboratory—4 hours. Prerequisite: course 147A. An exploration and evaluation of the principal methods in personality research.

Mr. Kalin

150. Comparative Psychology. (4) I, III.

Lecture—4 hours. Prerequisite: course 1B or appropriate biological training. Perspectives in animal behavior: zoological, physiological, psychological. Functional behavior categories: orientation and locomotion, feeding, reproduction, communication, learning. Behavioral theory as derived from psychological and ethological contexts.

Mr. Berman, Mr. Lott

150L. Comparative Psychology Laboratory. (2) I, III.

Laboratory—4 hours. Prerequisite: concurrent enrollment in course 150. Observation and analysis of behavior at various phyletic levels, with correlated outside readings.

Mr. Berman, Mr. Lott

165. Introduction to Clinical Psychology. (4) I, II.

Lecture—4 hours. Prerequisite: course 1C; 145 or 168; and 112 or 134 or 147A. Psychological assessment procedures in clinical psychology; psychological methods for modifying disordered behavior—rationale, process, and outcome; clinical psychology as a profession—work settings, functions, and professional problems. Not intended to provide practicum training in testing or therapy. Field trip.

Mr. Dörken

168. Abnormal Psychology. (4) I, II, III.

Lecture—4 hours. Prerequisite: course 1A. A descriptive and functional account of be-

havioral disorders, with primary considerations given to neurotic and psychotic behavior. methods and theories of psychotherapy.

Mr. Sommer

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: 20 units in psychology and honors status. Independent investigation of an empirical problem.

The Staff

196. Advanced General Psychology. (4) II, III.

Lecture—4 hours. Prerequisite: 18 units upper division work in psychology. Exploration of the present status of systematic psychology. An integrative treatment of the major areas, problems, and methodologies. Required of all majors in their senior years.

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: consent of instructor. The Staff

Graduate Courses

201. Proseminar in General Psychology. (4) I.

Seminar—4 hours. An intensive consideration of major areas and problems in general experimental psychology.

Mr. Natsoulas

PUBLIC HEALTH

Calvin W. Schwabe, D.V.M., M.P.H., Sc.D., *Chairman of the Department*

Department Office, 2086 Haring Hall

Professors:

John B. Enright, Ph.D.

Walter W. Sadler, D.V.M., M.P.H.

Calvin W. Schwabe, D.V.M.,
M.P.H., Sc.D.

Associate Professor:

Hans P. Riemann, D.V.M., Ph.D.

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Lecturers:

Frederick N. Cooper, B.S.

John H. Jones, M.D.

Upper Division Courses

111. Animal Hygiene. (5) III.

Lecture—5 hours. Prerequisite: Bacteriology 2. The causes, prevention, control, and eradication of animal diseases important in economic livestock production and public health.

The Staff

140. Principles of Epidemiology. (1) III.

Lecture—1 hour. Prerequisite: sophomore standing in the School of Veterinary Medicine

288. Research Preceptorship. (4) I, II, III.

Laboratory and discussion—6-9 hours. Prerequisite: consent of instructor. The Staff

291. Psychobiology. (4) I, II, III.

Seminar—4 hours.

292. Experimental Study of Personality.

(4) I, II, III.

Seminar—4 hours.

Mr. Coopersmith, Mr. Kalin

293. Environment and Behavior. (4) I.

Seminar—4 hours. The social psychology of the environment. Research into the use of space and its design implications.

Mr. Sommer

294. Psycholinguistics. (4) III.

Seminar—4 hours.

Mr. Bastian

295. Comparative and Physiological Psychology of Reproductive Behavior. (4) II.

Seminar—4 hours. Biological bases of environmental controls.

Mr. Berman, Mr. Hart, Mr. Lott

299. Research. (2-9) I, II, III.

The Staff

field of public health, with emphasis on preventing the transmission of diseases from lower animals to man. Mr. Enright, Mr. Cooper

250. Inspection and Sanitary Control of Meat and Milk. (2) III.

Lecture—2 hours. Prerequisite: junior standing in the School of Veterinary Medicine or permission of instructor. Principles and practice of inspection and sanitary control of meat of mammalian and avian origin and of milk.

Mr. Sadler, Mr. Riemann

260. Public Health Laboratory. (1) III.

Laboratory—30 hours. Prerequisite: senior standing in School of Veterinary Medicine. Inspection and sanitary control of foods of animal origin. Field trips. The Staff

290. Seminar in Public Health. (1) I, II, III.

Seminar—1 hour.

The Staff (Mr. Schwabe in charge)

299. Research in Public Health. (1-9) I, II, III.

The Staff (Mr. Schwabe in charge)

RANGE MANAGEMENT

John A. Zivnuska, Ph.D., *Chairman of the Committee (Berkeley Campus)*
R. Merton Love, Ph.D., *Vice-Chairman of the Committee*

Committee Office, 131 Hunt Hall

Committee in Charge:

Professors:

Harold H. Biswell, Ph.D. (*Forestry; Berkeley Campus*)

Harold F. Heady, Ph.D. (*Forestry; Berkeley Campus*)

R. Merton Love, Ph.D. (*Agronomy*)

William C. Weir, Ph.D. (*Animal Husbandry*)

William A. Williams, Ph.D. (*Agronomy*)

Lecturers:

Beecher Crampton, M.S. (*Agronomy*)

Arnold M. Schultz, Ph.D. (*Forestry*)

Instruction in Range Management is not organized as a single administrative unit in the University, but the relevant courses are offered by a number of departments, and are coordinated by the committee in charge.

Lower Division Course

1. Introduction to Range Management. (4) II.

Lecture—3 hours; discussion—1 hour. Basic principles of range management and their relationships to the management of wildlands for livestock production, wildlife, water, recreation, and timber.

Mr. Biswell

Upper Division Courses

100. Range Plants. (4) I.

Lecture—2 hours; laboratory—6 hours. Prerequisite: Botany 2. Systematic relationships and identification of range grasses; legumes, forbs, and shrubs; their distribution, environmental requirements, and use. One Saturday field trip.

Mr. Crampton

103. Grassland Inventory, Analysis and Planning. (4) III.

Lecture—3 hours; laboratory—3 hours. Pre-

requisite: course 100; or consent of instructor. Sampling grasslands and other vegetational types to determine species composition, forage production and utilization, carrying capacity, and changes in the plant community. Range inventory analysis and planning range use. Offered in odd-numbered years.

Mr. Heady

105. Summer Field Course. (6) Extra-Session.

Lecture—8 hours; laboratory—24 hours. Prerequisite: consent of instructor. Four weeks devoted to field studies of range condition and methods of utilization in various parts of the state. Required of all students with a major in range management.

Mr. Love

133. Grassland Ecology. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course in plant ecology; or consent of instructor. Composition, structure, development, and habitat factors of native North American grasslands. Concepts used in vegetative measurements. Principles of grassland management for forage production. Offered in even-numbered years.

Mr. Schultz

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open only to majors who are honors students of senior standing. 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. The Staff

198. Directed Group Study. (1-5) I, II, III.

Prerequisite: consent of instructor. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: senior standing and consent of instructor.

The Staff

Graduate Courses**290. Seminar. (1-2) I, II, III.**

Seminar—1-2 hours.

Mr. Love

299. Research. (1-9) I, II, III.

The Staff

RHETORIC**James J. Murphy, Ph.D., Chairman of the Department**

Department Office, 126 South Hall

Associate Professors:

James J. Murphy, Ph.D.

Ralph S. Pomeroy, Ph.D.

Assistant Professors:

Benne B. Alder, Ph.D.

Gerald P. Mohrmann, Ph.D.

Donovan J. Ochs, Ph.D.

◊ ◊ ◊

Assistant Professor:

John L. Vohs, M.A. (Acting)

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. (See page 98.)**The Major Program****Departmental Adviser.**—Mr. Murphy.**Lower Division Courses.**—Required are courses 1A-1B and 15. Recommended: courses in classical languages.**Upper Division Courses.**—Thirty-six units in rhetoric, including: (1) courses 110, 120 in the first quarter of upper division work; (2) at least one additional course from each of the following series: 110, 120, and 150; (3) course 190 in the senior year.**Required courses outside the Department of Rhetoric.**—A coherent program of twelve quarter units selected in consultation with the Departmental adviser from appropriate courses outside the Department of Rhetoric. This program will ordinarily be chosen from a designated set of courses related to one of the four course series in the Department of Rhetoric (Series 110, 120, 150, or 160).

The Department will certify completion of a major program only on the basis of at least a C average in the upper division courses taken in the Department.

Teaching Major.—Same as major.**Teaching Minor.**—Thirty quarter units, including Rhetoric 1A-1B, 15, 51, and eighteen upper division units including either course 110 or 120.**Lower Division Courses****1A. Introduction to Public Address. (4) I, II, III.**

Lecture—4 hours. Introduction to rhetorical theory and criticism as applied to public address, with practice in preparation and delivery of speeches.

The Staff

1B. Introduction to Public Address. (4) II, III.

Lecture—4 hours. Prerequisite: course 1A; or consent of instructor. Further applications of rhetorical theory and criticism to specified types of extemporaneous public address. Mr. Ochs

2A. Introduction to the Oral Interpretation of Prose. (4) I, II, III.

Lecture—4 hours. Introduction to the theory of oral interpretation, with criticism and practice of the oral reading of prose literature.

Mrs. Alder

2B. Introduction to the Oral Interpretation of Poetry. (4) II, III.

Lecture—4 hours. Prerequisite: course 2A. Introduction to the oral reading of poetry, with criticism and practice of the oral reading of poetic literature.

Mrs. Alder

15. Introduction to Rhetorical Studies. (4) III.

Lecture—4 hours. Examination of the rhetorical tradition of the Western world, illustrated by selections from influential theorists (such as Aristotle or Whately), by important speakers (such as Demosthenes, Cicero, or Roosevelt) and by major forms of public address (such as legislative debates or sermons). Mr. Murphy

51. Introduction to Advocacy. (4) I, II.

Lecture—4 hours. Introduction to the rhetoric of controversy, with emphasis upon the nature of public debate, the analysis of issues, and the logical presentation of evidence in support of arguments. Provision for practice in intercollegiate debate.

Mr. Mohrmann

Upper Division Courses**110. Classical Rhetorical Theory. (4) I.**

Lecture—4 hours. Origins of Greek and Roman rhetorical theory, with emphasis upon the contributions of Isocrates, Plato, Aristotle, Cicero, and Quintilian. Mr. Murphy

111. Medieval and Renaissance Rhetorical Theory. (4) II.

Lecture—4 hours. Development of the European rhetorical tradition to 1700 through the contributions of such writers as Augustine, Alcuin, Wilson, and other Ciceronians, with attention to the anti-Ciceronian reaction represented by Ramus, Francis Bacon, and Fenelon.

Mr. Murphy

112. Early Modern Rhetorical Theory. (4) III.

Lecture—4 hours. English and continental theories of rhetoric to 1900, with reference to developments in psychology, philosophy, and belles lettres. Emphasis upon the works of Ward, Priestley, Campbell, Blair, and Whately.
Mr. Pomeroy

***113. Contemporary Rhetorical Theory. (4) I.**

Lecture—4 hours. Current approaches to rhetorical theory, from the James-Winans theory of attention to the Hovland, Janis, Kelley studies of persuasion.
Mr. Vohs

120. Classical Public Address. (4) I.

Lecture—4 hours. Public address as a force in the development of Greek and Roman civilizations, with special attention to Demosthenes, the Attic Orators, and Cicero.
Mr. Ochs

121. British Public Address to 1914. (4) II.

Lecture—4 hours. British public address in the eighteenth and nineteenth centuries, with special attention to the parliamentary speaking of Burke, Fox, Pitt, Grattan, Peel, Disraeli, and Gladstone.
Mr. Pomeroy

122. American Public Address from Edwards to Lincoln. (4) II.

Lecture—4 hours. A survey of major speakers from the colonial period to the era of the Civil War.
Mr. Mohrmann

123. American Public Address from Grady to Wilson. (4) III.

Lecture—4 hours. A survey of major speakers from the Reconstruction Period to the founding of the League of Nations.
Mr. Mohrmann

125. Contemporary Public Address. (4) III.

Lecture—4 hours. Public address in the twentieth century, with special attention to the speeches of Churchill, Roosevelt, Hitler, and Ghandi.
Mrs. Alder

130. Advanced Oral Interpretation. (4) III.

Lecture—4 hours. Prerequisite: course 2B.

RUSSIAN

Department Office, 722 Sproul Hall

Associate Professor:

Valerie A. Tumins, Ph.D.

Assistant Professor:

²Alex M. Shane, Ph.D.

**Associate:**

Leonilla Strelkoff, M.A.

²Absent on leave, fall quarter 1966.

Special problems in applying the principles of oral interpretation to such forms as dramatic literature, epic poetry, and the novel.

Mrs. Alder

150. Modes of Discourse. (4) III.

Lecture—4 hours. Study of problems peculiar to various forms of discourse such as the uninterrupted address, the dialogue, and the debate, with special attention to differences between writing and speaking as they affect the understanding or acceptance of ideas.
Mr. Ochs

***151. Methods of Advocacy. (4) I.**

Lecture—4 hours. Study of problems inherent in securing acceptance of ideas; consideration of logical and nonlogical means of persuasion.
Mr. Pomeroy

***152. Study of a Major Rhetorician. (4) II.**

Lecture—4 hours. Prerequisite: open only to majors with senior standing. Intensive study of a major theorist, such as Aristotle, Cicero, Whately, or Toulmin, with emphasis upon the relation of his theory to the cultural environment of his times.
Mr. Murphy

***153. Experimental Studies in Rhetoric. (4) II.**

Lecture—4 hours. Prerequisite: open only to majors with senior standing. Consideration of contributions derived from sociometric and psychometric approaches to analysis of rhetorical process.
Mr. Vohs

***160. Rhetorical Criticism. (4) I.**

Lecture—4 hours. Prerequisite: course 15; or consent of instructor. Methods of evaluating public address, with emphasis on such factors as structure, language, and effectiveness.
Mrs. Alder

***190. Senior Proseminar. (4) II, III.**

Lecture—2 hours; seminar—2 hours. Prerequisite: required of majors with senior standing. Individual research on a rhetorical topic approved by a committee of the faculty.
The Staff

²Not to be given, 1966–1967.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 98.

Departmental Major Adviser.—Mr. Shane.

The Major Program

The requirements are Russian 1 through 6 (or the equivalent) and a minimum of 36 units of upper division course work including Russian 101A, 101B, 101C, 102A, 102B, 110, 111,

112, and 190, with a passing grade in the Senior Comprehensive Examination.

Honors and Honors Program (see page 95).—The honors program comprises two quarters of study under course 194H, which will include a research paper.

Teaching Major.—Requirements for the teaching major are the same as those for the departmental major with the addition of course 300.

Teaching Minor.—Six quarter courses in the lower division or their equivalents. Usually these will consist of Russian 1, 2, 3, 4, 5, 6. A total of 18 upper division units is required, including courses 101A, 101B, 101C, 102A, 102B.

Subject Representative: Mr. Shane.

Lower Division Courses

1. Elementary Russian. (5) I.

Recitation—5 hours; laboratory—2 hours.
Mrs. Strelkoff

2. Elementary Russian. (5) II.

Recitation—5 hours; laboratory—2 hours.
Prerequisite: course 1. A continuation of course 1.
Miss Tumins

3. Elementary Russian. (5) III.

Recitation—5 hours; laboratory—2 hours.
Prerequisite: course 2. A continuation of course 2.
Mrs. Strelkoff

4. Intermediate Russian. (5) I.

Recitation—5 hours. Prerequisite: course 3.
Mrs. Strelkoff

5. Intermediate Russian. (5) II.

Recitation—5 hours. Prerequisite: course 4.
Mr. Shane

6. Intermediate Russian. (5) III.

Recitation—5 hours. Prerequisite: course 5.
Miss Tumins

39. Great Russian Writers. (3) I.

Lecture—3 hours. Prerequisite: knowledge of Russian not required. An introduction to major prose and dramatic works of such writers as Gogol, Turgenev, Dostoevsky, Tolstoy, Chekhov, and Sholokhov.
Miss Tumins

16. Russian for Graduate Students. No Credit. II.

Lecture—3 hours. A course designed to prepare students for the graduate reading examination.
Mrs. Strelkoff

Upper Division Courses

101A. Advanced Grammar, Composition, and Conversation. (3) I.

Recitation—3 hours. Prerequisite: course 6.
Mrs. Strelkoff

101B. Advanced Grammar, Composition, and Conversation. (3) II.

Recitation—3 hours. Prerequisite: course 101A.
Mr. Shane

101C. Advanced Grammar, Composition, and Conversation. (3) III.

Recitation—3 hours. Prerequisite: course 101B.
Mr. Shane

102A. Russian Composition. (4) I.

Recitation—3 hours. Prerequisite: course 101C.
Miss Tumins

102B. Russian Composition. (4) II.

Recitation—3 hours. Prerequisite: course 102A.
Miss Tumins

110. Survey of Russian Literature to 1800. (4) I.

Lecture—3 hours. Knowledge of Russian not required. Offered in even-numbered years.
Miss Tumins

111. Survey of Russian Literature: Nineteenth Century. (4) II.

Lecture—3 hours. Knowledge of Russian not required. Offered in odd-numbered years.
Miss Tumins

112. Survey of Russian Literature: Twentieth Century. (4) III.

Lecture—3 hours. Knowledge of Russian not required. Offered in odd-numbered years.
Mr. Shane

121. The Russian Novel: Pushkin to Turgenev. (4) I.

Lecture—3 hours. Knowledge of Russian not required. Offered in odd-numbered years.
Mr. Shane

122. The Russian Novel: Tolstoy and Dostoevsky. (4) II.

Lecture—3 hours. Knowledge of Russian not required. Offered in even-numbered years.
Mr. Shane

123. The Russian Novel: Saltykov to Pasternak. (4) III.

Lecture—3 hours. Knowledge of Russian not required. Offered in even-numbered years.
Mr. Shane

125. Russian Drama of the Nineteenth Century. (4) I.

Lecture—3 hours. Prerequisite: course 6. Offered in odd-numbered years. Miss Tumins

127. The Golden Age of Russian Poetry. (4) II.

Lecture—3 hours. Prerequisite: course 101A. Offered in even-numbered years. Study of Russian versification; readings from Pushkin, Lermontov, and other poets of the first half of the nineteenth century.
Miss Tumins

128. Russian Poetry from Nekrasov to the Present. (4) III.

Lecture—3 hours. Prerequisite: course 127. Offered in even-numbered years. Miss Tumins

140. Dostoevsky. (4) II. ^{W.E.}

Lecture—3 hours. Prerequisite: course 6. Offered in odd-numbered years. Mr. Shane

190. Senior Proseminar. (4) III.

Group conference and assigned reading in preparation for the senior comprehensive examination. Miss Tumins

194H. Special Study for Honors Students. (5) I, II.

Prerequisite: open only to honors students. The Staff

SOCIOLOGY

Bennett M. Berger, Ph.D., *Chairman of the Department*

Department Office, 308 Voorhies Hall

Professors:

Bennett M. Berger, Ph.D.
Edgar Z. Friedenberg, Ph.D.
Cesar Graña, Ph.D.
¹Edwin M. Lemert, Ph.D.

Associate Professors:

Guenther Roth, Ph.D.
Julius Roth, Ph.D.

Assistant Professors:

Bruce Hackett, Ph.D.
¹Kenneth C. W. Kammeyer, Ph.D.
J. Rolf Kjolseth, Ph.D.
Robert H. Maisel, Ph.D.

*Lecturer:*

John P. Conrad, M.A.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses (see page 98).

Departmental Major Advisers.—(a) Undergraduate: Mr. Friedenberg, Mr. Kjolseth, Mr. G. Roth, Mr. Graña, (b) Pre-Social Welfare: Mr. Lemert, (c) Graduate: Mr. Lemert, Mr. G. Roth, Mr. Maisel.

The Major Program

Lower Division Courses.—Required: Sociology 1, 2, 12, 46A, 46B, and 46C or their equivalent; 8 units selected from Anthropology 2, Economics 1A, 1B, and Psychology 1A, 1B and 1C. Recommended: Anthropology 1 and Philosophy 12, 20A–20B–20C.

Upper Division Courses.—Required: 36 units of Sociology including 165A, 165B and 165C. Recommended: Anthropology 102, 119A, 119B, 124, 128A, 128B; History 101A, 101B; Philosophy 107C, 151, 156; Political Science 150, 161; Psychology 145; Mathematics 105A, 105B.

¹ Absent on leave, 1966–1967.

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

The Staff

*Professional Course***300. The Teaching of a Modern Foreign Language.**

(3) II.

Lecture—3 hours. Prerequisite: senior or graduate standing; a major or minor in a modern foreign language. Mr. Kawczynski

Pre-Social Welfare Students

Lower Division Courses.—Required: Sociology 1, 3, 46A, 46B, 46C, or their equivalent, and Psychology 1A, 1B and 1C. Recommended: Anthropology 2, Sociology 2, Economics 1A, 1B, Philosophy 12, Political Science 1A, 1B.

Upper Division Courses.—Required: Sociology 120A, 120B, 165A or 165B or 165C, 185, and Psychology 112, 147A, 147B, 165, 168; 8 additional units selected from Sociology 130, 131A, 131B, 140, 150, 152, 170; Psychology 145. Recommended: Anthropology 119A, 119B, 128A, 128B; Economics 116, 130A, 130B, 150A, 150B; Consumer and Family Sciences 136, 138A, 138B; Political Science 103, 104, 181.

Graduate Study.—The Department offers a program of study leading to the M.A. and Ph.D. degrees in sociology. Further information regarding graduate study may be obtained at the department office.

Teaching Major.—Requirements for the teaching major are the same as for the departmental degree plus Sociology 122 or 124, 130 and 140.

Teaching Minor.—Thirty units of sociology taken in consultation with the subject representative.

Subject Representative: Mr. Kjolseth.

*Lower Division Courses***1. Introduction to Sociology.** (4) I, II, III.

Lecture—3 hours; discussion—1 hour. Principles and basic concepts of sociology. The study of groups, culture, collective behavior, classes and caste, community and ecology, role, status, and personality.

2. Introduction to Sociology: Social Organization.

(4) II, III.

Lecture—4 hours. Prerequisite: course 1. A study of social organization and institutions, with attention to the application of concepts and related research findings.

3. Social Problems. (4) I, III.

Lecture—4 hours. A general sociological consideration of contemporary social problems in relation to sociocultural change and programs for improvement.

12. Introduction to Sociological Theory. (4) III.

Lecture—4 hours. An introduction to classic texts and problems in the tradition of sociological inquiry. Representative works of important figures, such as Marx, Comte, Weber, and Durkheim; the relevance of these materials for contemporary sociology.

Mr. Maisel

25. Sociology of Popular Culture. (4) II.

Lecture—4 hours. The historical emergence of popular culture. "High" culture, "folk" culture and "mas" culture; the democratization of culture values; the organization of popular tastes; characteristic art forms of popular culture: literature, music, the graphic arts. The social structure of audiences.

Mr. Graña

46A. Introduction to Social Research. (3) I.

Lecture—3 hours. Prerequisite: 8 units of Sociology. Examination of the methodological problems of social research. Selection and definition of problems of investigation, data-gathering techniques, and sampling.

Mr. Kammeyer

46B. Introduction to Social Research. (3) II.

Lecture—3 hours. Prerequisite: course 46A. Data-analysis techniques, measurement, scaling, multivariate analysis, and quantitative measures of association.

Mr. Kammeyer

46C. Introduction to Social Research. (3) III.

Lecture—3 hours. Prerequisite: course 46B. An introduction to the statistical analysis of social data, emphasizing the logic and use of statistical measures and procedures especially relevant to sociological analysis.

Mr. Kammeyer

Upper Division Courses**106. Quantitative Methods of Research. (4) II.**

Lecture—4 hours. Prerequisite: course 46C or equivalent. Logical and technical features of multiple and partial correlation and regression analysis. Scaling theory and factor analysis. Introduction to mathematical models in sociology.

107. Modes of Sociological Analysis. (4) I.

Lecture—4 hours. Prerequisite: junior or senior standing and 9 units of sociology. The place of sociology among the sciences and the humanities; generalization and explanation in sociology. Styles of sociological inquiry, functional analysis, historical sociology, social criticism.

Mr. Berger

108. Advanced General Sociology. (4) III.

Lecture—4 hours. Prerequisite: junior or senior standing and 9 units of sociology. Critical

analysis of basic concepts in sociology: social organization, culture, socialization, stratification, and their application to specific problems. The bearing of such analysis on problems of social order and social change.

Mr. Berger

118. Political Sociology. (4) II.

Lecture—4 hours. Prerequisite: course 1; or consent of instructor. The 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 movements; analysis of concepts of alienation, revolution, ideology, ruling class, and elite.

Mr. G. Roth

120A. Deviation and Society. (3) I.

Lecture—3 hours. Prerequisite: course 2 and junior or senior standing. Theory and studies of deviation in relation to societal reaction, group processes, and social roles. Stigma and incapacity; cosmetic defect.

Mr. Lemert

120B. Deviation and Society. (3) II.

Lecture—3 hours. Prerequisite: course 2 and junior or senior standing. Continuation of course 120A. Deviation theory applied to selected crimes, prostitution, drugs, alcohol use, and mental disorders. Creativity and society.

Mr. Lemert

122. Sociology of Adolescence. (4) III.

Lecture—4 hours. Prerequisite: 8 units of Sociology. 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.

Mr. Friedenberg

123. American Society. (4) III.

Lecture—4 hours. Prerequisite: 8 units of social science; or consent of instructor. The institutional structure and social organization of the United States.

Mr. Friedenberg

124. Sociology of Educational Institutions. (4) II.

Lecture—4 hours. Prerequisite: 4 units of sociology. Public schools as arenas of intergroup conflict and as instruments of social mobility. The meaning of local autonomy in the context of prevailing arrangements for certification and public support. The relevance of public education to the ethos and mythos of American society.

Mr. Friedenberg

125. Sociology of Intellectual Life. (4) I.

Lecture—4 hours. Prerequisite: upper division standing and consent of instructor. Sociological analysis of the intelligentsia; types of intellectuals, theories concerning their social role; research on the social sources of intellectual work in politics, literature, art, and science; historical considerations of intellectual milieu; international comparisons of intellectuals.

Mr. Graña

126. Social Structure and Personality. (4) I.

Lecture—4 hours. Prerequisite: course 2. Exposition of concepts, theories, and research relating the disciplines of sociology and psychology. Mechanisms of social influence on behavior. Complementarity of personality and learned roles; processes of internalization of roles and norms.

130. Race Relations and Minority Groups. (4) I.

Lecture—4 hours. Prerequisite: 8 units of social science; or consent of instructor. A study of contacts and interaction between racial and ethnic groups; sources and effects of prejudice and discrimination; programs for reducing intergroup tensions.

131A. Sociology of Family and Kinship: General Principles. (3) I.

Lecture—3 hours. Prerequisite: course 2. Biological basis of familial functions; biological and sociological kinship. Familial and extra-familial determinants of age-graded and sex roles. Normative supports of reproductive institutions; types of descent groups and status ascription. Relation of kinship to other social institutions.

131B. Sociology of Family and Kinship: Industrial Societies. (3) II.

Lecture—3 hours. Prerequisite: course 2. Comparative family structure in simple and advanced societies; current trends in industrial societies. Relations of family and stratification: hypergamy, industrialized status ascription, geographical mobility. Detailed study of events of the family cycle in industrial societies.

140. Social Stratification. (4) III.

Lecture—4 hours. Prerequisite: course 1. 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. Mr. Hackett

141. Industrialization and Social Change. (4) II.

Lecture—4 hours. Prerequisite: 4 units of sociology. The interrelations between technological and social change, the social conditions of economic development, and the social implications of automation in highly industrialized countries. Mr. G. Roth

142. Comparative Institutions and Social Structures. (4) I.

Lecture—4 hours. Prerequisite: 8 units of sociology. The central institutions and cultural legacies of the principal complex societies. Western nations will be compared with the USSR and newly developing states with respect to their patterns of institutional persistence and change. Mr. G. Roth

143. Urban Society. (4) I.

Lecture—4 hours. Prerequisite: 8 units of sociology. Urbanization as a social process; comparison of urban, suburban, metropolitan and rural phenomena; types of cities; the subcultures of cities; the urban future.

144. Rural Society. (4) III.

Lecture—4 hours. The characteristics of rural social systems in contrast to urban; the nature of peasant and folk societies; the impact of social change upon rural community life considered from the standpoint of regional differences in the United States and selected world areas.

146. Sociology of Religion. (4) II.

Lecture—4 hours. Prerequisite: 8 units of sociology; or consent of instructor. The relationship between social structure and religious life. Social class, political behavior, and religious affiliation. The passage from "sacred" to "secular" ways of life. Religion and social change in advanced societies. Churches as social organizations. "Established" churches and religious "cults." Mr. Graña

148. Collective Dynamics and Social Movements. (4) III.

Lecture—4 hours. Prerequisite: course 1; or consent of instructor. Non-institutionalized forms of group behavior; social contagions, fashion movements, public opinion formation, reform and revolutionary movements. Their relations to social change in mass societies.

150. Criminology. (4) III.

Lecture—4 hours. Prerequisite: 8 units of social science; or consent of instructor. The sociological analysis of criminal behavior in relation to social structure and the criminalization process. Mr. Lemert

152. Juvenile Delinquency. (3) II.

Lecture—3 hours. Prerequisite: 8 units of sociology or psychology. 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, with special attention given to the juvenile court. Mr. Lemert

155. Sociology of Law. (4) III.

Lecture—4 hours. Prerequisite: 8 units of social science. 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. Mr. Lemert

160. Work and Leisure. (4) II.

Lecture—4 hours. Prerequisite: course 1. Historical and comparative analysis of problems associated with quality of work and quan-

tity of leisure; impact of cultural and social change on occupational pattern and leisure activity.

Mr. Berger

165A. Sociological Theory. (3) I.

Lecture—3 hours. Prerequisite: 8 units of sociology. Major sociological theorists of the nineteenth century. Conservative, liberal, and radical traditions of sociological thought. Thinkers discussed include Comte, Saint Simon, Marx, Spencer, and Toennies.

165B. Sociological Theory. (3) II.

Lecture—3 hours. Prerequisite: 8 units of sociology. Sociological theorists of the late nineteenth and early twentieth centuries. Theorists discussed include Weber, Durkheim, Pareto, and Simmel.

165C. Sociological Theory. (3) III.

Lecture—3 hours. Prerequisite: 8 units of sociology. The development of the American sociological tradition, with emphasis on major contemporary theorists. Theorists discussed include Mead, Cooley, Park, Merton, and Parsons.

170. Population. (4) I.

Lecture—4 hours. Prerequisite: 8 units of social science; or consent of instructor. 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; socio-psychological factors affecting fertility.

Mr. Kammeyer

174. Sociology of Language. (4) III.

Lecture—4 hours. Prerequisite: 6 units of sociology. The relation of language patterns to social patterns; "talk" as a multi-level social phenomenon; relationship of dialects to social groups; sociological analyses of stability and change in language; problems of learning and un-learning languages.

Mr. Kjolseth

175. Sociology of Communication. (4) I.

Lecture—4 hours. Prerequisite: 4 units of sociology. Sociological analysis of sources and consequences of oral and written communicative styles. Literacy and mass society. Institutionalization of personal and bureaucratic modes of address.

Mr. Friedenberg

180. Complex Social Organization. (4) II.

Lecture—4 hours. Prerequisite: course 1; or consent of instructor. Institutional analysis of administrative structures and voluntary associations; consideration of informal organization, ideologies, bureaucracy, decision-making, and morale in selected areas of government, industry, religion, and education.

Mr. Hackett

185. The Field of Social Welfare. (3) III.

Lecture—3 hours. Prerequisite: course 2 and upper division standing. A sociological analysis of social work as an institution. Attention given to agency organization and functions.

Mr. Conrad

199. Special Study for Advanced Undergraduates. (1-5) I, II, III.

Prerequisite: open to seniors only.

The Staff (Mr. Lemert in charge)

Graduate Courses

201. The Fields of Sociology. (3) I, III.

Lecture and discussion—3 hours. Critical analysis of major fields of contemporary sociology. Core problems, theories, and findings of research in these fields.

The Staff (Mr. Maisel in charge)

205. Methodological Critique of Research. (3) III.

Lecture and discussion—3 hours. Prerequisite: course 46C; or consent of instructor. Methodological analysis and criticism of empirical research exemplifying different types of research design. Examination of surveys, experiments, historical and comparative studies, and studies using biographical and demographic data.

Mr. Kammeyer

220. Deviance, Law, and Social Control. (3) I.

Lecture and discussion—3 hours. Prerequisite: courses 120A and 120B; or consent of instructor. The relation of crime, mental disorder, and other forms of deviance to cultural values, norms, and legal institutions; formal and informal means for the social control of deviance.

Mr. Lemert

226. Social Interaction and Personality. (3) II.

Lecture and discussion—3 hours. Prerequisite: course 126; or consent of instructor. The influence of social structure, personality, and social interaction in face-to-face social situations; the relations of role-taking and personal autonomy to the development of the self; social-psychological processes in intimate and small-group situations.

242. Comparative Method in Historical Sociology. (3) III.

Lecture and discussion—3 hours. Prerequisite: course 142; or consent of instructor. Comparative approaches to major historical phenomena such as nationalism, bureaucratization, feudalism, and capitalism; the relevance of psychological and sociological theories to historical interpretation; the verifiability of historically grounded hypotheses; the meaning of analogy, correspondence, and causality.

Mr. G. Roth

252. Sociology of Art. (3) III.

Lecture and discussion—3 hours. Prerequisite: course 25 and 125; or consent of instructor. The relationship of social class, institutions, and value system to art. The art of primitive, aristocratic, and democratic societies. Art and political ideology. The question of art as "representative" of social values. Artists as a social type. Mr. Graña

sent of instructor. The emergence of sociological thinking as part of the history of ideas; the application of sociological analysis to sociological ideas. The French sociological tradition from Saint-Simon to Durkheim; the influence of Marxist thinking on subsequent sociological ideas.

265. Sociological Theory. (3) II.

Lecture and discussion—3 hours. Prerequisite: courses 165A, 165B, and 165C; or con-

290. Seminar. (3) I, II, III.

Seminar—3 hours.

The Staff

299. Individual Study. (1-6) I, II, III.

The Staff (Mr. Berger in charge)

SOIL AND WATER SCIENCE

Victor V. Rendig, Ph.D., *Chairman of the Committee*

Committee Office, 251 Hoagland Hall

Committee in Charge:

C. C. Delwiche, Ph.D. (*Soils and Plant Nutrition*)

Donald R. Nielsen, Ph.D. (*Water Science and Engineering*)

Victor V. Rendig, Ph.D. (*Soils and Plant Nutrition*)

Verne H. Scott, Ph.D. (*Water Science and Engineering and Civil Engineering*)

Major Advisers.—See *Schedule and Directory Listing.*

Bachelor of Science Major Program and Graduate Study. See page 67.

Lower Division Courses**1. Soil, Water, and Air Resources. (3) I.**

Lecture—3 hours. Prerequisite: Biology 1 or consent of instructor. Interrelationships of man and environmental factors; utilization and development of renewable natural resources; characteristics of soil, water, and air and their relation to management and planning concepts. Open to nonmajors. Mr. Henderson

2. Soil, Water, and Air Resources. (3) II.

Lecture—3 hours. Prerequisite: course 1; Biology 1. Recommended: Physics 2A. Development and properties of soils; source and properties of water; properties of the atmosphere; soil, water, and air management in relation to crop production; planning concepts related to agricultural development and production. Mr. Whittig

Upper Division Courses**101. Physics of Soil and Water Systems. (5) I.**

Lecture—5 hours. Prerequisite: course 2; Physics 2B; Mathematics 16B. Factors affecting soil physical condition and irrigation; soil texture, structure, aeration, and strength. Principles of soil management; basic concepts of hydraulics, soil water storage and movement, infiltration, water potential, irrigation and drainage. Principles of irrigation practices.

Mr. Vomocil

102. Soil and Water Chemistry. (5) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: Chemistry 5; course 2. Chemical nature of the mineral and organic constituents of soil and of the soil solution; ion exchange and other colloidal phenomena including the effect of soil amendments and fertilizers; microbiological processes in soils.

Mr. Bureau

103. Water Quality, Salt Control, and Reclamation. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 102 or consent of instructor. Water quality, water analysis, salinity, salt and plant relations, reclamation of water and soil, infiltration problems, and soil amendments.

Mr. Doneen

104. Soil-Water-Plant Relationships. (4) II.

Lecture—4 hours. Prerequisite: courses 101, 102; Botany 2. Influence of soil physical, chemical, and biological properties and of soil water supply on plant growth; availability, uptake, and use of nutrients and water by plants; principles of soil structure, irrigation, and fertilizer management for crop production. Mr. Hsiao

SOILS AND PLANT NUTRITION

C. C. Delwiche, Ph.D., *Chairman of the Department*

Department Office, 139B Hoagland Hall

Professors:

Daniel G. Aldrich, Ph.D. (*Irvine Campus*)

Francis E. Broadbent, Ph.D.

Lannes E. Davis, Ph.D. (*Emeritus*)

C. C. Delwiche, Ph.D.
 Emanuel Epstein, Ph.D.
 Frank F. Harradine, Ph.D.
 Victor V. Rendig, Ph.D.
 Perry R. Stout, Ph.D.

Associate Professors:

James A. Vomocil, Ph.D.
 Lynn D. Whittig, Ph.D.

Assistant Professors:

Richard G. Bureau, Ph.D.
 John L. McMurdie, Ph.D.

: ◊ ◊ ◊

Lecturers:

Eugene L. Begg, B.S.
 Arthur L. Brown, Ph.D.
 Gordon L. Huntington, M.S.
 Jerome J. Jurinak, Ph.D.
 H. Michael Reisenauer, Ph.D.

Departmental Major Adviser.—See *Schedule and Directory Listing*.

Bachelor of Science Major Program and Graduate Study. See page 67.

Plant Science

Upper Division Courses

116. Principles of Plant Nutrition. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: Botany 2, Chemistry 5. Evolution and scope of plant nutrition; essential and other elements; mechanisms of absorption and translocation; mineral metabolism; deficiencies and toxicities; genetic and ecological aspects of plant nutrition; relation to animal nutrition; experimental techniques, including solution culture and radioactive tracing.

Mr. Epstein

Soil Science

Upper Division Courses

105. Summer Field Course. (8) .

Lecture—8 hours; field study—48 hours. Prerequisite: course 120B or consent of instructor. Field study of soils, *in situ*, with special emphasis on their characteristics, morphology, and genesis. Field exercises in classifying and mapping soils, and preparation of soil survey reports. Practice in identifying and evaluating soils for agricultural, range, forest, and other use.

Mr. Begg, Mr. Huntington

109. Soil Fertility and Fertilizers. (4) III.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Soil and Water Science 2. The forms and availability of plant nutrient elements in

soils; composition and use of fertilizers and soil amendments; laboratory exercises in fertility assays and their interpretation. Mr. Reisenauer

120A. Soil Genesis and Morphology. (2) II.

Lecture—2 hours. Prerequisite: Soil and Water Science 2; Geology 1 or 5. Basic principles of geomorphology; soil forming factors and processes as they influence the genesis and characteristics of soil properties. Mr. Harradine

120B. Soil Classification, Mapping, and Evaluation. (3) III.

Lecture—2 hours; laboratory or field—3 hours. Prerequisite: course 120A. Basic principles underlying various systems of soil classification and mapping; methods of evaluating and rating soils for land use. Mr. Harradine

123. Chemistry of Arid Soils. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: Soil and Water Science 102. Diagnostic procedures for assessing features of soil chemistry related to plant growth, with emphasis on soils of arid regions and problems of salinity. Theoretical basis of the procedures and its bearing on the interpretation of results.

Mr. Brown

194H. Special Study for Honors Students.

(1–5) I, II, III.

Prerequisite: open only to majors who are honors students of senior standing. 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.

The Staff

198. Directed Group Study. (1–5) I, II, III.

Directed group study in soil science for advanced undergraduates. The Staff

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

The Staff

Graduate Courses

207. Soil Physics. (3) III.

Lecture—3 hours. Prerequisite: Soil and Water Science 101; recommended: Mathematics 2C. Physical processes occurring in soils; selected topics in the soil-plant relationship.

Mr. McMurdie

208. Soil-Plant Interrelationships. (3) III.

Lecture—3 hours. Prerequisite: Botany 111; Soil and Water Science 104; or consent of instructor. An advanced course on the effects of soil factors on plant development; the influence of soil conditions, processes, and reactions on metabolic reactions in plants; effects of plant root activity on the nature of the rhizosphere.

Mr. Rendig

211. Soil Microbiology. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 8; Soil and Water Science 102. Soil microorganisms and their biochemical activities; plant residue decomposition; soil organic matter and its properties. Mr. Broadbent

214. Soil Mineralogy. (5) I.

Lecture—2 hours; discussion—1 hour; laboratory—6 hours. Prerequisite: Chemistry 109B or 110B; Soil and Water Science 102. Nature, properties, and occurrence of the more common minerals in soils and rocks. Application of mineral analysis methods in the study of the formation and properties of soils and of weathering of minerals. X-ray, thermal, and chemical analyses of mineral fractions. Mr. Whittig

215. Physical Chemistry of Soils. (3) I.

Lecture—3 hours. Prerequisite: Chemistry 110C; Soil and Water Science 102. Physicochemical, colloidal, and surface aspects of the soil system. Offered in even-numbered years.

Mr. Jurinak

216. Advanced Instrumentation in Biology. (3) III.

Lecture—1 hour; laboratory—6 hours. Prerequisite: consent of instructor. The applica-

tion of electronic and mechanical devices to solution of problems of measurement and control in biological research; emphasis given to the synthesis and application of low current or low potential measurement equipment, vacuum techniques, optical processes, and electromagnetic transduction.

Mr. Delwiche

222. Salt-affected Soils. (3) II.

Lecture—3 hours. Prerequisite: Soil and Water Science 102, or consent of instructor. Scope of soil problems in salt-prone arid zone climates; origin and encroachment of salt; chemical interactions with alumino silicates under alkaline situations. Physiological characteristics of native and crop plant species governing salt tolerance and sensitivity.

Mr. Whittig

290. Seminar. (1) I, II, III.

Seminar—1 hour. Prerequisite: graduate standing in soil science, plant physiology, or related subjects. Topics of current interest in soil science, including research recently carried out by students, will be discussed. Each student will prepare and present reports to the seminar.

Mr. Delwiche

299. Research. (1-12) I, II, III.

The Staff

SPANISH

^a*Donald G. Castanien, Ph.D., *Chairman of the Department*
Daniel S. Keller, Ph.D., *Acting Chairman of the Department*
Department Office, 624 Sproul Hall

Professors:

Homero Castillo, Ph.D.
Iver N. Nelson, Ph.D. (*Emeritus*)

Associate Professors:

Donald G. Castanien, Ph.D.
Daniel S. Keller, Ph.D.

Assistant Professors:

Didier T. Jaén, Ph.D.
Robert M. Scari, Ph.D.

**Assistant Professors:**

Roberto Assardo, M.A. (*Acting*)
Jerry R. Craddock, A.B. (*Acting*)
Dale E. Enwall, M.A. (*Acting*)
Robert E. Kelsey, A.B. (*Acting*)
Edwin T. Williams, M.A. (*Acting*)

Lecturer:

David H. Allen, Jr., M.A.

Associates:

Skaidrite Ranne, M.A.
Ronald R. Senft, B.A.

^a Absent on leave, winter quarter 1967.

^b Absent on leave, spring quarter 1967.

The Major Program

Lower Division Courses.—Required: Spanish 1, 2, 3, 4, 5, and 6, or their equivalents; 26A–26B–26C. Recommended: one year of college Latin or the equivalent.

Upper Division Courses.—Required: 36 units of upper division courses including 101A–101B, 180, one course in each of the following areas: literature of the Golden Age, twentieth-century Spanish literature, twentieth-century Spanish American literature. The remaining units may be from any of the upper division courses.

Honors and Honors Program (see page 95).—The honors program comprises two quarters of study under course 194H, which will include a research paper and a comprehensive examination.

The Master of Arts Degree

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 its equivalent. Candidates will be recommended for admission to graduate studies in Spanish provided they meet the requirements of the Graduate Division and the Department of Spanish. Detailed information may be obtained by writing to the Graduate Adviser, Department of Spanish.

Teaching Major.—Requirements for the teaching major are the same as for the departmental major.

Teaching Minor.—Spanish 1, 2, 3, 4, 5, 6, 26A–26B–26C, or their equivalents. At least 16 units of upper division work, including Spanish 101A–101B, 134 and one of the following courses: Spanish 131A, 120A, 104C, or 122.

Subject Representative: Daniel S. Keller.

Portuguese

Lower Division Courses

1. Elementary Portuguese. (4) I.

Laboratory—2 hours; recitation—3 hours. Portuguese grammar, conversation, and reading. No credit will be allowed if the student has completed two or more years of high school Portuguese.
Mr. Assardo

2. Elementary Portuguese. (4) II.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 1. A continuation of course 1.
Mr. Assardo

3. Elementary Portuguese. (4) III.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 2. A continuation of course 2.
Mr. Assardo

Spanish

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 98.

Departmental Major Advisers.—Mr. Jaén, Mr. Kelsey, Mr. Williams, Mr. Scari.

Graduate Adviser.—Mr. Castanien.

Lower Division Courses

1. Elementary Spanish. (4) I, II, III.

Laboratory—2 hours; recitation—3 hours.
The Staff

2. Elementary Spanish. (4) I, II, III.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 1. A continuation of course 1.
The Staff

3. Elementary Spanish. (4) I, II, III.

Laboratory—2 hours; recitation—3 hours. Prerequisite: course 2. A continuation of course 2.
The Staff

4. Intermediate Spanish. (3) I, II, III.

Recitation—3 hours. Prerequisite: course 3.
The Staff

5. Intermediate Spanish. (3) I, II, III.

Recitation—3 hours. Prerequisite: course 4. Continuation of course 4.
The Staff

6. Intermediate Spanish: Conversation and Reading.

(3) I, II, III.

Recitation—3 hours. Prerequisite: course 5. Spoken Spanish stressed through class discussion of a variety of selected readings. The Staff

26A–26B–26C. Introduction to Spanish Literature.

(3) I–II–III.

Lecture—3 hours. Prerequisite: course 6.

The Staff

Upper Division Courses

101A–101B. Grammar and Composition.

(4) I, II; III.

Lecture—3 hours. Prerequisite: course 6.

The Staff

104A. History of Spanish-American Literature:

Colonial Period to the Nineteenth Century.

(4) I.

Lecture—3 hours. Prerequisite: course 26C.
Mr. Keller

104B. History of Spanish-American Literature:

the Nineteenth Century through Modernismo.

(4) II.

Lecture—3 hours. Prerequisite: course 26C.
Mr. Keller

104C. History of Spanish-American Literature:

Modernismo to the Present. (4) III.

Lecture—3 hours. Prerequisite: course 26C.
Mr. Keller

105. Spanish Drama of the Nineteenth Century.

(4) I.

Lecture—3 hours. Prerequisite: course 26C. Offered in even-numbered years.
Mr. Scari

109A–109B. Spanish Drama of the Golden Age.

(4) II–III.

Lecture—3 hours. Prerequisite: course 26C. Offered in even-numbered years.
Mr. Kelsey

111. Don Quijote. (4) II.

Lecture—3 hours. Prerequisite: course 26C. Offered in odd-numbered years.
Mr. Castanien

112. Prose of the Golden Age. (4) II.

Lecture—3 hours. Prerequisite: course 26C. Offered in odd-numbered years.
Mr. Castanien

115. Lyric Poetry of the Golden Age. (4) I.

Lecture—3 hours. Prerequisite: course 26C. Offered in even-numbered years.
Mr. Kelsey

119. Spanish Novel of the Nineteenth Century. (4) I.

Lecture—3 hours. Prerequisite: course 26C. Offered in odd-numbered years.
Mr. Scari

120A. Twentieth-Century Spanish Prose. (4) I.

Lecture—3 hours. Prerequisite: course 26C. Offered in even-numbered years. Mr. Williams

120B. Twentieth-Century Spanish Drama. (4) II.

Lecture—3 hours. Prerequisite: course 26C. Offered in odd-numbered years. Mr. Williams

120C. Twentieth-Century Spanish Poetry. (4) III.

Lecture—3 hours. Prerequisite: course 26C. Offered in odd-numbered years. Mr. Enwall

122. Spanish-American Fiction of the Twentieth Century. (4) I.

Lecture—3 hours. Prerequisite: course 26C. Offered in odd-numbered years. Mr. Assardo

131A. Modern Spanish Syntax. (4) I.

Lecture—3 hours. Prerequisite: course 101B. Mr. Craddock

131B. Modern Spanish Syntax. (4) II.

Lecture—3 hours. Prerequisite: course 101B. Mr. Craddock

131C. Modern Spanish Syntax. (4) III.

Lecture—3 hours. Prerequisite: course 101B. Mr. Craddock

134. Survey of Spanish Culture. (4) II.

Lecture—3 hours. Prerequisite: course 26C. Mr. Jaén

135. Survey of Spanish-American Culture. (4) III.

Lecture—3 hours. Prerequisite: course 26C. Mr. Jaén

140A. Medieval Spanish Language and Literature. (4) II.

Lecture—3 hours. Prerequisite: course 26C and 101B. Linguistic and literary analysis of representative works of the thirteenth, fourteenth, and fifteenth centuries. Offered in even-numbered years. Mr. Craddock

140B. Medieval Spanish Language and Literature. (4) III.

Lecture—3 hours. Prerequisite: course 26C and 101B. Linguistic and literary analysis of the *Libro de buen amor* and the *Poema de mio Cid*. Offered in even-numbered years. Mr. Craddock

150. Masterpieces of Spanish Literature. (4) I.

Lecture—3 hours. Reading, lectures, and discussion in English. May not be counted as part of the major in Spanish. Mr. Castanien

151. Study of a Major Writer. (4) I, II, III.

Lecture—3 hours. Prerequisite: course 26C. May be repeated for credit with consent of the instructor. The Staff

180. History of Spanish Literature. (4) III.

Lecture—3 hours. Prerequisite: open only to

majors in their senior year; consent of instructor. Mr. Scari

194H. Special Study for Honors Students.

(4) I, II, III.

Prerequisite: open only to honors students. Guided research leading to an honors thesis. The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

The Staff

Graduate Courses**230A. History of the Spanish Language. (4) I.**

Seminar—3 hours. Prerequisite: Latin 1. Mr. Craddock

230B. History of the Spanish Language. (4) II.

Seminar—3 hours. Prerequisite: Latin 1. Mr. Craddock

231A-231B. Spanish Literature of the Golden Age.

(4-4) II-III.

Seminar—3 hours. Offered in odd-numbered years. Mr. Castanien

234A. Twentieth-Century Spanish Poetry. (4) I.

Seminar—3 hours. Offered in even-numbered years. Mr. Enwall

234B. Twentieth-Century Spanish Poetry. (4) II.

Seminar—3 hours. Offered in odd-numbered years. Mr. Enwall

235A. Twentieth-Century Spanish Prose. (4) I.

Seminar—3 hours. Offered in odd-numbered years. Mr. Williams

235B. Twentieth-Century Spanish Prose. (4) II.

Seminar—3 hours. Offered in even-numbered years. Mr. Williams

238A. Spanish-American Drama: 1880-1930. (4) III.

Seminar—3 hours. Offered in odd-numbered years. Mr. Keller

238B. Spanish-American Drama: 1930 to Present.

(4) III.

Seminar—3 hours. Offered in even-numbered years. Mr. Keller

239. Nineteenth-Century Spanish Literature. (4) II.

Seminar—3 hours. Offered in even-numbered years. Mr. Scari

299. Research. (2-5) I, II, III.

The Staff

Professional Course**300. The Teaching of Modern Foreign Language.**

(3) II.

Lecture—3 hours. Prerequisite: senior or graduate standing; a major or minor in a modern foreign language. The Staff

SUBJECT A

Department Office, TB 123, Room 106

Instruction Supervisor:

Leonard G. Homann, A.B.

VETERINARY MICROBIOLOGYJohn W. Osebold, D.V.M., Ph.D., *Chairman of the Department*

Department Office, 2004 Haring Hall

Professors:

Norman F. Baker, D.V.M., Ph.D.

Ernst L. Biberstein, D.V.M., Ph.D.

Hugh S. Cameron, D.V.M., Ph.D.
(Emeritus)

James R. Douglas, Ph.D.

Delbert G. McKercher, D.V.M., Ph.D.

John W. Osebold, D.V.M., Ph.D.

Clyde Stormont, Jr., Ph.D.

Jacob Traum, D.V.M. *(Emeritus)*

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Lecturers:

Michel M. J. Lavoipierre, M.B., Ch.B.

Richard N. Rossan, Ph.D.

Upper Division Courses**120. Principles and Techniques of Bacteriology.**

(2) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: second-year standing in the School of Veterinary Medicine or consent of the instructor. The lectures deal with the fundamental physical and physiological properties of bacteria, microbial classification, and nomenclature. The laboratory exercises are designed to acquaint the student with basic methods used in studying bacteria.

Mr. McKercher

121. Immunity and Serology. (3) I.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 120 or consent of the instructor. The principles of immunity and serology.

Mr. Osebold, Mr. Stormont

122. Bacterial and Mycotic Pathogens of Domestic Animals. (4) II.

Lecture—4 hours; laboratory—8 hours. Prerequisite: course 121, or consent of instructor. The biology of infectious animal diseases caused by bacteria and fungi.

Mr. Biberstein

123. Fundamentals of Virology and Virologic Techniques. (3) II.

Lecture—4 hours; laboratory—8 hours. Prerequisite: course 122, or consent of the instruc-

Subject A. English Composition (no credit), I, II, III.

Lecture—2 hours; discussion—2 hours. Principles of composition, with special emphasis on precision and exactness of sentences. The Staff

tor. The basic physical and physiological properties of viruses and the virus-host relationship; laboratory methods of propagating viruses, with respect to their immunologic, serologic and pathologic properties.

Mr. McKercher

124. Veterinary Protozoology. (2) II.

Lecture—1 hour; laboratory—3 hours. Prerequisite: second year standing in the School of Veterinary Medicine or consent of the instructor. The protozoan parasites of domesticated animals with emphasis on biology, life history, identification, and control.

Mr. Baker, Mr. Rossan

125. Veterinary Helminthology and Entomology.

(5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: second year standing in the School of Veterinary Medicine or consent of the instructor. The helminth and arthropod parasites of domestic animals with emphasis on biology, life history, identification, and control.

Mr. Baker, Mr. Douglas, Mr. Lavoipierre

127. Introduction to Immunology. (2) II.

Lecture—1 hour; laboratory—3 hours. Prerequisite: Biology 1; Chemistry 8, Zoology 2 recommended. Principles of infection and resistance, nature and manifestations of immune and allergic responses in higher animals.

Mr. Biberstein

128. Medical Microbiology. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 127. The microorganisms, exclusive of protozoa and metazoa, pathogenic for man.

Mr. Biberstein

199. Special Study for Advanced Undergraduates.

(2-8) I, II, III.

The Staff

Graduate Courses**201. Clinical Microbiology. (2) II.**

Laboratory—6 hours. Prerequisite: course 121, junior standing in School of Veterinary Medicine. Principles and methods of etiological diagnosis of bacterial, mycotic, viral, protozoan, helminthic, and ectoparasitic infections affecting domestic animals.

The Staff

270. Advanced Immunology. (6) III.

Lecture—3 hours; laboratory—9 hours. Prerequisite: courses 120–123 or 127 or consent of the instructor. Dynamics of infection and resistance: antibody production and manifestations of antigen-antibody reactions, immuno-chemistry, hypersensitivity. Immunological considera-

tions of the groups of disease agents. Offered in even-numbered years. Mr. Osebold

290. Seminar. (1) I, II, III.

Seminar—1 hour.

Mr. Osebold

298. Group Study. (1–9) I, II, III.

The Staff

299. Research. (1–9) I, II, III.

The Staff

WATER SCIENCE AND ENGINEERING

Verne H. Scott, Ph.D., *Chairman of the Department*

Department Office, 113 Veihmeyer Hall

Professors:

Frank Adams, M.A., LL.D. (hon.c.)
(*Emeritus*)

Jaime Amorocho, Ph.D. (*Water Science
and Engineering and Civil Engineering*)

Robert H. Burgy, M.S. (*Water Science and
Engineering and Civil Engineering*)

Lloyd D. Doneen, Ph.D.

Robert M. Hagan, Ph.D.

Delbert W. Henderson, Ph.D.

James N. Luthin, Ph.D. (*Water Science
and Engineering and Civil Engineering*)

Verne H. Scott, Ph.D. (*Water Science and
Engineering and Civil Engineering*)

Frank J. Veihmeyer, C.E., Ph.D.
(*Emeritus*)

Associate Professor:

Donald R. Nielsen, Ph.D.

Assistant Professors:

Theodore C. Hsiao, Ph.D.

Theodor S. Strelkoff, Ph.D. (*Water Science
and Engineering and Civil Engineering*)

**Lecturers:**

James W. Biggar, Ph.D.

William E. Hart, M.S.

William O. Pruitt, Jr., M.S. (*Water Science
and Engineering and Civil Engineering*)

**Departmental Major Advisers—See Schedule
and Directory Listing.****Bachelor of Science Major Program and Graduate Study.** See page 67.

Lower Division Courses

10. Water and Man. (3) III.

Lecture—3 hours. Water as a factor in civilization and man's environment. Water supply and utilization problems of agricultural, domestic, industrial, and other water users in developed and developing nations. A cultural and technical course providing an introduction to water science and engineering. Mr. Hagan

Upper Division Courses

106. Principles of Soil Water Movement. (3) II.

Lecture—2 hours; laboratory—3 hours. Prerequisite: Soil and Water Science 101. An introduction to basic mechanisms of soil water movement with emphasis on infiltration, evaporation, and redistribution within the soil profile. Laboratory measurements of the forces involved in soil water movement. Mr. Nielsen

110A. Irrigation Principles and Practices. (3) II.

Lecture—3 hours. Prerequisite: Physics 2B. A general course for engineering and agricultural students. Principles for relating water, soil, plant and atmospheric conditions to irrigation planning and practices. Selecting lands for irrigation, water-soil-plant relations, irrigation requirements for principal crops, irrigation scheduling for maximum efficiency. Mr. Henderson

110B. Irrigation Principles and Practices. (3) III.

Lecture—3 hours. Prerequisite: Physics 2B. A general course for engineering and agricultural students. Farm irrigation distribution systems, water measurement, farm water supply including wells and pumping plants, land preparation for irrigation, water application, and drainage requirements. Mr. Henderson

116. Processes of Water and Soil Pollution. (2) II.

Lecture—2 hours. Prerequisite: Soil and Water Science 102 recommended and consent of instructor. Physical, chemical and biological processes, natural and man-made, that cause pollution of water and soil; nature of pollutants, persistence, and control. Mr. Biggar

118A. Hydraulics. (3) II.

Lecture—3 hours. Prerequisite: Mathematics 1C or 16C; Physics 2B and 2C. Principles of incompressible fluid mechanics and hydraulics. Applications to the analysis of water conveyance, control and measurement systems. Mr. Amorocho

118B. Hydraulics. (3) III.

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 118A. Continuation of course 118A. Mr. Amorocho

140. Farm Drainage Systems. (2) III.

Lecture—2 hours. Prerequisite: Soil and Water Science 101. Drainage principles and methods including investigation of drainage problems, types of drainage systems and layout of farm drains, and drainage requirements for land reclamation and irrigated agriculture.

Mr. Luthin

141. Hydrology. (3) II.

Lecture—3 hours. Prerequisite: course 118A or Engineering 103A. Principles of hydrologic analysis including consideration of precipitation, stream flow and ground water phenomena.

Mr. Burgy

150. Water Rights and Irrigation Institutions. (3) I.

Lecture—3 hours. Water rights: kinds, requirements, adjudication, administration, loss and evaluation. Irrigation enterprises: kinds, organization, financing, public regulation, operation, and usefulness under different conditions.

160. Farm Irrigation Systems. (3) III.

Lecture—3 hours. Prerequisite: senior standing in Soil and Water Science or Civil Engineering, or consent of instructor. Design, construction, operation and maintenance of farm irrigation systems including appurtenant structures. Preparation of land for irrigation. Analysis of irrigation systems and water application methods.

Mr. Hart

170. Irrigation and Drainage Summer Laboratory. (3)

Lecture—15 hours total; laboratory—45 hours total. Prerequisite: senior standing in Soil and Water Science or Civil Engineering or consent of instructor. Laboratory and field exercises conducted during the summer. Such topics as ground water, wells, and pumping plants; soil-water characteristics and water-soil-plant relations; farm irrigation system design and operation; evaluation of water application methods; drainage investigation techniques; and layout of farm drainage systems.

Mr. Hart

194H. Special Study for Honors Students.

(1-5) I, II, III.

Prerequisite: open to majors in Soil and Water Science who are honors students of senior standing. Independent study of selected topics under direction of a member of the staff. Completion will involve writing of a paper.

The Staff

198. Directed Group Study. (1-5) I, II, III.

The Staff

199. Special Study for Advanced Undergraduates.

(1-5) I, II, III.

Prerequisite: senior standing. The Staff

Graduate Courses**200. Water-Soil-Plant Relationships in Irrigation Programming. (3) III.**

Lecture—3 hours. Prerequisite: Soil and Water Science 104. Selected topics including prediction of crop responses to irrigation, evapotranspiration and water requirements, production functions, strategy for using limited water supplies, and irrigation planning and operations for optimizing water use and crop production under conditions of developed and developing nations.

Mr. Hagan

201. Water in Physiology and Biochemistry of Plants. (3) I.

Lecture—3 hours. Prerequisite: Botany 111; Chemistry 5. Recommended: Biochemistry 101B; Botany 120A and a course in physical chemistry. Solute-water interactions; water and the structure of biological macromolecules; cell-water relations; physiology and biophysics of water uptake, transport and dissipation by plants; physiology and biochemistry of stomata; water stress and plant metabolism.

Mr. Hsiao

202. Evapotranspiration: Summer Course. (2).

Lecture—18 hours total, laboratory—9 hours total. Prerequisite: Agricultural Engineering 106. Analysis and prediction of evapotranspiration. Influence of climate, vegetative cover, and soil on crop water use. Field and laboratory techniques of measuring evaporation radiation, sensible heat fluxes, and determination of profiles of temperature, humidity, and wind.

Mr. Pruitt

215. Advanced Topics in Water Chemistry. (3) II.

Lecture—3 hours. Prerequisite: Soil and Water Science 102. Recommended: Chemistry 110C; Soil and Water Science 103. An advanced course in water chemistry emphasizing principles governing interactions of ionic constituents in water with soils and plants. Topics include electro-kinetic properties of clays, diffusion mechanisms, hydrodynamic dispersion during leaching, and irreversible thermodynamics in soil-salt systems.

Mr. Biggar

215L. Advanced Topics in Water Chemistry Laboratory. (1) II.

Laboratory—3 hours. Prerequisite: course 215 concurrently or consent of instructor. Laboratory techniques for studying the physical and chemical interactions of soil and water.

Mr. Biggar

250. Physics of Soil Water Movement. (3) I.

Lecture—3 hours. Prerequisite: Mathematics 2C or consent of instructor. Recommended: course 106. The physics of fluid flow through porous media; miscible and immiscible displacement theories; theory of capillary pressure and pore size distribution with emphasis on

unsaturated flow problems; physical aspects of permeability, porosity, specific surface, and pore structure.
Mr. Nielsen

290. Seminar. (1-9) II.

Seminar—1 hour. Required of all graduate students in Irrigation Science. Discussion of advanced problems in irrigation.
Mr. Nielsen

298. Group Study. (1-9) I, II, III.

Group study on advanced topics in irrigation.
The Staff

299. Research. (1-9) I, II, III.

Individual research in irrigation science.
The Staff

ZOOLOGY

Herman T. Spieth, Ph.D., *Chairman of the Department*
Milton Hildebrand, Ph.D., *Vice-Chairman of the Department*

Department Office, 247 Animal Science (after September 1, 205 Horticulture)

Professors:

Charles R. Goldman, Ph.D.
Milton Hildebrand, Ph.D.
Everett W. Jameson, Jr., Ph.D.
Bernard John, Ph.D.
Loye H. Miller, Ph.D., LL.D. (*Emeritus*)
Milton A. Miller, Ph.D.
Lauren E. Rosenberg, Ph.D.
Herman T. Spieth, Ph.D.
Tracy I. Storer, Ph.D., LL.D. (*Emeritus*)
Kenneth E. F. Watt, Ph.D.

Associate Professors:

Robert L. Rudd, Ph.D.
¹George W. Salt, Ph.D.

Assistant Professors:

Dennis Barrett, Ph.D.
Ronald J. Baskin, Ph.D.
William J. Hamilton, III, Ph.D.
William M. Hamner III, Ph.D.
Warren G. Kinzey, Ph.D. (*Zoology and Anthropology*)
Stephen L. Wolfe, Ph.D.



Professor:

James R. Douglas, Ph.D. (*Veterinary Microbiology*)

Associate Professor:

Norman F. Baker, D.V.M., Ph.D.
(*Veterinary Microbiology*)

Assistant Professor:

Ann E. Kammer, M.S. (*Acting*)

Lecturer:

¹William M. Longhurst, Ph.D.

Bachelor of Arts Major Program

Lower Division Courses.—Required: Biology 1, Zoology 2, Botany 2 or Bacteriology 2, Chemistry 1A, 1B, and 1C or 8.

¹ Absent on leave, 1966-1967.

Upper Division Courses.—Required: 36 units of upper division courses in Zoology (not more than 5 units of courses in the 190 series may be counted in this requirement). Students in the A.B. program are required to complete a course in four of the five following core areas:

1. Vertebrate Embryology: Zoology 100; or Vertebrate Comparative Anatomy: Zoology 106A.

2. Invertebrate Zoology; Zoology 112.

3. Genetics: Genetics 100.

4. Physiology with laboratory: Zoology 142 and 142L, Zoology 150, Animal Husbandry 110, Poultry Husbandry 107 and 108, or animal Physiology 100 and 100L.

5. Cell Biology: Zoology 121 or Botany 130.

Any courses taken outside the department in partial satisfaction of the core course requirement will be counted toward the satisfaction of the 36-unit requirement.

Within the major program there are four principal areas of concentration for which electives are recommended as follows:

1. Preparation for Graduate Study.—With attention to the requirements for advanced degrees, additional courses in botany, biochemistry, chemistry, a second foreign language, physics, calculus, and statistics.

2. Preparation for Careers as Teachers.—To provide desirable breadth of training, additional courses selected from botany, bacteriology, cell biology, chemistry, and courses in physics, entomology, field zoology and physiology.

3. Preparation for Careers as Technicians.—Courses 104, 107, 110, and electives in biochemistry, parasitology and physiology.

4. Preparation for Careers in Wildlife.—The A.B. program may serve as preparation for careers in wildlife, but the B.S. program is specifically designed for that purpose. Hence, students in the A.B. program interested in this field should select as many electives as possible from the courses listed under the B.S. program.

Bachelor of Science Major Program

The B.S. program is an interdisciplinary major for students with professional orientation in the field of wildlife.

Lower Division Courses.—Required: Biology

1, Zoology 2; Botany 2; Chemistry 1A, 1B, 8; Entomology 1; Mathematics 13. Recommended: Bacteriology 2; Geology 1A; Physics 2A; Mathematics 16B, 36, 41; Chemistry 5.

Upper Division Courses.—At least 36 units, 18 of which must be in upper division zoology courses. Not more than 5 units of courses in the 190 series may be counted toward the upper division course requirement.

Required: Genetics 100; Zoology 116.

Elective groups: 18 units of upper division electives including courses from at least four of the following groups:

Group 1. Limnology and Oceanography.—Zoology 140, 140L, 144.

Group 2. Physiology, Nutrition, and Biochemistry.—Zoology 142, 142L; Animal or Poultry Husbandry 105; Animal Husbandry 110; Biochemistry 101.

Group 3. Biometry.—Mathematics 105B, 109.

Group 4. Parasitology and Bacteriology.—Bacteriology 100, 104; Veterinary Microbiology 124.

Group 5. Vertebrate Zoology.—Zoology 133, 134, 106A, 106B.

Group 6. Ecology.—Zoology 125, 125L; Botany 117.

Honors and Honors Program (see page 95).—The honors program comprises courses 194H and 195H. These two courses will be accepted as part of the 36-unit requirement in upper division courses.

Graduate Study.—The Department of Zoology offers programs of study and research leading to the M.A. and Ph.D. degrees. For detailed information regarding graduate study, write to the Graduate Adviser, Department of Zoology.

Teaching Major.—Required lower division courses are Biology 1, Zoology 2, Chemistry 1A and 1B or 8. A total of 24 upper division units is required, including a course in four of the following five areas:

1. Vertebrate Embryology or Vertebrate Comparative Anatomy: Zoology 100 or 106A.

2. Invertebrate Zoology: Zoology 112.

3. Genetics: Genetics 100.

4. Physiology with laboratory: Zoology 142, 142L, or any related animal physiology courses.

5. Cell Biology: Zoology 121 or Botany 130.

Recommended: additional courses in botany, bacteriology, cell biology, chemistry and physics, entomology, field zoology, and physiology.

Teaching Minor.—A minimum of 30 units in zoology, including Biology 1, Zoology 2, and 18 units of upper division courses in zoology or closely related fields chosen in consultation with the subject representative. An upper division course in invertebrate zoology is recommended, and it is recommended that the remaining upper division units cover as many other areas as possible (e.g., cell biology, physiology, ecology, genetics, and evolution).

Subject Representative: Mr. Wolfe.

Biology

Lower Division Courses

1. Principles of Biology. (6) I, II, III.

Lecture—4 hours; laboratory—6 hours. Prerequisite: Chemistry 1A; or a passing score in a qualifying examination in chemistry. An interdisciplinary course designed for majors in the biological sciences. Emphasis on the unity of basic biological principles as related to cell structure and function, reproduction, genetics, growth and differentiation, evolution, ecology, and taxonomy.

I. Mr. Ketellapper, II. Mr. Wolfe

III. Mr. Reynolds

*4. Biological Diversity. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 1. A survey of representative microorganisms, plants, and animals stressing diversity, classification, structure, and function.

The Staff

10. General Biology. (4) I, III.

Lecture—3 hours; discussion—1 hour. Not open for credit to those who have had course 1. Consideration of the main features and principles of biology, with emphasis on biological processes and special reference to evolution, heredity, and the bearing of biology on human life. Designed for students not specializing in biology.

I. Mr. Spieth, III. Mr. Ketellapper

Physiology

Lower Division Courses

2. Introductory Physiology. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: Biology 1. The physiology of muscular contraction, nervous integration, sensation, circulation, respiration, excretion, and digestion.

Mr. Baskin

2L. Introductory Physiology Laboratory. (2) I.

Laboratory—6 hours. Prerequisite: Physiology 2; completed or in progress. Mr. Baskin

10. Elementary Physiology. (4) II.

Lecture—3 hours; discussion—1 hour. Prerequisite: not open for credit to students who have had Biology 1. An introductory course in Physiology for non-science majors.

Zoology

Lower Division Courses

2. General Zoology. (6) I, II.

Lecture—4 hours; laboratory—6 hours. Prerequisite: Biology 1. A survey of the diversity of animal life and the basic principles of adaptation, evolution, and integration in animals.

The Staff

* Not to be given, 1966-1967.

25. General Human Anatomy. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biology 1, 10, or Physiology 1; and sophomore standing. A basic study of human anatomy with demonstration and laboratory study of prepared human dissections, models, and microscopic materials. Not open to pre-medical students.

Mr. Kinzey

Upper Division Courses**100. Vertebrate Embryology. (5) I, III.**

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2. Embryonic development of vertebrates with emphasis on amniotes.

I. Mr. Hildebrand, III.

103. Experimental Embryology. (6) III.

Lecture—3 hours; discussion—1 hour; laboratory—6 hours. Prerequisite: course 100 and consent of the instructor. Mechanisms of growth and differentiation; experimental manipulation and biochemical analysis of a variety of embryonic materials.

Mr. Barrett

104. Principles of Microscopy. (4) III.

Lecture—1 hour; laboratory—9 hours. Prerequisite: course 2. History, theory, and application of methods of microscopy, including sectioning and staining, phase contrast in microscopy, fluorescence microscopy, photomicrography, autoradiography, and preparations for the electron microscope.

106A. Analysis of Vertebrate Structure. (4) II.

Lecture—2 hours; laboratory—6 hours. Prerequisite: course 2. Recommended: course 100. The interpretation of vertebrate structure with emphasis on phylogeny.

Mr. Hildebrand

106B. Analysis of Vertebrate Structure. (3) III.

Lecture—1 hour; laboratory—4 hours. Prerequisite: course 2. The interpretation of vertebrate structure with emphasis on function.

Mr. Hildebrand

107. Microanatomy. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2. The finer structure and activities of organs, tissues, and cells of vertebrates, with emphasis on those of mammals.

Mr. Rosenberg

110. Protozoology. (6) III.

Lecture—3 hours; laboratory—9 hours. Prerequisite: Biology 1 and junior standing. Structure, life history, and ecology of the groups of protozoa with emphasis on relationships to biological problems.

Mr. Rosenberg

112. Invertebrate Zoology. (6) III.

Lecture—3 hours; laboratory—9 hours. Prerequisite: course 2. Comparative anatomy, classification, phylogeny, and natural history of the invertebrate Metazoa.

Mr. Miller

116. Principles of Animal Resource Management. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biology 1; Mathematics 13 and 16A. Population dynamics and management of marine, freshwater, and terrestrial animal resources; analysis and solution of problems in maximization of animal resource production.

Mr. Watt

121. Cell Biology. (4) I.

Lecture—4 hours. Prerequisite: Biochemistry 101A and 101B, and Genetics 100. The mechanics of living systems. A combined ultrastructural, physiological, and biochemical analysis of subcellular organization, including such topics as nucleic acid "code," synthesis of specific macromolecules, contractility, photosynthesis and respiration, cell division, molecular structure of organelles, and cell regulatory mechanisms.

121L Cell Biology Laboratory. (2) II.

Laboratory—6 hours. Prerequisite: course 121. Exercises illustrating principles of cell biology; individual programs of research, employing one or more advanced techniques.

125. Animal Ecology. (3) II.

Lecture—3 hours. Prerequisite: course 2 and one course in biological science having at least part of the studies conducted in the field (e.g., Zoology 112, 133, 134, 140L, Botany 108 or Botany 117.) Theory of relationships between animals and their environments.

125L Field Ecology. (3) III.

Laboratory—9 hours. Prerequisite: course 125. Laboratory and field investigations of ecological phenomena.

126. Chemical Embryology. (4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100; Chemistry 1C or 8. Recommended: course 103. Molecular aspects of embryonic development and regeneration.

Mr. Barrett

133. Biology of the Cold-Blooded Vertebrates. (5) II.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2. Identification; ecologic and geographic distribution; field study of habits and life histories; emphasis on species in California and western North America. Mr. Jameson

134. Biology of Birds and Mammals. (5) III.

Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2. Identification; ecologic and geographic distribution; field study of habits and life histories; emphasis on species in California and western North America. Field trips included.

Mr. Rudd

140. Limnology. (3) I.

Lecture—3 hours. Prerequisite: Biology 1 and junior standing. The biology and productivity of inland waters with emphasis on the physical and chemical environment.

Mr. Goldman

140L. Limnology Laboratory. (3) I.

Laboratory—6 hours. Prerequisite: course 140 (may be taken concurrently). Limnological studies of lakes, streams, and reservoirs with interpretation of aquatic ecology. Mr. Goldman

142. Invertebrate Physiology. (4) III.

Lecture—3 hours. Prerequisite: course 112; Chemistry 1A, 1B; Physics 2B. Recommended: Physiology (Animal) 100B. Comparison of the physiology of invertebrate organ systems. To be offered in odd-numbered years. Miss Kammer

142L. Invertebrate Physiology Laboratory. (4) III.

Laboratory—12 hours. Prerequisite: course 142 (may be taken concurrently). Studies and experiments on the physiological mechanisms of invertebrate organ systems. Miss Kammer

Miss Kammer

144. Oceanography. (4) II.

Lecture—3 hours; laboratory—3 hours. Prerequisite: Biology 1. Biological, chemical, physical, and geological aspects of the marine environment. Consideration of biological communities, productivity, the distribution of currents and tides, the origin of ocean basins, and marine sedimentation.

Mr. Goldman

147. Zoogeography. (3) I.

Lecture—3 hours. Prerequisite: course 2 or Entomology 1. Movements of terrestrial animals. The role of geologic, climatic, and biologic changes in the geographic distribution of animals.

Mr. Jameson

148. Animal Phylogeny and Evolution. (5) II.

Lecture—5 hours. Prerequisite: course 2 or Entomology 1. Recommended: course 147 and Genetics 100. The origins and relationships of the major groups of animals, with emphasis on the analysis of variation and the mechanics of evolutionary change.

Mr. Rudd

155. Animal Social Systems. (4) I.

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 2. The behavioral basis, organization, and evolution of animal societies.

Mr. Hamilton

158. Introduction to Physico-Chemical Biology.

(4) I.

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2; Physics 2B; Chemistry 8. Recommended: Mathematics 9B or 16B. The application of physico-chemical principles to the study of living organisms.

Mr. Baskin

160. Invertebrate Neurophysiology. (5) III.

Lecture—2 hours; discussion—1 hour; laboratory—6 hours. Prerequisite: an upper division course in physiology or physico-chemical biology or invertebrate zoology. Comparisons of the nervous systems of invertebrates with emphasis on nervous processes related to behavior. To be given in even-numbered years. Miss Kammer

194H. Special Study for Honors Students.

(2–5) I, II, III.

The Staff

195H. Honors Thesis in Zoology. (2) I, II, III.

Prerequisite: course 194H and second quarter senior standing. A comprehensive paper incorporating the studies undertaken in 194H.

The Staff

199. Special Study for Advanced Undergraduates.

(1–5) I, II, III.

The Staff

Graduate Courses**202. Biomathematics. (4) II.**

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16B and 105B; or consent of instructor. Mathematical aspects of physiology, ecology, and epidemiology; development and testing of models; mathematical description of biological systems; measurement, analysis, simulation and optimization in biology. Offered in odd-numbered years.

Mr. Watt

223. Seminar in Fisheries Management. (2) III.

Seminar—2 hours. Prerequisite: course 116; Mathematics 16B, 105B. Analysis of fish population problems, including review of recent research. Offered in even-numbered years.

Mr. Watt

230. Advanced Cytology. (2) II.

Seminar—2 hours. Prerequisite: consent of instructor. Topics of current interest in the ultra-structure of cells.

Mr. Wolfe

231. The Ultrastructure of Self-Reproducing Systems.

(3) III.

Lecture—3 hours. Recommended: courses in cytology, cell biology or cytogenetics and Genetics 100. Structure and function of self-reproducing subcellular organelles illustrated primarily in metazoan animals.

Mr. Wolfe

***240. Muscle Physiology. (4) III.**

Lecture—3 hours; laboratory—3 hours. Prerequisite: an upper division course in animal physiology; Mathematics 1B or 16B; or consent of instructor. The physical and chemical aspects of muscle function.

Mr. Baskin

250. Recent Developments in Zoology. (1) II.

Seminar—1 hour. Prerequisite: graduate standing in Zoology.

The Staff

* Not to be given, 1966–67.

287. Seminar in Animal Behavior. (1) I, II.

Seminar—1 hour. Prerequisite: consent of instructor. Reports and discussion on the principles and recent developments in invertebrate and vertebrate animal behavior.

Mr. Hamilton, Mr. Spieth

288. Seminar in Physicochemical Biology. (1) III.

Seminar—1 hour. Prerequisite: consent of the instructor. Discussion of recent literature on the physicochemical aspects of the organization and function of living systems. Physicochemical properties on the molecular and cellular levels will be considered. Mr. Baskin, Mr. Wolfe

289. Seminar in Analysis of Vertebrate Structure. (1) I.

Seminar—1 hour. Prerequisite: course 106A. Recommended: course 106B. Mr. Hildebrand

291. Seminar in Protozoology. (2) I.

Seminar—2 hours. Prerequisite: course 110; or consent of instructor. Mr. Rosenberg

292. Seminar in Development. (1) II.

Seminar—1 hour. Prerequisite: consent of instructor. Reports and discussion on embryology, morphogenesis, and developmental mechanisms.

Mr. Barrett

293. Seminar in Invertebrate Zoology. (1) I.

Seminar—1 hour. Prerequisite: course 112; or consent of instructor.

Miss Kammer, Mr. Miller

294. Seminar in Animal Ecology. (1) I.

Seminar—1 hour. Prerequisite: course 125; or consent of instructor. Mr. Rudd, Mr. Salt

295. Seminar in Limnology. (2) II.

Seminar—2 hours. Prerequisite: course 140; or consent of instructor. Recent developments in limnology and related advances in oceanography.

Mr. Goldman

297. Seminar on Systematic Zoology and Evolution.

(1) III.

Seminar—1 hour. Prerequisite: consent of instructor. Principles of animal classification, speciation, and the evolution of higher categories; emphasis on modern concepts and pertinent contributions from the fields of genetics and paleontology.

Mr. Rudd

299. Research. (1-9) I, II, III.

The Staff

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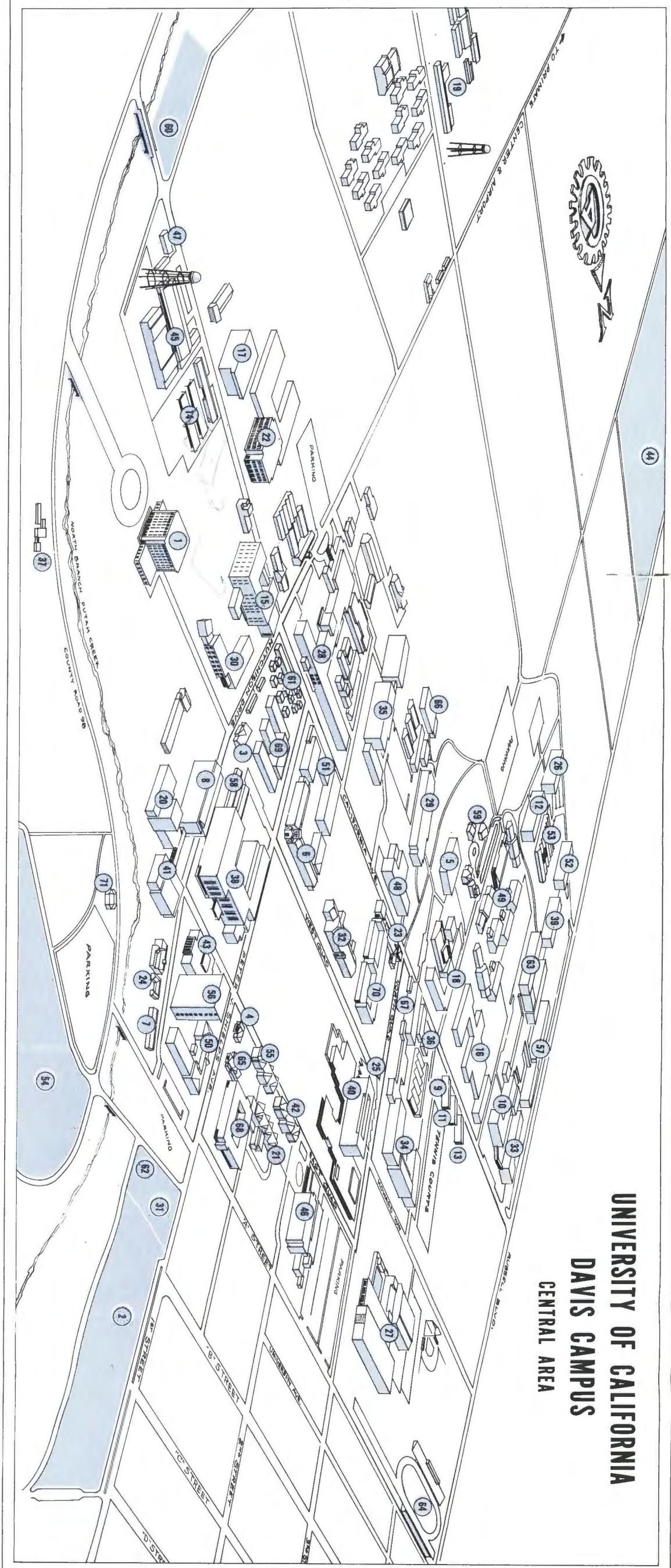
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CAMPUS MAP

UNIVERSITY OF CALIFORNIA

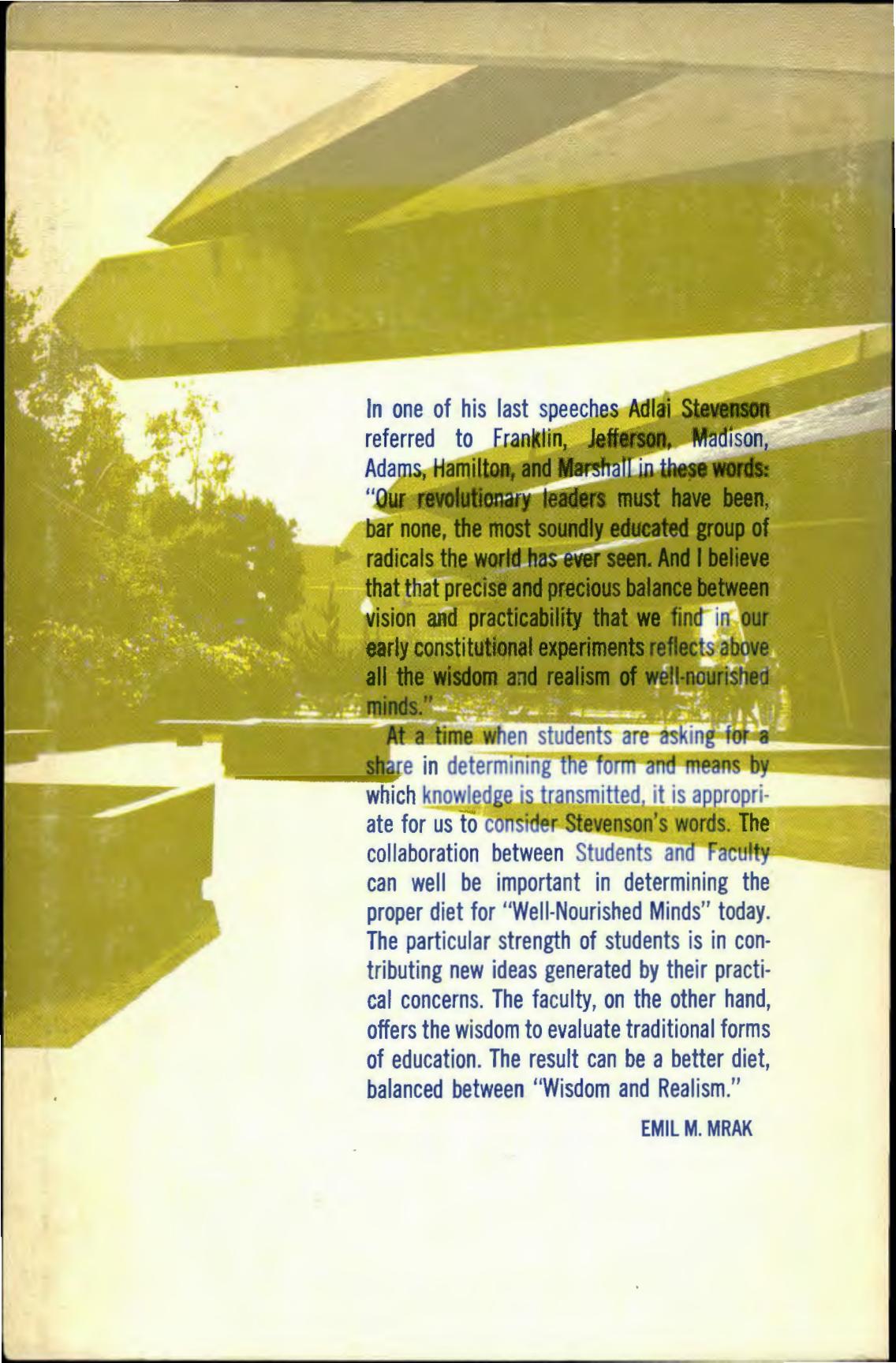
DAVIS CAMPUS

CENTRAL AREA



- | | | | | | |
|---------------------------|---------------------------------|----------------------------|---|---------------------------|----------------------------------|
| 1 Administration Building | 13 Cedar Hall | 25 Freeborn Hall | 37 Landscape Horticulture Field Station | 48 Poultry Husbandry | 60 Temporary Buildings (29-35) |
| 2 Aggie Villa | 14 Central Garage | 26 Gilmore Hall | 38 Library | 49 Regan Hall | 61 Temporary Buildings (100-115) |
| 3 Agricultural Education | 15 Chemistry Building | 27 Gymnasium | 39 Malcolm Hall | 50 Roadhouse Hall | 62 Temporary Buildings (116-124) |
| 4 Agricultural Extension | 16 Cowell Student Health Center | 28 Haring Hall | 40 Memorial Union | 51 Robbins Hall | 63 Titus Hall |
| 5 Agricultural Toxicology | 17 Crocker Nuclear Laboratory | 29 Hoagland Hall | 41 Music Building | 52 Ryerson Hall | 64 Toomey Field |
| 6 Animal Science | 18 Cruess Hall | 30 Home Economics Building | 42 North Hall | 53 Segundo Hall | 65 University House |
| 7 Art Building | 19 Dairy Cattle Research | 31 Home Management | 43 Olson Hall | 54 Solano Park Apartments | 66 Vegetable Crops Facility |
| 8 Art Building | 20 Dramatic Art Building | 32 Horticulture Building | 55 South Hall | | 67 Veihmeyer Hall |
| 9 Ash Hall | 21 East Hall | 33 Hughes Hall | 56 Sproul Hall | | 68 Voorhees Hall |
| 10 Beckett Hall | 22 Engineering Building | 34 Hunt Hall | 57 Struve Hall | | 69 Walker Engineering Building |
| 11 Birch Hall | 23 Entomology Laboratory | 35 Hutchison Hall | 58 Temporary Buildings (5-6) | | 70 Wickson Hall |
| 12 Bixby Hall | 24 Fire House | 36 Irrigation Laboratory | 59 Temporary Buildings (13-16) | | 71 Wyatt Pavilion Theatre |





In one of his last speeches Adlai Stevenson referred to Franklin, Jefferson, Madison, Adams, Hamilton, and Marshall in these words: "Our revolutionary leaders must have been, bar none, the most soundly educated group of radicals the world has ever seen. And I believe that that precise and precious balance between vision and practicability that we find in our early constitutional experiments reflects above all the wisdom and realism of well-nourished minds."

At a time when students are asking for a share in determining the form and means by which knowledge is transmitted, it is appropriate for us to consider Stevenson's words. The collaboration between Students and Faculty can well be important in determining the proper diet for "Well-Nourished Minds" today. The particular strength of students is in contributing new ideas generated by their practical concerns. The faculty, on the other hand, offers the wisdom to evaluate traditional forms of education. The result can be a better diet, balanced between "Wisdom and Realism."

EMIL M. MRAK